service. In one embodiment, a software data structure may be shared between a queue **524a-b**, **525a-b** and a queueendpoint **540a-c** that indicates a status as to whether or not a particular queue needs to be serviced by a queueendpoint. The structure may be local to the queueendpoint and may be exposed from the queueendpoint to the queues. The software structure may contain a flag to indicate, for example, if a queue is congested, if a queue is not congested, if a queue is empty, or if a queue is full.

With Java or Java-like languages, objects may be synchronized by using synchronized methods. Although Java or Java-like languages provide monitors that block threads to prevent more than one thread from entering an object and, thus, potentially corrupting data, the DPE **501** provides interrupt disabling and enabling mechanism by which a thread may be granted exclusive access to an object. The DPE **501** ensures that information may be transferred between layers in a deterministic manner without needing to trap on instructions (i.e., by not using monitors). In one embodiment, all interrupts are disabled.

The DPE **501** relies on a set of classes that enable the mechanism to pass bocks **B** of data across the thread boundary of a layer. The present invention does so because putting or taking a frame **526a-b, 527a-b, 528** from a queue **524a-b**, **525a-b** may occur quickly. In comparison, if synchronized methods were to be used to manage contention among queues attempting to enter a monitor of a layer, the contentions that could occur could consume a relatively large amount of time and latency would not be guaranteed (i.e., entering an monitor means locking an object).

In the DPE **501**, before a frame is put into a queue **524a-b**, **525a-b**, interrupts are disabled, and once a frame has been put into a queue, interrupts are restored. Before interrupts are disabled, however, a queue notifies a respective queueendpoint that something is happening. Upon notification by a queue, a queuendpoint may enable and disable interrupts by calling a method called kernel.disable.interrupts-kernel.enable.interrupts. At load time a class loader may detect calls to kernel.disable.interrupts-kernel.enable.interrupts methods. When found, invoke instructions that call those methods are replaced by the loader with a disableInterrupt and enableInterrupt opcode (and 2 nop opcodes) to fully replace a 3 byte invoke instruction. By doing so, an invoke sequence that typically would take 30 to 100 clock cycles may be replaced by a process that is performed in about 4 clock cycles. By disabling interrupts with kernel.disable.interrupts, latency is guaranteed, whereas, when entering a monitor, latency cannot be guaranteed. As compared to using monitors, kernel.disable.interrupts-kernel.enable.interrupts

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may be 10 to 50 times faster in guaranteeing exclusive access to an object.

Because some protocols using the DPE **501** may sometimes operate under realtime constraints, they cannot allow well-known standard garbage collection techniques to interfere with their execution. Garbage collection allocates and frees memory continuously, thereby being unbounded. To ensure that operations occur in a predefined time window, the DPE **501** pre-allocates blocks **B** at startup and keeps track of them in a free list **529**. Memory may be divided and allocated into fixed size blocks **B** at start-up. In one embodiment, the memory is divided into small blocks **B** to avoid memory fragmentation. After creation, frames **526a-b, 527a-b, 528** may be consumed by the protocol stack **422**, after which blocks **B** of memory may be recycled. The size of the queues **524a-b, 525a-b** may be determined at startup by the protocol stack **422** so that any one layer **523a-c** does not consume too many of the blocks **B** in the free list **529** and so that there are enough free blocks **B** for other layers, frames, or queues. Because all blocks **B** are statically pre-allocated in the freelist **529**, with the present invention garbage collection need not be relied upon to manage blocks of memory. After startup, because the DPE **501** includes a closed reference to all its objects and doesn't have to allocate objects, for example blocks **B**, and because the DPE's threads operate at a higher priority than the garbage collector thread, it may operate independently and asynchronously of garbage collection.

The DPE **501** buffers information transferred between a source and destination and allows information to be passed by one or more queues **524a-b, 525a-b** without having to copy the information, thereby freeing up bottlenecks to the processing of the information. Each layer **523a-c** may process the information as needed without having to copy or recopy the information. Once information is allocated to a block **B**, it may remain in the memory location defining the block. Each layer **523a-c** may add or remove headers and trailers from frames **526a-b, 527a-b, 528**, as well as remove, add, modify blocks **B** in a frame through methods which are part of the Frame class instantiated in the layers **523a**-c. Once information in an output **530** or input **531** stream is copied to a block **B**, it may be processed from that block **B** throughout the layers **523a-c** of protocol stack **422**, then streamed out of the block **B** to an application or other software or device. For example, in an input stream direction, information from a baseband circuit **307** needs be copied to a memory location only once before use by an application, the protocol stack **422**, or other software.

Because in the DPE **501** different layers and their threads may read and write the same queue and, thus, the same frame and block, methods and blocks of code which access the memory

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location defining the queue, frame, or block would normally need remain synchronized to guarantee coherency of the DPE **501** when making read-modify-write operations to the memory location. As discussed earlier, synchronization is the process in Java that allows only one thread at a time to run a method or a block of code on a given instance. By providing an alternative to Java or Java-like synchronization, i.e., by disabling interrupts, the DPE **501** provides that if different threads do read-modify write operations on the same memory location, the information in the memory location, for example, global variables, does not get corrupted.

As referenced below, it will be understood that the conceptual entities described above may be implemented as software data structures. Hereafter, conceptual entities (for example, queue) are distinguished from software data structures (for example, Queue) by capitalization of the first letter of their respective descriptor. Although such distinctions are provided below, it is understood that those skilled in the art may, as needed, when viewing the Figures and description herein, interpret the software data structures and corresponding physical or conceptual entities interchangeably.

Referring now to Figures 6a-e, there are seen representations of Block, Frame, and Queue data structures. Referring now to Figures 6a, a frame may comprise a plurality of blocks **B**, each block comprising a fixed block size. A block **B** may comprise a completely full block of information or a partially full block of information. As described in Figure 13 below, a byte array comprising a contiguous portion of memory may be an element of Block. A partially filled block **B** may be referenced by a start and end offset. As illustrated in Figure 6b, after processing and reassembly of blocks **B** of a frame by a layer, a frame may no longer comprise contiguous information.

A frame may comprise multiple blocks **B** linked together by a linked list. The first block **B** in a block chain may reference the frame. Leading and trailing empty blocks **B** may be removed from a frame as needed. The number of blocks **B** in a frame may therefore change as processed by different layers. Adding or removing information to or from a block **B** may be implemented through Block class methods and Block class method data structures. In one embodiment, Block class may comprise the following variables:

- Private. Start offset of a payload in a block **B**. The payload can start anywhere in a block provided it is not after the end of the payload. This allows unused space at the start of the block in a frame.
- Private. End offset of payload in a block **B**. The payload can end anywhere in a block

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provided it is not before the start of the payload. This allows unused space at the end of the block in a frame.

- Private. Payload in a block **B**. The payload of a contiguous array of bytes in a block.
- Private. Next block **B** within in a frame. Null if the block is the last block in the frame. This reference may also be used to link blocks **B** in the free list of blocks.
- Private. Last block **B** in a frame if the first block of a frame, null otherwise. This variable may serve two purposes. First it allows efficient access to the tail of the frame. Second, it allows delimiting frames if multiple frames are chained together.

As illustrated in Figure 6c, information in a block **B** is at the end of the block. The information could also be at the start of the block. The first time information is written to a block **B** determines to which end of the block it will be put. A put to tail puts information at the start, and a put to head puts information at the end. As represented by the 3 blocks **B** comprising the frame in Figure 6d, information may be added before or after a block **B**.

Referring now to Figure 6e, and any other Figures as needed, a representation of a Queue class data structure is shown. Queue data structures may be used to manage frames. When a layer has finished processing a frame, an executing thread may put the frame onto a queue to make the frame available for processing by another layer, application, or hardware. The DPE **501** kernal.disableinterrupts-kernal.enableinterrupts classes, which disable and enable interrupts when information is queued onto or from a queue, in effect provide that synchronization occurs on the threads. A protocol stack may define more than one queue for each layer. The blocks **B** of a frame may be linked together using the next block reference within Block class and the last block references may be used to delimit the frames.

In one embodiment, member variables of the Queue Class may include:

- Private. Maximum size of the queue in blocks.
- Private. Flow control low threshold in blocks.
- Private. Flow control high threshold in blocks.
- Private. Flow control flag.
- Private. First block in the queue.
- Private. Last block in the queue.
- Private. Consumer QueueEndpoint.
- Private. Producer QueueEndpoint.

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Putting to and getting from queues can be a blocking or non-blocking event for threads as specified in a parameter in enqueue() and dequeue() methods of the Queue class that take frames on and off a queue. If non-blocking has been specified and a queue is empty before a get, then a null block reference may be returned. If non-blocking has been specified and a queue is full before a put, then a status of false may be returned. If the access to the queue is blocking, then the wait will always have a loop around it, and a notify all instruction may be used. Waits and notifies can be for queue empty / full or for flow control. A thread may be unblocked if its condition is satisfied, for example, queue-not-empty if waiting on an empty queue and queue-not-full if waiting to put to a full queue.

Referring now to Figures 7a-b, there are seen block diagram representations of subsystems of the DPE implemented as a memory management subsystem, and a frame processing subsystem, respectively. With reference to the software data structures and description above, the subsystems may be implemented with the software data structures disclosed herein, including, but not limited to, Block, Frame, Queue, FreeList, QueueEndpoint. Figure 7a shows a representation of a memory management subsystem responsible for the exchange of Block handles/pointers between Queue, FreeList, and Frame. Figure 7b shows a representation of a processing subsystem responsible for the functions of inspecting a frame, modifying a frame, and forwarding a frame with Frame.

Referring now to Figures 7a and 8, and any other Figures as needed, there are seen representations of how memory management may effectuated by using a FreeList data structure that operates independent of a garbage collection mechanism, whereby Block handles/pointers are exchanged in a closed loop between FreeList, Frames, and Queue data structures, and such that the DPE **501** may operate under real-time constraints without losing reference to the blocks **B**.

The Block data structure is used to transfer basic units of information (i.e., blocks **B**). At any point in time, a block **B** uniquely belongs either to FreeList if it is free, Frame if it is currently held by a protocol layer, or Queue if it is currently across a thread boundary. More than one block **B** may be chained together into a block chain to form a frame. An instance of the Frame class data structure is a container class for Block or a chain of Blocks. More than one frame may also be chained together. The Block data structure may comprise two fields to point to the next block **B** and the last block **B** in a block chain. The next block **B** after the last block of a block chain indicates the start of the next block chain. A block chain may comprise a payload of information embodied

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as information to be transported and a header that identifies what the information is or what to do with it.

Referring now to Figures 7b, and any other Figures as needed, Queue may be modified with QueueEndpoint. Blocks **B** in a block chain may be freed or allocated to or from FreeList with QueueEndpoint. All blocks **B** to be used are allocated at system startup inside FreeList, allowing the memory for chaining blocks **B** to be available in real time and not subject to garbage collection.

The Queue data structure may be used to transfer a block chain from one thread to another in a FIFO manner. Queue exchanges Blocks with Frame by moving a reference to the first block of a chain of Blocks from Frame to Queue or vice versa. Queue is tied to two instances of QueueEndpoints.

The Frame data structure comprises a basic container class that allows protocols to inspect, modify, and forward block chains. Frame may be thought of as an add/drop MUX for blocks **B**. All block chain manipulations may be done through the Frame data structure in order to guarantee integrity of the blocks **B**. The Frame data structure abstracts Block operations from the protocol stack. To process information provided by more than one frame simultaneously, Frame instances are private members of QueueEndpoint instances.

Unlike instances of Queue, which may contain multiple chains of Blocks, instances of Frame may contain one chain of Blocks. All frames and queues may be allocated at startup, just like blocks; however, unlike blocks **B** that are allocated as actual memory, Frame and Queue may be instantiated with a null handle that can be used later to point to a chain of blocks.

FreeList comprises a container class for free blocks **B**. FreeList comprises a chain of all free blocks **B**. There is typically only one FreeList per protocol stack **422**. Operations on instances of Frame that allocate or release blocks **B** interact with the FreeList. All blocks **B** within the freelist preferably have the same size. The FreeList may cover all layers of a protocol stack, from a physical hardware layer to an application layer. FreeList may be used when allocating, freeing, or adding information to/from a frame. In one embodiment, synchronization may be provided on the instance of FreeList. Every time a block **B** crosses a thread boundary, interrupts are disabled and then enabled, for example, every time a block **B** goes into the freelist or a queue, or a queuendpoint, layer, or thread boundary is crossed.

Referring to Figure 8, and any other Figures as needed, there is seen a representation of an illustration of multiple queues interacting with queueendpoint threads. As described herein,

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because a thread can be used to service multiple queues, on both transmit and receive, and because the Java threading model allows threads to wait on one and only one monitor, a queueendpoint preferably waits on one object (optionally itself) and all queues notify that object (optimally the queueendpoint).

Referring now to Figures 7b and 9, and any other Figures as needed, there is seen a frame processing subsystem responsible for dequeing a frame, inspecting its header, and consuming or forwarding the contents of a frame. A frame may be modified before being forwarded. InnerQueueEndpoint holds handles to instances of Queue, which may contain instances of Frame. InnerQueueEndpoint comprises its own thread to process Frame instances originating from Queue instances. Once it has completed its tasks, an InnerQueueEndpoint thread may wait for something to do. Notifications come from instances of Queue, which notify a destination QueueEndpoint that it just changed from empty to not empty, or a source QueueEndpoint that it crossed a low threshold or it that it changed from congested to not congested.

A queue may be bounded by two queueendpoints, and may be serviced by different threads of execution. Instances of Queue may provide an interface for notification that can be used by QueueEndpoint. Instances of Queue may also hold a reference to both queueendpoints, which the DPE **501** can use for notifications when queue events occur. Queue may specify control thresholds (hi-low) as well as a maximum number of blocks **B** to help to debug for conditions that could deplete the freelist. Flow control ensures that the other end of a communication path is notified if an end can't keep up, i.e., if a queue is filling up it can be emptied. InnerQueueEndpoint is responsible for creating, processing, or terminating block chains.

QueueEndpoint class may contain two fields "queueCongested" and "queueNotEmpty". QueueEndpoint may comprise an array with which it can readily access queueCongested and queueNotEmpty, where the status elements of the array are shared with respective queues. A queue may set one of these fields, which may be used to notify a queueendpoint that it has a reason to inspect the queue. QueueEndpoint allows optimizations of queue operations, for example, queueendpoints are able to determine which queue needs to be serviced from notifications provided by a queue. The DPE **501** provides a means by which every queue need not be polled to see if there is something to do based on a queue event. Previously, with standard Java techniques, to see if a queue would be empty or full, a query would have been made through a series of synchronized method calls, which would implicate the previously discussed contention

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and latency issues. By making decisions through an internal data structure, method calls may be replaced by direct field access of data structures.

Referring now to Figure 10, and any other Figures as needed, there is seen a representation of a hardware interface to the DPE. At the hardware level, transfers of information to/from a receive or transmit FIFO buffer of a baseband circuit **307** or other hardware used to transfer information may occur through Interrupt Service Routines (ISRs) and Direct Memory Access (DMA) requests that interface to the DPE **501** through the Block data structure. At the lowest hardware level, a framer may operate on the information from the FIFO. The framer may comprise hardware or software. In one embodiment, a software framer comprises interrupt service threads that are activated by hardware interrupts when information is received by the FIFO from input **531** or output **530** streams. The Frame data structure is filled or emptied with information from an output **530** or input **531**stream at the hardware level by the framer in block **B** sized increments. The queueendpoint closest to the hardware services hardware interrupts and DMA requests from peripherals by a QueueEndpoint interface to the transmit and receive buffers **312, 311** which may be accessed by the software support layer's kernel. QueueEndpoint registers to a particular hardware interrupt by making itself known to the kernel. QueueEndpoint is notified by the interrupts it is registered to. The kernel has a reference to a QueueEndpoint in its interrupt table, which is used to notify a thread whenever a corresponding interrupt occurs.

Referring now to Figure 11 and other Figures as needed there is seen an embodiment as described herein. Circuit **300** may utilize a software protocol stack **422** and DPE **501,** as described previously herein, when communicating with peripherals or devices. In one embodiment, the communications may occur over a baseband circuit **307** that is compliant with a Bluetooth™ communications protocol. Bluetooth™ is available form the Bluetooth Special Interest Group (SIG) founded by Ericsson, IBM, Intel, Lucent, Microsoft, Motorola, Nokia, and Toshiba, and is available as of this writing at www.bluetooth.com/developer/specification/specification.asp. It is understood that although the specifications for the Bluetooth communications protocol may change from time to time, such changes would still be within the scope and spirit of the present invention. Furthermore, other wireless communications protocols are within the scope and skill of the present invention as well as those skilled in the art, including, 802.11, HomeRF, IrDA, CDMA, GSM, HDR, and so called 3rd Generation wireless protocols such as those defined in the Third Generation Partnership Project (3GPP). Although described above in a wireless context, communications with

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circuit **300** may also occur using wired communication protocols such as TCP/IP, which are also within the scope of the present invention. In other embodiments, wireless or wired data transfer may be facilitated as ISDN, Ethernet, and Cable Modem data transfers. In one embodiment, a radio module **308** may be used to provide RF wireless capability to baseband circuit **307**. In one embodiment, radio module **308** may be included as part of the baseband circuit **307**, or may be external to it. Bluetooth technology is intended to have low power consumption and utilize a small memory footprint, and is, thus, well suited for small resource constrained wireless devices. In one embodiment, circuit **300** may include baseband circuit **307** and processor core **302** functionality on one chip die to conserve power and reduce manufacturing costs. In one embodiment, the circuit **300** may include the baseband circuit **307**, processor core **302**, and radio module **308** on one chip die.

In the prior art, access to peripheral's/device's functionality may be accomplished through lower level languages. For example, in previously existing hardware accelerators that implement Java, Java "native methods" (JNI) require an interface written in, for example, a C programming language, before the native methods can access peripheral functionalities. In contrast to the prior art, the embodiments described herein provide applications or other software residing on or off circuit **300** direct access to the functionality and features of peripherals or devices, for example, access to the data reception/transmission functionality of baseband circuit **307**.

In one embodiment, memory **362** of circuit **300** may be embodied as any of a number of memory types, for example: a SRAM memory **309** and/or a Flash memory **304**. In one embodiment, the memory **362** may be defined by an address space, the address space comprising a plurality of locations. In one embodiment, the software data structures described previously herein (indicated generally by descriptor **310**) may be mapped to the plurality of locations. In one embodiment, the software data structures **310** may span a contiguous address space of the memory **362**. Data received by baseband circuit **307** may be tied to the data structures **310** and may be accessed or used by an application program or other software. In one embodiment data may be accessed at an application layer program level through API **419.** As described herein, in one embodiment the software data structures **310** may comprise objects. In one embodiment, the objects may comprise Java objects or Java-like objects. In one embodiment, the data structures **310** may comprise one or more Queues, Frames, Blocks, ByteArrays and other software data structures as described herein.

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In one embodiment, circuit **300** may comprise a receive **312** (Rx) and transmit **311** (Tx) buffer. In one embodiment, the receive **312** (Rx) and transmit **311** (Tx) buffers may be embodied as part of the baseband circuit **307**. As described further herein, information residing in the baseband receive **312** (Rx) and transmit **311** (Tx) buffers may be tied to the data structures **310** with minimal software intervention and minimal physical copying of data, thereby eliminating the need for time consuming translations of the data between the baseband circuit **307** and applications or other software. In one embodiment, an application or other software may utilize the received information directly as stored in the locations in memory **362**. In one embodiment, the stored information may comprise byte-codes. In one embodiment, the byte-codes may comprise Java or Java-like byte-codes. In other embodiments, it is understood that information as described herein is not limited to byte-codes, but may also include other data, for example, bytes, words, multi-bytes, and information streams to be processed and displayed to a user, for example, an information stream such as an audio data stream, or database access results. In one embodiment, the information may comprise a binary executable file (binary representations of application programs) that may be executed by processor core **302.** Unlike prior art solutions, the embodiments described herein enable transparent, direct, and dynamic transfer of data, reducing the number of times the information needs to be copied/recopied before utilization or execution by applications, the protocol stack, other software, and/or the processor core **302.**

As previously described, the software data structures **310** in memory **362** may be constructs representing one or more blocks **B** in queues **524a-b, 525a-b** that act as FIFOs for the information streams **530**, **531**. Data or information received by radio module **308** may be communicated to the baseband circuit **307** from where it may be transferred from the receive **312** buffer to a queue **524a-b, 525a-b** by the DMA controller **305**; or may originate in a queue **524a-b, 525a-b** from where it may be transferred by the DMA controller **305** to the transmit buffer **311** and from the transmit buffer to the radio module **308** for transmission. Setup of a transfer of data may rely on low level software interaction, with "low level software" referring to software instructions used to control the circuit **300**, including, the processor core **302**, the DMA controller **305**, and the interrupt request IRQ controller **306**. Preferably, no other software interaction need occur during a DMA transfer of data between baseband circuit **307** and memory **362**. From the point of view of the DMA controller **305**, data in a block **B** of a queue **524a-b, 525a-b** is in memory **362**, and the baseband circuit **307** is a peripheral. DMA transfers may occur without software intervention after

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the low level software specifies a start address, a number of bytes to transfer, a peripheral, and a direction. Thereafter, the DMA controller **305** may fill up or empty a receive- or transmit- buffer when needed until a number of units of data to transfer has been reached. Events requiring the attention of low- level software control may be identified by an IRQ request generated by IRQ controller **306**. Type of events, that may generate an IRQ request include: the reception of a control packet, the reception of the first fragment of a new packet of data, and the completion of a DMA transfer (number of bytes to transfer has been reached).

In a receive mode, the baseband receive buffer **312** may hold data received by the radio module **308** until needed. In one embodiment, circuit **300** may comprise a framer **313**. In one embodiment, the framer **313** may be embodied as hardware of the baseband circuit **307** and/or may comprise part of the low level software. The framer **313** may be used to detect the occurrence of events, which may include, the reception of a control packet or a first fragment of a new packet of data in the receive buffer **312**. Upon detection, the framer **313** may generate an IRQ request. In one embodiment, when receiving, an application or other software in memory **362** may use high level software protocols to listen to a peer application, for example, a web server application on an external device acting as an access point for communicating over a Bluetooth link to the baseband circuit **307**. Low- level software routines may be used to set up a data transfer path between the baseband circuit **307** and the peer application. Data received from a peer application may comprise packets, which may be received in fragments. The framer **313** may inspect the header of a fragment to determine how to handle it. In the case of a control packet, low- level software may perform control functions such as establishing or tearing down connections indicated by the start or end of a data packet. If a fragment is marked as a first fragment of a packet, the framer **313** may generate an interrupt allowing the low level software to allocate the fragment in an input stream to a block **B**. The framer may then issue DMA **305** requests to transfer all the fragments of the packet from the baseband receive buffer **312** to the same block **B**. If a block in the queue **525a-b** fills up, the DMA **305** may generate an interrupt and the low level software may allocate another block **B** to a queue. Upon reception of another fragment, marked as a first fragment of another packet, the framer **312** may generate another interrupt to transfer the data to another block **B** in the same queue.

In a transmit mode, the baseband circuit **307** transmit buffer **311** may receive data from an application or other software executing under control of the processor core **302**, and when

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received, may send the data to the radio module **308** in its entirety or in chunks at every transmit opportunity. In a time division multiplexed system, a transmit time slot may be viewed as a transmit opportunity. When a queue **524a-b,** in an output stream receives a block **B** of data from an application or other software, the low level software may configure the DMA **305** and tie that queue to the baseband transmit buffer **311**. The baseband transmit buffer **311**, if empty, may issue a request to get filled up by the DMA **305**. Every time the baseband transmit buffer **311** is not full or reaches a predetermined watermark, it may issue another DMA request until the first block **B** that was allocated in the queue in the transmit chain has been completely transferred to the buffer, at which point the DMA **305** may request an interrupt. The low level software may service the interrupt by providing the DMA **305** with another block **B** as filled with data from an application or other software. In one embodiment, the processor core **302** may be switched into a power saving mode between reception or transmission of two data packets. In one embodiment, when transmitting, a web application program may communicate using high level software protocols via baseband circuit **307** with other applications, software, or peripherals or devices, for example, a web server application located on an external device. Layered on top of this communication may be a high level HTTP protocol. In one embodiment, the external device may be a mobile wireless device or an access point providing a wireless link to web servers, the Internet, other data networks, service provider, or another wireless device.

In one embodiment, the memory **362** may comprise a Flash memory **304**, which could be used to store application programs, VM executive, or APIs. The contents of the Flash memory **304** may be executed directly or loaded by a boot loader into RAM **309** at boot-up. In one embodiment, after startup, an updated application, VM, and/or API provided by an external radio module **308** could be uploaded to RAM **309**. After a step of verifying the operability of the uploaded software, the updated software could be stored to the Flash memory **304** for subsequent use (from RAM or Flash memory) upon subsequent boot-up. In one embodiment, updated applications, software, APIs, or enhancements to the VM may be stored in Flash memory or RAM for immediate use or later use without a boot-up step.

Referring to Figure 12 and other Figures as needed, there is seen represented an information transfer into a software data structure. In one embodiment, circuit **300** and a DMA **305** are configured to allow the transfer of data from a peripheral or device directly into a software data structure. Once data is transferred into the data structure **310**, it may be utilized by an application

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program, other software, or hardware without any further movement of the data from its location in memory **362**. For example, if the data comprises Java or Java-like byte-codes, the byte-codes may be executed directly from the their location in memory. By reducing or eliminating the transfers of data before use of the data, fewer processor instructions may be executed, less power may be consumed, and circuit **300** operation may be optimized. In one embodiment, a data transfer may occur in the following steps:

1. A packet of data from a peripheral or device may be received and stored in receive buffer **312** of a device or peripheral. The peripheral or device may comprise an on or off circuit **300** peripheral (on circuit shown). In one embodiment, the peripheral or device may comprise baseband circuit **307**.
2. Reception of data in the receive buffer **312** may generate a DMA **305** request. The DMA request may flush receive buffer **312** directly into data structure **391**.
3. After the DMA **305** transfer of the data, the processor core **302** may be notified to hand the data off to an application or other software.

Although a DMA **305** is described herein in one embodiment as being used to control the direct transfer and execution of data from a peripheral or device with a minimal number of intervening processor core **302** instruction steps, it is understood that the DMA **305** comprises one possible means for transferring of data to the memory, and that other possible physical methods of data transfer between a peripheral or device and the memory **362** could be implemented by those skilled in the art in accordance with the description provided herein. One such embodiment could make use of an instruction execution means, for example, the processor core **302**, to execute instructions to perform a read of data provided by a peripheral or device and to store the data temporarily prior to writing the data to the memory **362,** for example, in a programmable register in the processor core **302.** In one embodiment, the programmable register could also be used to write data directly to a data structure **310** in memory **362** to effectuate operations using the data in as few processor instruction steps as possible. In contrast to the DMA embodiment described previously, in which large blocks of data may be transferred to memory **362** with one DMA instruction, in the this embodiment, the processor core **302** may need to execute two instructions per unit of data stored in the peripheral or device receive buffer **312**, for example, per word. The two instructions may include an instruction to read the unit of data from the peripheral or device and an instruction to write the unit of data from the temporary position to memory **302**. Although,

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compared to the DMA embodiment described above, two processor instructions per unit of data could consume more power and would use processor cycles that could be used for other processes, execution of two instructions, as described herein, is still fewer than the number of instructions that need to be executed by the prior art. For example, the methodology of Figure 2 requires the transfer of a unit of data from a peripheral or device to memory, including at least the following steps: a transfer of the data from the FIFO **198** to a register in the processor core **196**, a transfer of the data from the core to the receive buffer **192**, a transfer of the data from the buffer to the processor core **196**, and finally, a transfer of the data from the core into a Java object **191**, which would necessitate the execution of at least four processor instructions (read-write-read-write) per unit of data.

Referring to Figure 13 and other Figures as needed, there is seen an embodiment as described herein. A software data structure **391** may comprise a Block data structure, as described herein previously. In one embodiment, the Block data structure may comprise a Java or Java-like software data structure, for example, a Block object. In one embodiment, the Block object may comprise a ByteArray object. After instantiation, the Block object's handle/pointer may be referenced and saved to a FreeList data structure. The handle may be used to access the ByteArray object. With the ByteArray object, pushed to the top of the stack (TOS), the base address of the ByteArray object may be referenced by a pointer.

In one embodiment, the (TOS) value may be stored in a memory mapped DMA buffer base address register. To do so, circuit **300** may include registers that may be read and written using an extended byte-code instruction not normally supported by standard Java or Java-like virtual machine instruction sets, for example, with an instruction providing functionality similar to a PicoJava register store instruction. A ByteArray object of a Block object may be defined as comprising a predefined size, for example Byte[ ] a=new Byte [20] may set aside 20 contiguous byte-size memory locations for the ByteArray object. The predefined size may be written to a DMA "word count register" to specify how many transfers to conduct every time the DMA is triggered to service a peripheral or device, for example, the baseband circuit **307**. With one DMA channel dedicated to each peripheral or device, the word count register would need to be initialized only once, whereas the DMA buffer base address register would need to be modified for every new Block object, for example:

void Native setUpDMA(nameOfByteArray, sizeOfByteArray) {

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write nameOfByteArray to the DMA memory buffer register
write sizeOfByteArray to the DMA word count register
return
}

whereby a caller could call setUpDMA as follows:
setUpDMA(aByteArray, sizeOF(aByteArray))

In one embodiment, a ByteArray data structure may be set up to receive data from a peripheral or device in the following steps:

a-An application or other software **394** may obtain a handle of, or reference to, a Byte Array data in a current execution context as a local variable.

b-The handle may be pushed onto a stack **393**, for example, onto a stack cache or onto a stack in memory, thereby becoming the top of stack (TOS) element.

c-The TOS element may be written to an appropriate DMA **305** buffer base address register.

d-A peripheral or device **395** may initiate a DMA transfer, writing information to or from the peripheral or device directly into the pre-instantiated ByteArray data structure as specified by the DMA buffer base address register.

In one embodiment, circuit **300** may operate as or with a wireless device, a wired device, or a combination thereof. In one embodiment, the circuit **300** may be implemented to operate with or in a fixed device, for example a processor based device, computer, or the like, architectures of which are many, varied, and well known to those skilled in the art. In one embodiment, the circuit **300** may be implemented to work with or in a portable device, for example, a cellular phone or PDA, architectures of which are many, varied, and well known to those skilled in the art. In one embodiment, the circuit **300** may be included to function with and/or as part of an embedded device, architectures of which are many, varied, and well known to those skilled in the art.

While some embodiments described herein may be used with data comprising Java or Java-like data and byte-codes, and Java or Java-like objects or data structures including, but not limited, those used in J2SE, J2ME, PicoJava, PersonalJava and EmbeddedJava environments available from Sun Microsystems Inc, Palo Alto, it is understood that with appropriate modifications and alterations, the scope of the present invention encompasses embodiments that utilize other similar programming environments, codes, objects, and data structures, for example, C#

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programming language as part of the .NET and .NET compact framework, available from Microsoft Corporation Redmond, Washington; Binary Run-time Environment for Wireless (BREW) from Qualcomm Inc., San Diego; or the MicrochaiVM environment from Hewlett-Packard Corporation, Palo Alto, California. The Windows operating systems described herein are also not meant to be limiting, as other operating systems/environments may be contemplated for use with the present invention, for example, Unix, Macintosh OS, Linux, DOS, PalmOS, and Real Time Operating Systems (RTOS) available from manufacturers such as Acorn, Chorus, GeoWorks, Lucent Technologies, Microware, QNX, and WindRiver Systems, which may be utilized on a host and/or a target device. The operation of the processor and processor core described herein is also not meant to be limiting as other processor architectures may be contemplated for use with the present invention, for example, a RISC architecture, including, those available from ARM Limited or MIPS Technologies, Inc. which may or may not include associated Java or other semi-compiled/interpreted language acceleration mechanisms. Other wireless communications protocols and circuits, for example, HDR, DECT, iDEN, iMode, GSM, GPRS, EDGE, UMTS, CDMA, TDMA, WCDMA, CDMAone, CDMA2000, IS-95B, UWC-136, IMT-2000, IEEE 802.11, IEEE 802.15, WiFi, IrDA, HomeRF, 3GPP, and 3GPP2, and other wired communications protocols, for example, Ethernet, HomePNA, serial, USB, parallel, Firewire, and SCSI, all well known by those skilled in the art may also be within the scope of the present invention. The present invention should, thus, not be limited by the description contained herein, but by the claims that follow.

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What is claimed is:

1. An apparatus for utilizing information, comprising:
a memory, the memory comprising at least one data structure; and
a plurality of layers, each layer comprising at least one thread, each thread utilizing each data structure from the same portion of the memory.
2. The apparatus of claim 1, further comprising an application layer and a hardware layer, wherein the application layer comprises one of the plurality of layers, wherein the hardware layer comprises one of the plurality of layers, wherein the application layer and hardware layer utilize each data structure from the same portion of memory.
3. The apparatus of claim 2 wherein at least one of the plurality of layers comprises a real-time thread.
4. The apparatus of claim 1, wherein each data structure comprises a block object, wherein at least a portion of each block object is comprised of a contiguous portion of the memory.
5. The apparatus of claim 4, wherein the contiguous portion of the memory is defined a byte array.
6. The apparatus of claim 1, wherein the at least one data structure comprises a block object.
7. The apparatus of claim 1, further comprising a Java or Java-like virtual machine, wherein each thread comprises a Java or Java-like thread, wherein the Java or Java-like thread utilizes the same portion of memory independent of Java or Java-like monitors.
8. The apparatus of claim 1, the apparatus further comprising interrupt means for disabling interrupts; and a Java or Java-like virtual machine capable of executing each thread, wherein each thread utilizes the same portion of memory after the interrupts are disabled by the interrupt means.
9. The apparatus of claim 8,wherein all interrupts are disabled before each thread utilizes the same portion of memory.
10. The apparatus of claim 8, wherein the threads disable the interrupts via the interrupt means.
11. The apparatus of claim 1, wherein the information is received by the apparatus as streamed information, wherein each data structure is preallocated to the memory prior reception of the information.
12. The apparatus of claim 4, further comprising a freelist data structure, wherein each block object is preallocated to the freelist data structure by the apparatus prior to utilization of the information.
13. The apparatus of claim 12, the apparatus further comprising a protocol stack, the protocol stack residing in the memory, wherein the protocol stack preallocates each block to the freelist data structure.

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14. The apparatus of claim 1, the apparatus further comprising a virtual machine, the virtual machine utilizing a garbage collection mechanism, the virtual machine running each thread, each thread utilizing the same portion of the memory independent of the garbage collection mechanism.

15. The apparatus of claim 14, wherein the garbage collection mechanism comprises a thread, wherein the threads comprise Java-like threads, wherein the threads each comprise a priority, wherein the priority of the Java-like threads is higher than the priority of the garbage collection thread.

16. The apparatus of claim 1, wherein each data structure comprises a block object, and further comprising a freelist data structure and at least one queue data structure, each block object comprising a respective handle, wherein at any given time the respective handle belongs to the freelist data structure or a queue data structure.

17. The apparatus of claim 6, further comprising, at least one queue data structure; and at least one frame data structure, each frame data structure comprising an instance of one or more block objects, each block object comprising a respective handle, each queue data structure capable of holding an instance of at least one frame data structure, and each thread using the queue data structure to pass a block handle to another thread.

18. The apparatus of claim 1, further comprising a virtual machine, the virtual machine running each thread; at least one queueendpoint, each queueendpoint comprising at least one of the threads; and at least one queue, each queue comprising ends, each end bounded by a queueendpoint, each queue for holding each of data structures in a data path for use by each queuendpoint, wherein each queue notifies a respective queueendpoint when the queue needs to be serviced by the queueendpoint, wherein a queueendpoint passes instances of each data structure from one queue to another queue by a respective handle belonging to the data structure.

19. The apparatus of claim 18, wherein a queue notifies a respective queueendpoint upon the occurrence of a queue empty event, queue not empty event, queue congested event, or queue not congested event.

20. The apparatus of claim 19, further comprising a queue status data structure shared by a queue and a respective queueendpoint, wherein the queue sets a flag in the data status structure to notify the respective queueendpoint when the queue needs to be serviced.

21. An apparatus for utilizing a stream of information in a data path, comprising:

a memory, the memory comprising at least one data structure, each data structure comprising a pointer;

a plurality of layers, the data path comprising the plurality of layers, the stream of information comprising the at least one data structure, each layer utilizing each data structure via its pointer.

22. The apparatus of claim 21, wherein each layer comprises at least one thread, each thread utilizing

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each data structure from the same portion of the memory.

23. The apparatus of claim 22, further comprising an interrupt disabling mechanism; and at least one queue, each queue disposed in the data path between a first layer and a second layer, the first layer comprising a producer thread, the second layer comprising a consumer thread, the producer thread for enqueuing each data structure onto a queue, the consumer thread for dequeing each data structure from the queue, wherein prior to dequeing and enqueing each data structure interrupts are disabled.

24. The apparatus of claim 22, the apparatus further comprising a virtual machine, the virtual machine comprising a garbage collection mechanism, the virtual machine running each thread independent of the garbage collection mechanism.

25. A system for utilizing data structure with a plurality of threads, comprising;
an interrupt mechanism for enabling and disabling interrupts;
a memory, the memory comprising at least one data structure; and
a plurality of threads, the plurality of threads utilizing the data structures after disabling interrupts with the interrupt mechanism.

26. The system of claim 25, wherein the plurality of threads utilize each of the data structures from the same portion of memory.

27. A system for accessing streaming information with a plurality of threads, comprising:
a memory; and interrupt means for enabling and disabling interrupts; wherein the plurality of threads access the streaming information from the memory by disabling the interrupts via the interrupt means.

28. The system of claim 27, further comprising a memory, wherein the plurality of threads access the streaming information from the same portion of the memory.

29. A method for accessing information in a memory with a plurality of threads, comprising the steps of:
transferring information from one thread to another thread via handles to the information; and disabling interrupts via the threads before performing the step of transferring the information.

30. The method of claim 29, further comprising a step of accessing the information with the plurality of threads from the same portion of the memory.

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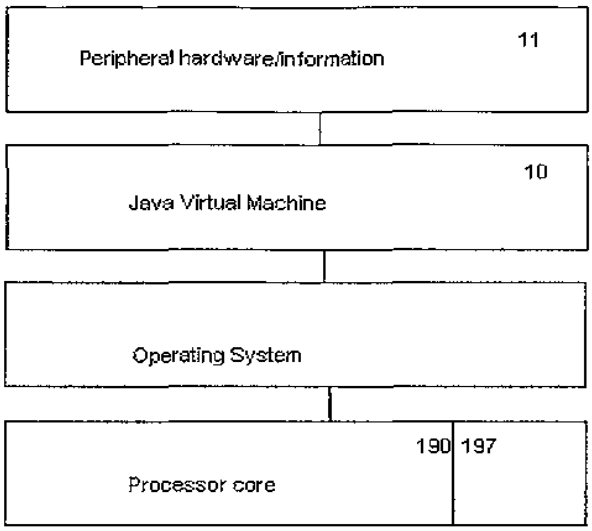


Figure 1

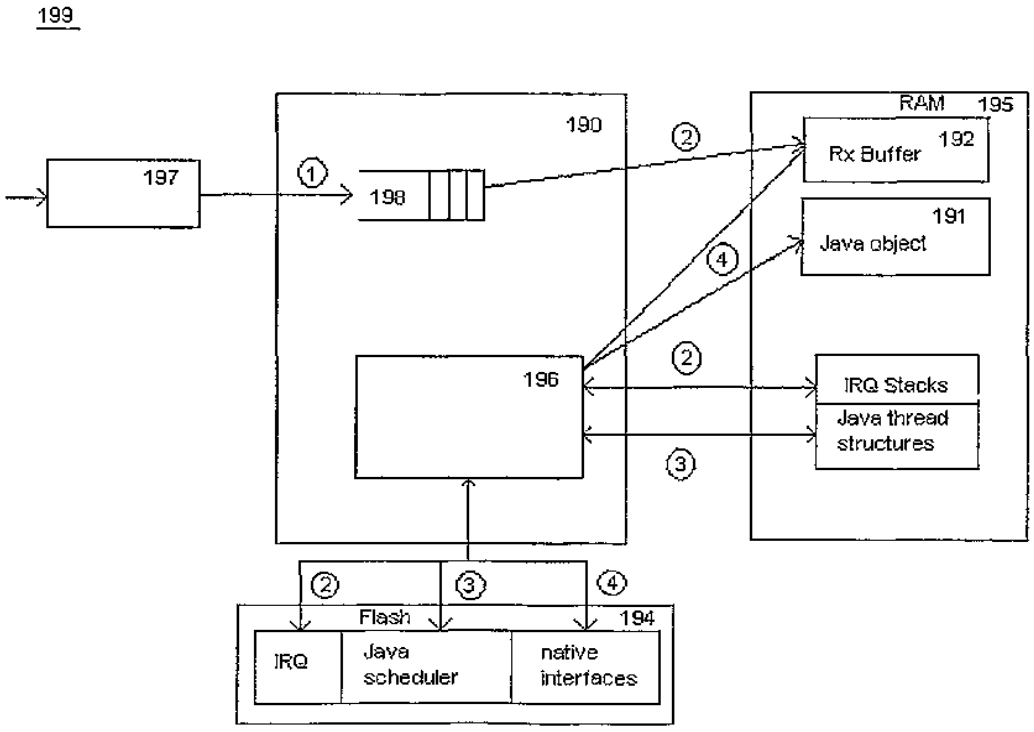


Figure 2

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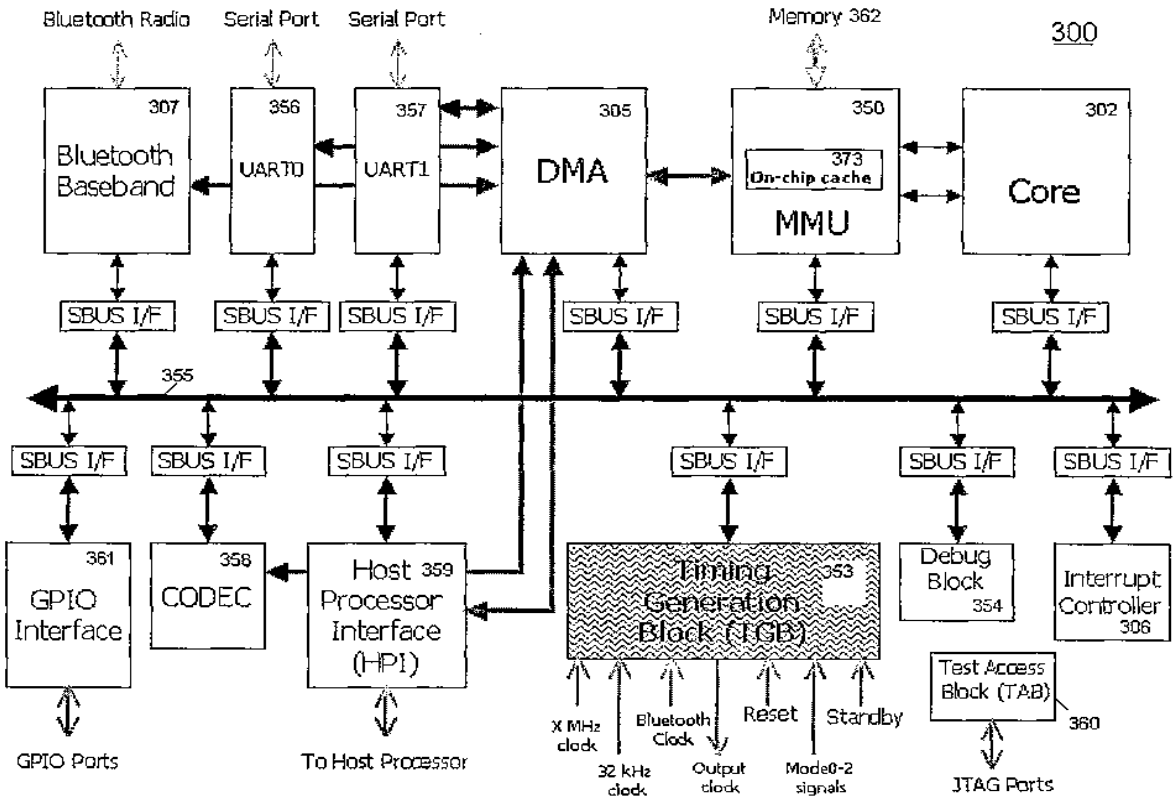


Figure 3a

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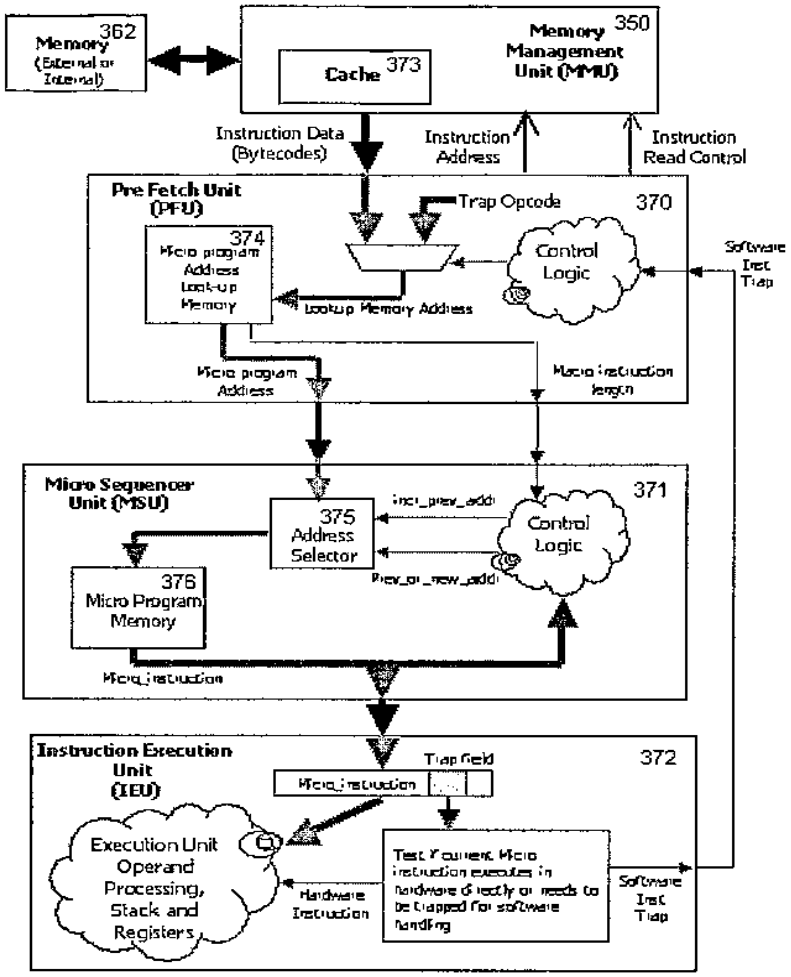


Figure 3b

Upon a trapped instruction which is not directly executed in hardware:

1) Current Opcode is loaded into a register used to handle vector table bases (in IEU)
2) Some registers are swapped
3) Some registers are pushed onto the stack
4) Software execution transfers via the vector table setting
5) Current opcode is translated via software into a sequence of opcodes that can be executed directly in hardware
6) This opcode sequence is then executed in place of the current opcode

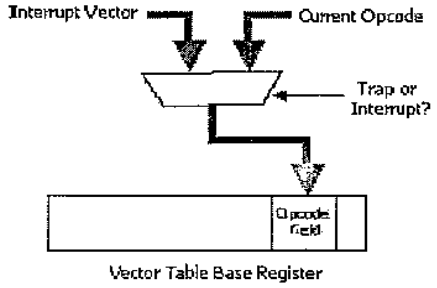


Figure 3c

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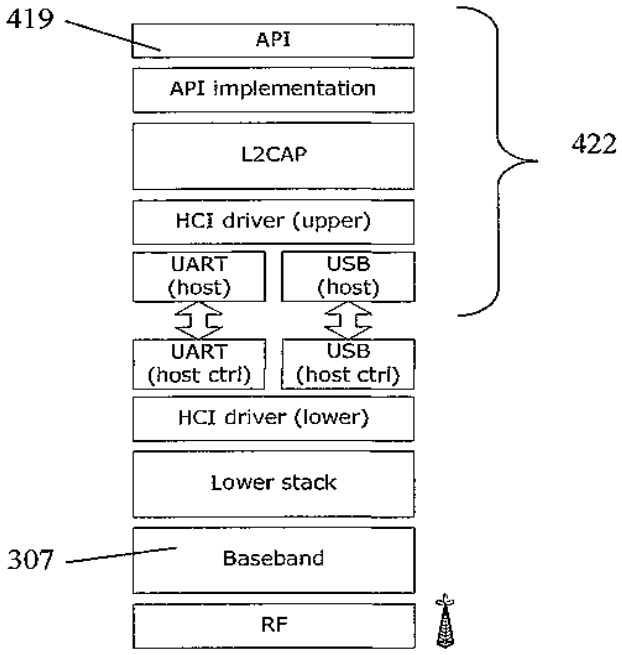


Figure 4

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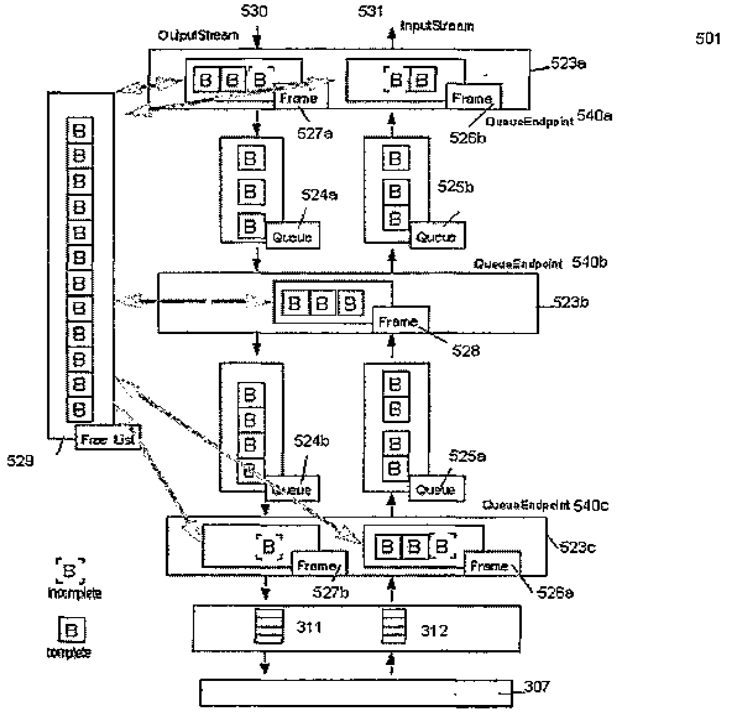


Figure 5

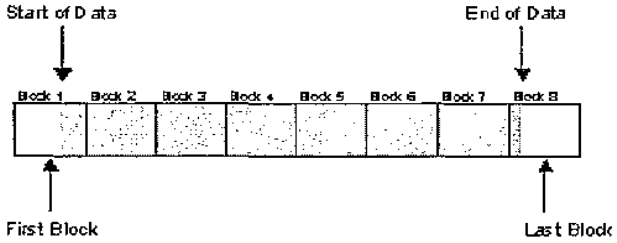


Figure 6a

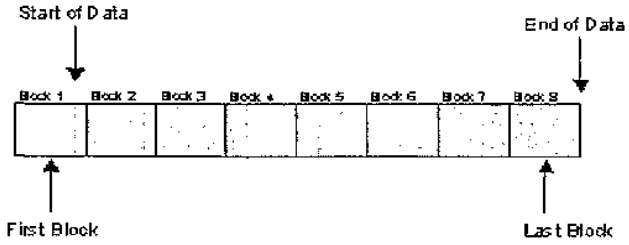


Figure 6b

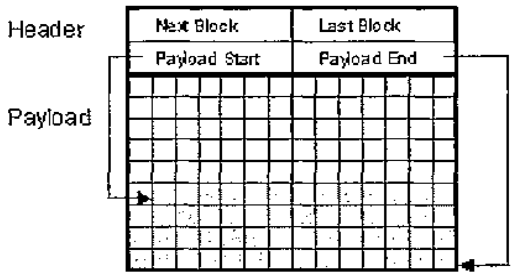


Figure 6c

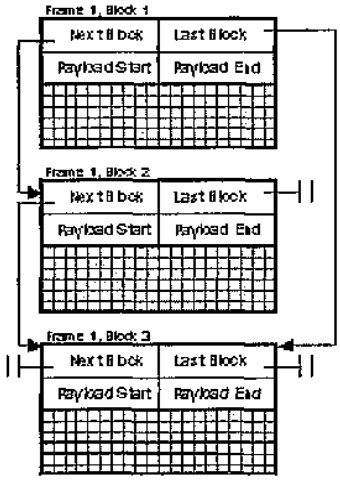


Figure 6d

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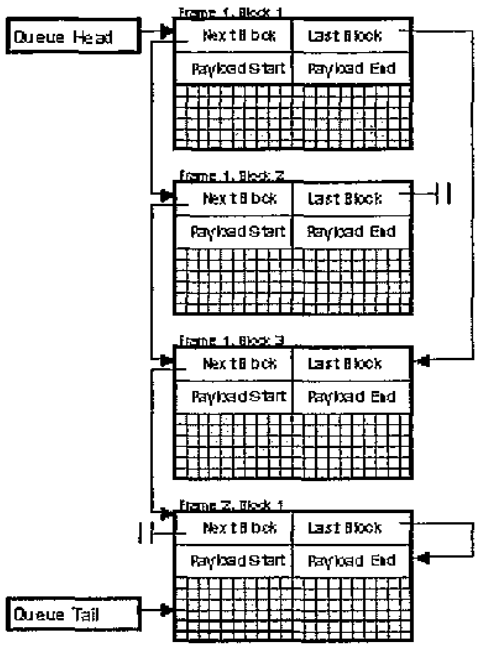


Figure 6e

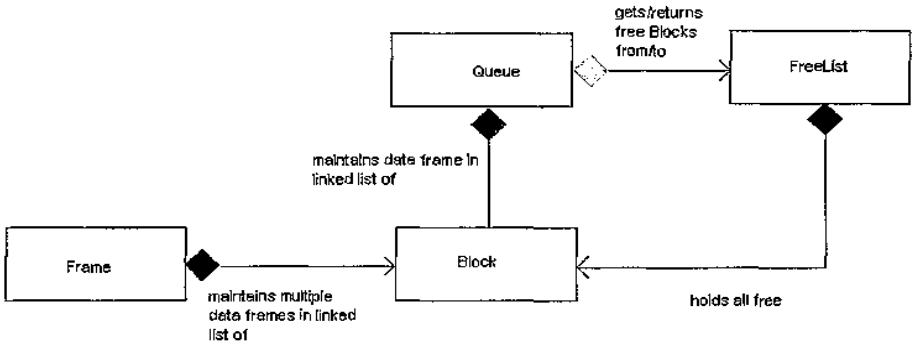


Figure 7a

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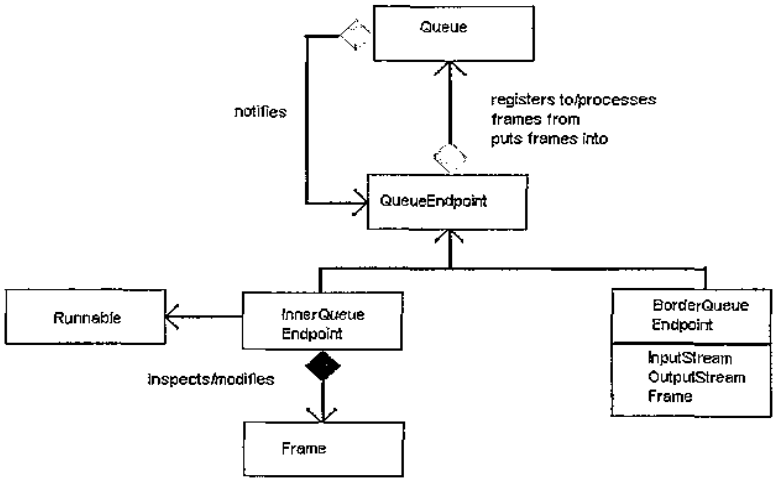


Figure 7b

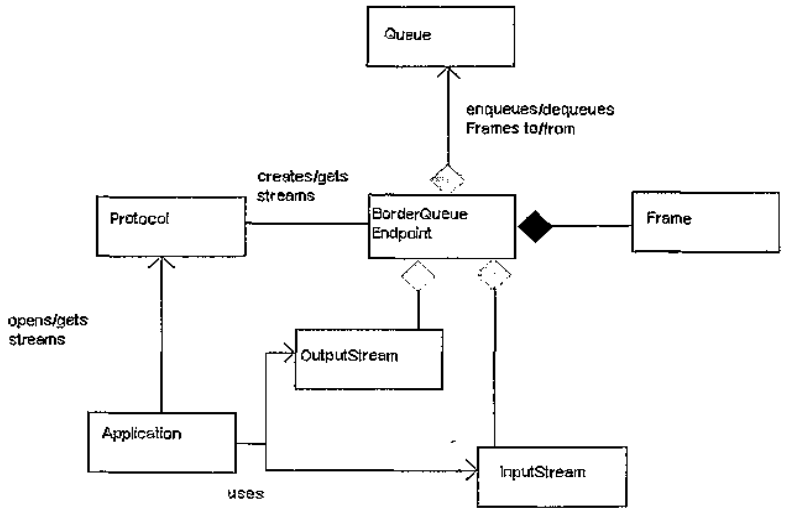


Figure 7c

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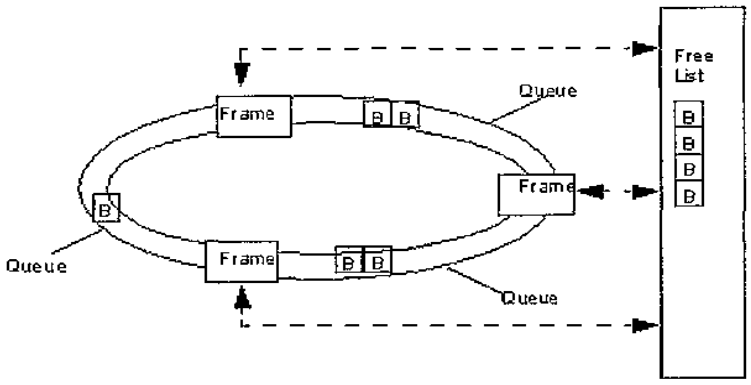


Figure 8

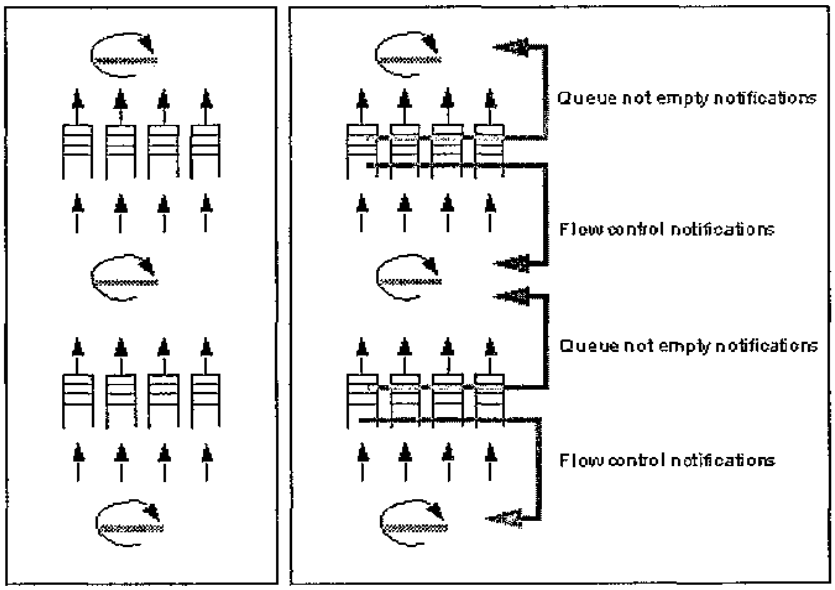


Figure 9

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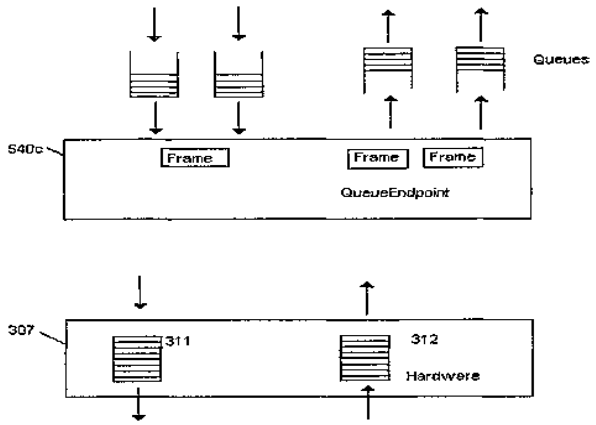


Figure 10

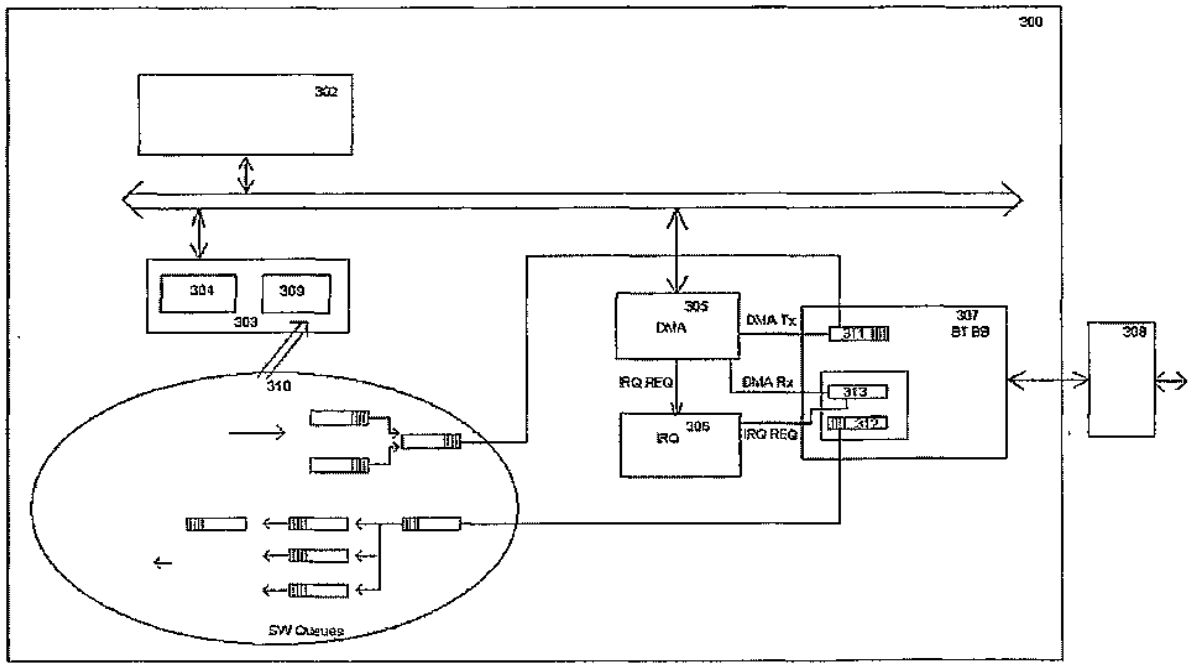


Figure 11

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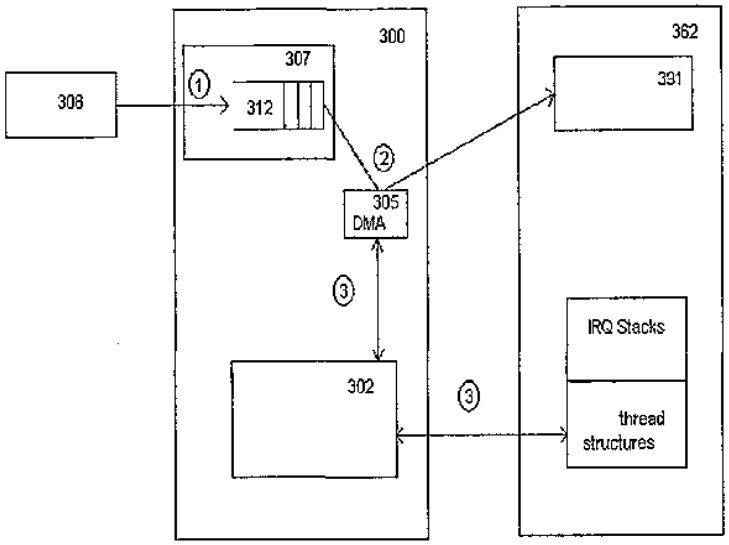


Figure 12

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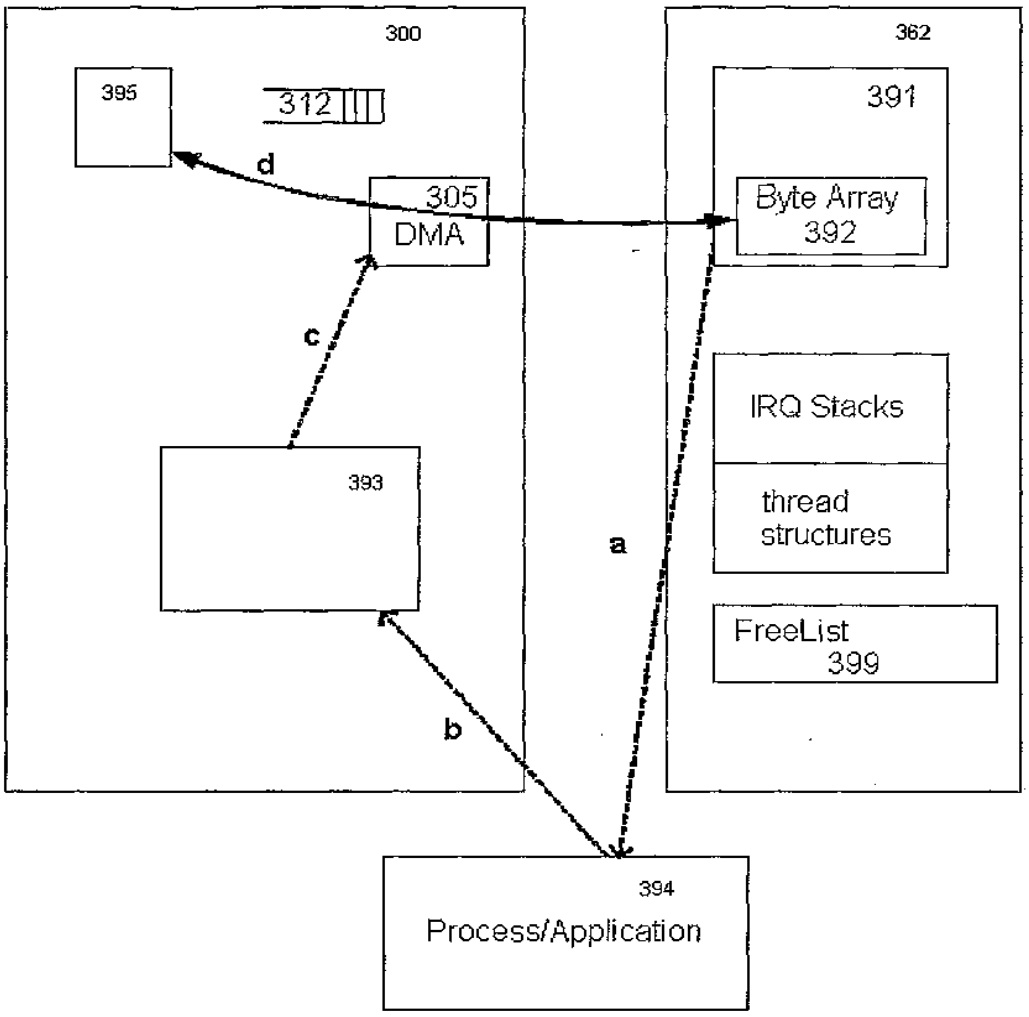


Figure 13

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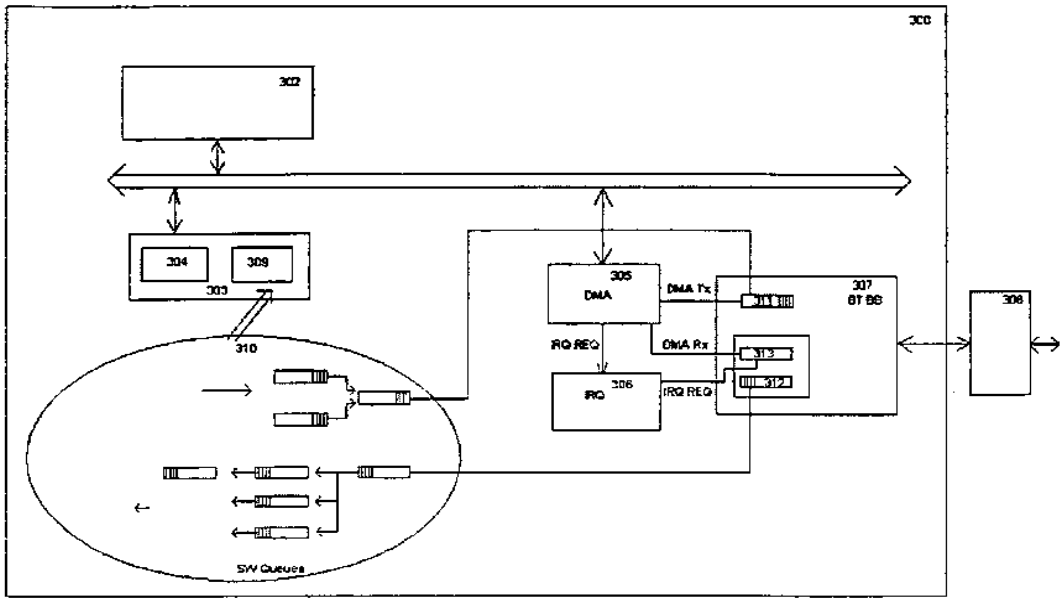
(74) Agent: WARDAS, Mark; 4225 Executive Square, Suite 400, La Jolla, CA 92037 (US).

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[Continued on next page]

(54) Title: WIRELESS JAVA DEVICE



(57) Abstract: A method and apparatus are provided for performing operations on data transferred between a peripheral directly into a data structure stored in a memory. The data structure may comprise a Java or Java-like data structure.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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Wireless Java Device

Field of the Invention

The description provided herein relates to efficient data and information transfers between a peripheral and a memory of a device in general and to efficient data and information transfers between wireless devices running Java or Java-like languages in particular.

Background

As access to global networks grows, it is increasingly possible for carriers to offer compelling services to their subscribers. In the case of wireless carriers, the carriers have the ability to reach customers and provide "anytime, anywhere" services. However, a service based revenue model is difficult to implement in portable devices. It may be preferable for carriers to outsource the design of these services. It may behoove carriers, therefore, to choose a design, which supports an environment that behaves consistently from one device to another as well as to provide protection from malicious attack such as software viruses or fraud.

Various implementations of a Java byte-compiled object oriented programming language are available from Sun Microsystems, Inc. 901 San Antonio Road Palo Alto, CA 94303 as well as others are well known in the art. Although these implementations may resolve portability and security issues in portable devices, they can impose limitations on overall system performance. First, a semi-compiled/interpreted language, like Java, and an associated virtual machine or interpreter running on a conventional portable power-constrained device can consume roughly ten times more power than a native application. Second, due to Java language and run time environment feature redundancy, Java ported onto an existing operating system requires a large memory footprint. Third, the development of a wireless protocol stack for such a system is very difficult given the real-time constraints, which are inherent in the operation of existing processors. Fourth, execution speed is relatively slow. Fifth, data and programs downloaded to a portable device capable of running Java applications may require significant processing and data handling overhead when interfaced to a processor and/or a main operating system.

In an attempt to solve Java application execution speed limitations, a number of approaches to accelerate Java on embedded devices have been developed, including: software emulation, just-in-time-compiling (JIT), hardware accelerators on existing

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processor cores, and Java processor cores. Software emulation is the slowest and most power consumptive implementation. JIT provides increased speed by software translation between Java byte-codes and native code, but requires significant amounts of memory to store a cross compiler program and significant processing resources, and also exhibits a time lag between when the program is downloaded and when it is ready to executed. Most hardware accelerators on existing processor cores are more or less equivalent to JIT, with similar performance, but increased chip gate count. One of the biggest challenges with hardware accelerators is in the software integration of a required Java virtual machine with a coexisting operating system running on the processor.

Software emulation, JIT, and hardware accelerators cannot provide an optimal level of design integration for embedded devices because they must respect traditional software architecture boundaries. Although it is possible to obtain an advantage over hardware accelerators with Java processor cores, previous solutions are non optimal solutions directed to general-purpose applications, or have been targeted to industrial or control applications which are sub-optimal for wireless or consumer devices.

Referring to Figure 1, there is seen one prior art system architecture on which a Java virtual machine (VM) is implemented. One factor that plays a critical role in overall system performance and power consumption of previous Java implementations in traditional systems is the boundary between a processor core **190**, peripherals **197**, and software representations **11** of the peripherals **197**. The most common system architecture follows horizontal layers, which provide abstractions to peripherals. In terms of processing resources, the natural split in these layers results in mediocre efficiency. Known Java hardware accelerator solutions that utilize a VM **10**, fail to optimize the path between peripherals **197** and their software representation **11**.

Referring to Figure 2 and other preceding Figures as needed, there is seen control and data paths of a prior art system. System **199** communicates across a wireless network in which a frame of data from an external network is received by peripherals **197**. Until the frame is wrapped into a Java object **191**, the system operates generally in the following steps:

1. A packet of data from an off-chip peripheral **197** (for example a baseband circuit), is received and the packet is stored in a receive FIFO **198** of a processor **190** operating under control of a processor core **196**.

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2. The receive FIFO **198** triggers an interrupt service routine, which copies the packet to a serial receive buffer **192** of a device driver associated with the peripheral. The packet is now in the realm of an operating system, which may signal a Java application to service the receive buffer **192**. Since the system **199** follows the usual hardware, operating system, virtual machine paradigm, it is necessary to buffer the packet under the control of an operating system device driver to guarantee latency and prevent FIFO **198** overflow.
3. A Java scheduler is activated to change execution to the Java listener thread associated with the peripheral device.
4. A listener thread, that is active, issues native function calls (JNI) to get data out of the receive buffer **192**, to allocate a block of memory of corresponding size, and to copy the packet into a Java object **191**.

In system **199**, it is apparent why targeting of applications is important. Even if the processor **190** is very fast, since the path followed by the packet is very convoluted, it is not transferred efficiently. While the goal is to get the packet from the FIFO **198** into a Java object **191** as efficiently as possible, the system copies bytes individually to memory at least twice, toggles bus lines continuously throughout the process, and causes excessive switching inside the processor **190** and memories **195** and **194**.

Thus, there exists a need for a new solution that provides efficient processing of data transferred by wireless means. Although various approaches have been developed for handling transmission of data over the wireless medium, they are not optimized for efficient processing of data by a software stack that consists of multiple layers, let alone, by multiple layers of multiple software stacks. There are known to exist in the software arts various software constructs. For example, in the UNIX arts there are Mbuf class constructs, which are known as malloc'ed, multi-chunk-supporting, memory-buffers. The memory-buffers may be extended by either appending data to the construct (which may reallocate the last chunk of data to fit the new characters) and/or by adding more pre-allocated chunks of data to the construct (which can be either appended or prepended to the list of buffer chunks). When using software constructs to pass information between layers of a software stack, it is possible that unbounded operations or corruption of information may occur. It is desirable that unbounded operations be avoided when processing data with software stacks, as well as to process and pass the data between software layers efficiently and without corruption.

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What is needed, therefore, is a device and methodology, which can improve upon the deficiencies of the prior art.

Summary of the Invention

One embodiment of the invention may include a method of manipulating data, comprising the steps of: providing a peripheral; providing a memory, the memory defined by an address space, the address space comprising a location; mapping a data structure to the location; receiving data with the peripheral; and storing the data to the location. The step of storing may comprise a step of transferring the data from the peripheral directly to the location. The step of storing may comprise a DMA transfer of the data from the peripheral to the location. The method may further comprise a step of executing the data directly from the location. The data may comprise streaming data. The data may comprise a binary executable file. The data structure may comprise a Java-like data structure. The data structure may comprise an object. The object may comprise an array object. The array object may comprise a byte array object. The method may further comprise the step of providing an execution means for executing a set of instructions, and the step of storing comprising the step of execution of no more than two of the instructions. The execution means may comprise a processor, and the instructions may comprise a processor read instruction and a write instruction. The data may comprise byte-codes. The byte-codes may comprise Java-like byte-codes. The method may further comprise the step of providing an application program; and the step of operating on the Java-like byte-codes with the application program directly from the location. The method may further comprise the step of receiving comprising receiving the data as wireless data. The method may further comprise a step of directly operating on the data with an application layer program. The method may further comprise a step of executing the data, wherein the data is stored in only one memory location before executing the data.

One embodiment of the invention may include a communications apparatus, comprising: a peripheral, the peripheral receiving data memory, the memory defined by an address space, the address space comprising a location, the location comprising a data structure; and a data transfer portion for transferring the data directly from the peripheral to the data structure. The data structure may comprise a Java-like data structure. The data structure may comprise an object. The object may comprise a byte array object. The apparatus may further comprise a processor, the processor executing instructions, the transfer of data from the peripheral to the location occurring in no more than two of the

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instructions. The data transfer portion may comprise a DMA controller. The data may comprise byte-codes. The byte-codes may comprise Java-like byte-codes. The peripheral may comprise a wireless baseband. The data may comprise streaming data. The wireless baseband may comprise a Bluetooth compatible wireless baseband. The wireless baseband may be selected from a group comprising: 802.11, HomeRF, IrDA, CDMA, GSM, HDR, and 3GPP compatible basebands. The apparatus may further comprise: a program execution unit; an application layer; and an application layer program, the application layer comprising the application program, the application program operating under control of the program execution unit, the application program operating on the data directly from the location. The application layer program may comprise a Java-like application program. The data may comprise a binary executable file. The data may comprise streaming data.

One embodiment of the invention may include a communications apparatus, comprising: a peripheral, the peripheral receiving data; a memory, the memory defined by an address space, the address space comprising a location, the location comprising an object; and a data transfer portion for transferring the data directly from the peripheral to object. The object may comprise a Java object. The object may comprise a byte array object. The data transfer portion may comprise an execution means for executing instructions, the execution means transferring the data in no more than two of the instructions.

One embodiment of the invention may include a communications apparatus, comprising: a peripheral, the peripheral receiving data; a memory, the memory defined by an address space, the address space comprising a data structure; and a data transfer portion for transferring the data directly from the peripheral to the data structure. The data transfer portion may comprise a processor, the processor executing instructions, the transfer of data requiring no more than two of the instructions to transfer the data from the peripheral to the data structure. The data may comprise Java-like byte-codes and the data structure may comprise a Java-like object. The peripheral may comprise a baseband. The apparatus may comprise a wireless communications apparatus. The apparatus may comprise a die, the die comprising the execution means and the baseband. The baseband may comprise a Bluetooth compatible baseband.

These as well as other aspects of the invention discussed above may be present in embodiments of the invention in other combinations, separately, or in combination with

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other aspects and will be better understood with reference to the following drawings, description, and appended claims.

Brief Description of the Drawings

Figure 1 illustrates one prior art system architecture on which a virtual machine (VM) is implemented;

Figure 2 illustrates control and data paths of a prior art system;

Figure 3a illustrates a top-level block diagram architecture of an embodiment described herein;

Figure 3b illustrates an embodiment in which byte-codes are fetched from memory by an MMU, with control and address information passed from a Prefetch Unit;

Figure 3c illustrates an embodiment wherein trapped instruction may be transferred to software control;

Figure 4 illustrates a representation of a software protocol stack;

Figure 5 illustrates an embodiment of a Data Path Engine;

Figures 6a-e illustrate embodiment of various data structures utilized by the Data Path Engine;

Figures 7a-b illustrate embodiments of two subsystems of the Data Path Engine;

Figure 8 illustrates multiple queues interacting with queueendpoints.

Figure 9 illustrates an interaction between FreeList, Frame, Queue, and Block data structures;

Figure 10 illustrates an embodiment of a hardware interface to the Data Path Engine;

Figure 11 illustrates an embodiment as described herein;

Figure 12 illustrates representation of a transfer of data into a software data structure; and

Figure 13 illustrates an embodiment as described herein.

Description of the Invention

Referring to Figure 3 and other Figures as needed, there is seen a top-level block diagram architecture of an embodiment described herein. In one embodiment, a circuit **300** may comprise a processor core **302** that may be used to perform operations on data that is directly and dynamically transferred between the circuit **300** and peripherals or devices on or off the circuit **300**. In one embodiment, the circuit **300** may comprise an instruction execution means for executing instructions, for example, application program instructions, application program threads, hardware threads of execution, and processor

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read or write instructions. In one embodiment, the data may comprise instructions of a semi-compiled or interpreted programming language utilizing byte-codes, binary executable data, data transfer protocol packets such as TCP/IP, Bluetooth packets, or streaming data received by a peripheral or device and transferred from the peripheral or device directly to a memory location. In one embodiment, after a transfer of data from the peripheral or device to the memory location occurs, operations may be performed on the data without the need for further transfers of the data to, or from, the memory.

In one embodiment, the circuit **300** may comprise a Memory Management Unit (MMU) **350**, a Direct Memory Access (DMA) controller **305**, an Interrupt Controller **306**, a Timing Generation Block (TGB) **353**, a memory **362**, and a Debug Controller **354**. The Debug Controller **354** may include functionality that allows the processor core **302** to upload micro-program instructions to memory at boot-up. The Debug Controller **354** may also allow low level access to the processor core **302** for program debug purposes. The MMU **350** may act as an arbiter to control accesses to an Instruction and Data Cache of memory **373**, to external memories, and to DMA controller **305**. The MMU **350** may implement the Instruction and Data Cache memory **362** access policy. The MMU **350** may also arbitrate DMA **305** accesses between the processor core **302** and peripherals or devices on or off the circuit **300**. The DMA **305** may connect to a system bus (SBUS) **355** and may include channels for communicating with various peripherals or devices, including: to a wireless baseband circuit **307**, to UART1 **356**, to UART2 **357**, to Codec **358**, to Host Processor Interface (HPI) **359**, and to MMU **350**.

In one embodiment, the SBUS **355** allows one master to poll several slaves for read and write accesses, i.e., one slave per bus access cycle. The processor core **302** may be the SBUS master. In one embodiment, only the SBUS master may request a read or write access to the SBUS **302** at any time. In one embodiment, peripherals or devices may be slaves and are memory mapped, i.e. a read/write access to a peripheral or device is similar to a memory access. If a slave has new data for the master to read, or needs new data to consume, it may send an interrupt to the master, which reacts by polling all slaves to discover the interrupting slave and the reason for the interruption. The UARTs **356/357** may open a bi-directional serial communication channel between the processor core **302** and external peripherals. The Codec **358** may provide standard voice coding/decoding for the baseband circuit **307** or other units requiring voice coding/decoding. In one embodiment, the circuit **300** may comprise other functionalities,

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including a Test Access Block (TAB) **360** comprising a JTAG interface and a general purpose input/output interface (GPIO) **361**.

In one embodiment, circuit **300** may also comprise a Debug Bus (DBUS) (not shown). The DBUS may connect peripherals through the GPIO **361** to external debugging devices. The DBUS bus may allow monitoring of the state of internal registers and on-chip memories at run-time. It may also allow direct writing to internal registers and on-chip memories at run time.

In one embodiment, the processor core **302** may be implemented on a circuit **300** comprising an ASIC. The processor core **302** may comprise a complex instruction set (CISC) machine, with a variable instruction cycle and optimizations for executing software byte-codes of an semi-compiled/interpreted language directly without high level translation or interpretation. The software byte-code instructions may comprise byte-codes supported by the VM functionality of a software support layer (not shown). An embodiment of a software support layer is described in commonly assigned U.S. Patent Application S.N. 09/767,038, filed 22 January 2001. In one embodiment, the byte-codes comprise Java or Java-like byte-codes. In one embodiment, in addition to a native instruction set, the processor core **302** may execute the byte-codes. The circuit **300** may employ two levels of programmability/executability; as macro-instructions and as micro-instructions. In one embodiment, the processor core **302** may execute macro-instructions under control of the software support layer, or each macro-instruction may be translated into a sequence of micro-instructions that may be executed directly by the processor core **302**. In one embodiment, each micro-instruction may be executed in one-clock cycle.

In one embodiment, the software layer may operate within an operating system/environment, for example, a commercial operating system such as the Windows® OS or Windows® CE, both available from Microsoft Corp., Redmond, Washington. In one embodiment, the software layer may operate within a real time operating system (RTOS) environment such as pSOS and VxWorks available from Wind River Systems, Inc., Alameda, CA. In one embodiment, the software layer may provide its own operating system functionality. In one embodiment, the software support layer may implement or operate within or alongside a Java or Java-like virtual machine (VM), portions of which may be implemented in hardware. In one embodiment, portions of the VM not included as the software support layer may be included as hardware. In one embodiment, the VM may comprise a Java or Java-like VM embodied to utilize Java 2

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Platform, Enterprise Edition (J2EE™), Java 2 Platform, Standard Edition (J2SE™), and/or Java 2 Platform, Micro Edition (J2ME™) programming platforms available from Sun Microsystems. Both J2SE and J2ME provide a standard set of Java programming features, with J2ME providing a subset of the features of J2SE for programming platforms that have limited memory and power resources (i.e., including but not limited to cell phones, PDAs, etc.), while J2EE is targeted at enterprise class server platforms.

Referring to Figure 3b and other Figures as needed, there is seen an embodiment in which byte-codes are fetched from memory **362** by a MMU **350**, with control and address information passed from a Prefetch Unit **370**. In one embodiment, byte-codes may be used as addresses into a look-up memory **374** of a Pre Fetch Unit (PFU) **370**, which may be used to store an address of a corresponding sequence of micro-instructions that are required to implement the byte-codes. The address of the start of a micro-instruction sequence may be read from look-up memory **374** as indicated by the Micro Program Address. The number of micro-instructions (Macro instruction length) required may also be output from the look-up memory **374**.

Control logic in a Micro Sequencer Unit (MSU) **371** may be used to determine whether the current byte-code should continue to be executed, and whether the current Micro Program address may be used or incremented, or whether a new byte-code should be executed. An Address Selector block **375** in the MSU **371** may handle the increment or selection of the Micro Program Address from the PFU **370**. The address output from the Address Selector Block **375** may be used to read a micro-instruction word from the Micro Program Memory **376**.

The micro-instruction word may be passed to the Instruction Execution Unit (IEU) **372**. The IEU **372** may check trap bits of the micro-instruction word to determine if it can be executed directly by hardware, or if it needs to be handled by software. If the micro-instruction can be executed by hardware directly, it may be passed to the IEU, register, ALU, and stack for execution. If the instruction triggers a software trap exception, a Software Inst Trap signal may set to true.

The Software Inst Trap signal may be fed back to the Pre Fetch Unit **370**, where it may be processed and used to multiplex in a trap op-code. The trap op-code may be used to address a Micro Program address, which in turn may be used to address the Micro Program Memory **376** to read a set of micro-instructions that are used to handle the

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trapped instruction and to transfer control to the associated software support layer. Figure 3c illustrates how trapped instruction may be transferred to software control.

In one embodiment, byte-codes may comprise a conditionally trapped instruction. For example, depending on the state of the processor core **302**, the conditionally trapped instruction may be executed directly in hardware or may trapped and handled in software.

The present invention identifies that benefits derive when information is passed between wireless devices by an software protocol stack written partly or entirely in a Java or Java-like language. Although an approach could be used to provide a solution implemented partly in native code and partly in a Java or Java-like language, with such an approach it would be very hard to assess overall system effects of design decisions, since only half of the system (native or Java) would be visible. For example, in a Java system using a software virtual machine (VM), use of previous Unix Mbuf constructs would require semaphores and native threads, which would incur extra overhead and complexity. Although in a Unix system it might be possible to process the MBuf constructs above the Java layer, a system designer would have to first figure out a methodology to get the data to the Java level, how to keep Java garbage collection from interfering, and how to guarantee data integrity and contentions. The present invention interfaces with an upper software protocol stack written entirely in Java or Java-like semi-interpreted languages so as to avoid having to cross over native code boundaries multiple times. By using an all Java or Java-like protocol stack, however, various system issues need to be addressed, including, synchronization, garbage collection, interrupts as well as aforementioned instruction trapping.

Referring now to Figure 4, there is seen a representation of a software protocol stack. One embodiment of an upper software protocol stack **422** written in Java or a Java-like language is described in commonly assigned U.S. Patent Application S.N. 09/849,648, filed on 4 May 2001. In one embodiment, the protocol stack **422** may comprise software data structures compatible with the functionality provided by Java or Java-like programming languages. The protocol stack **422** may utilize an API **419** that provides a communication path to application programs (not shown) at the top of the stack, and a lower **488** interface to a baseband circuit **307**. The protocol stack also interfaces to a software support layer, the functionality of which is described in previously referenced U.S. Patent Application S.N. 09/767,038, filed on 22 January 2001,

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wherein is provided a Virtual machine (VM) with no operating system (OS) overhead and wherein Java classes can directly access hardware resources.

The protocol stack **422** may comprise various layers/modules/profiles (hereafter layers) with which received or transmitted information may be processed. In one embodiment, the protocol stack **422** may operate on information communicated over a wireless medium, but it is understood that information could also be communicated to the protocol stack over a wired medium. In other embodiments it is understood that the invention disclosed herein may find applicability to layers embodied as part of other than a wireless protocol stack, for example other types of applications that pass information between layers of software, for example, a TCP/IP stack.

Referring now to Figure 5, and any other Figures as needed, there is seen a representation of an embodiment of a Data Path Engine (DPE) **501**. As described herein, the DPE **501** passes information between one or more of layers **523a-c** of a protocol stack **422**. The DPE **501** provides its functionality in a protocol independent manner because it is possible to decouple the management of memory blocks used for datagrams from the handling of those datagrams. Hence, the function of interpreting protocol specific datagrams is delegated to the layers.

The present invention identifies that enqueing and dequeing information from an information stream for use by different software layer threads of a protocol stack preferably should occur in a bounded and synchronized manner. To provide predictability to potentially unbounded operations that may result from an all Java or Java-like solution, the present invention disables interrupts when enqueing or dequeing information to or from software layers via queues.

The DPE **501** comprises certain data structures that are discussed herein first generally, then below, more specifically. The DPE **501** instantiates the whole DPE instance (for example, QueueEndpoints, Queues, Blocks, FreeList, that will be described below in further detail) at startup. In one embodiment, the DPE **501** comprises one or more receive and transmit queues **524a-b**, **525a-b** as may be specified at startup by the protocol stack **422**. The queues may be used to transfer information contained in output **530** and input **531** information streams between layers **523a-c**. Although only one queue in a receive and transmit direction is shown between any two layers in Figure 5, it is understood from the descriptions herein that more than one queue between any two layers is within the scope of the present invention, for example, with different receive or

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transmit queues corresponding to different communications channels, or different queues corresponding to different information streams, for example, video and audio, or the like. Each layer **523a-c** may comprise at least one thread that takes information from one or more queues **524a-b**, **525a-b**, that processes the information, and that makes the processed information available to another layer through another queue. In one embodiment, threads may comprise real-time threads. More than one protocol layer or queue may be serviced by the same thread. Flow control between layers may be implemented by blocking or unblocking threads based on flow control indications on the queues **524a-b**, **525a-b.** Flow control is an event which may occur when a queue becomes close to full and which may be cleared when it falls to a lower level.

The DPE **501** manages information embodied as blocks **B** of memory and links the blocks **B** together to form frames **526a-b, 527a-b, 528** as shown in Fig. 5. Frames may also be held by queues. As shown, a frame may comprise groups of one block, two blocks, four blocks, but may also comprise other numbers of blocks **B**. The threads comprising a layer may put frames to and take frames from the queues **524a-b**, **525a-b**. The DPE **501** allows that frames **526a-b, 527a-b, 528** may be passed between software layers, wherein adding, removing, and modifying information in the queues, frames, and blocks **B** occurs without corruption of the information. Blocks **B** may be recycled as frames are produced and consumed by the layers.

In one embodiment, queueendpoints **540a-c** may comprise the layers **523a-c** and may perform inspect-modify-forward operations on frames **526a-b, 527a-b, 528**. For example, queueendpoints may take frames **526a-b, 527a-b, 528** from a queue or queues **524a-b**, **525a-b** to look at what is inside a frame to make a decision, to modify a frame, to forward a frame to another queue, and/or to consume a frame. In one embodiment, the DPE **501** has one thread per layer **523a-c** and, thus, one thread per queueendpoint **540a-c**. A thread may inspect the queues and may go waiting. A queueendpoint **540a-c** may wait on an object. A queueendpoint may optionally wait on itself. Prior to waiting on itself, a queueendpoint **540a-c** may register itself to all queues **524a-b**, **525a-b** that the queueendpoint terminates. When something is put into a queue **524a-b**, **525a-b**, or a congestion from the queue that was sourced by a queueendpoint **540a-c** is cleared, the queue may notify the queueendpoint to wake the queueendpoint up, then the queueendpoint may take remedial action if there is congestion, or it can service the queue that it now has to service. In one embodiment, a software data structure may be shared

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between a queue **524a-b**, **525a-b** and a queueendpoint **540a-c** that indicates a status as to whether or not a particular queue needs to be serviced by an queueendpoint. The structure may be local to the queueendpoint and may be exposed from the queueendpoint to the queues. The software structure may contain a flag to indicate, for example, if a queue is congested, if a queue is not congested, if a queue is empty, or if a queue is full.

With Java or Java-like languages, objects may be synchronized by using synchronized methods. Although Java or Java-like languages provide monitors that block threads to prevent more than one thread from entering an object and, thus, potentially corrupting data, the DPE **501** provides interrupt disabling and enabling mechanism by which a thread may be granted exclusive access to an object. The DPE **501** ensures that information may be transferred between layers in a deterministic manner without needing to trap on instructions (i.e., by not using monitors). In one embodiment, all interrupts are disabled.

The DPE **501** relies on a set of classes that enable the mechanism to pass bocks **B** of data across the thread boundary of a layer. The present invention does so because putting or taking a frame **526a-b, 527a-b, 528** from a queue **524a-b, 525a-b** may occur quickly. In comparison, if synchronized methods were to be used to manage contention among queues attempting to enter a monitor of a layer, the contentions that could occur could consume a relatively large amount of time and latency would not be guaranteed (i.e., entering an monitor means locking an object).

In the DPE **501**, before a frame is put into a queue **524a-b, 525a-b**, interrupts are disabled, and once a frame has been put into a queue, interrupts are restored. Before interrupts are disabled, however, a queue notifies a respective queueendpoint that something is happening. Upon notification by a queue, a queuendpoint may enable and disable interrupts by calling a method called kernel.disable.interrupts-kernel.enable.interrupts. At load time a class loader may detect calls to kernel.disable.interrupts-kernel.enable.interrupts methods. When found, invoke instructions that call those methods are replaced by the loader with a disableInterrupt and enableInterrupt opcode (and 2 nop opcodes) to fully replace a 3 byte invoke instruction. By doing so, an invoke sequence that typically would take 30 to 100 clock cycles may be replaced by a process that is performed in about 4 clock cycles. By disabling interrupts with kernel.disable.interrupts, latency is guaranteed, whereas, when entering a monitor, latency cannot be guaranteed. As compared to using monitors, kernel.disable.interrupts-

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kernel.enable.interrupts may be 10 to 50 times faster in guaranteeing exclusive access to an object.

Because some protocols using the DPE **501** may sometimes operate under realtime constraints, they cannot allow well known standard garbage collection techniques to interfere with their execution. Garbage collection allocates and frees memory continuously, thereby being unbounded. To ensure that operations occur in a predefined time window, the DPE **501** pre-allocates blocks **B** at startup and keeps track of them in a free list **529**. Memory may be divided and allocated into fixed size blocks **B** at start-up. In one embodiment, the memory is divided into small blocks **B** to avoid memory fragmentation. After creation, frames **526a-b, 527a-b, 528** may be consumed by the protocol stack **422**, after which blocks **B** of memory may be recycled. The size of the queues **524a-b, 525a-b** may be determined at startup by the protocol stack **422** so that any one layer **523a-c** does not consume too many of the blocks **B** in the free list **529** and so that there are enough free blocks **B** for other layers, frames, or queues. Because all blocks **B** are statically pre-allocated in the freelist **529**, with the present invention garbage collection need not be relied upon to manage blocks of memory. After startup, because the DPE **501** includes a closed reference to all its objects and doesn't have to allocate objects, for example blocks **B**, and because the DPE's threads operate at a higher priority than the garbage collector thread, it may operate independently and asynchronously of garbage collection.

The DPE **501** buffers information transferred between a source and destination and allows information to be passed by one or more queues **524a-b, 525a-b** without having to copy the information, thereby freeing up bottlenecks to the processing of the information. Each layer **523a-c** may process the information as needed without having to copy or recopy the information. Once information is allocated to a block **B**, it may remain in the memory location defining the block. Each layer **523a-c** may add or remove headers and trailers from frames **526a-b, 527a-b, 528**, as well as remove, add, modify blocks **B** in a frame through methods which are part of the Frame class instantiated in the layers **523a-c**. Once information in an output **530** or input **531** stream is copied to a block **B**, it may be processed from that block **B** throughout the layers **523a-c** of protocol stack **422**, then streamed out of the block **B** to an application or other software or device. For example, in an input stream direction, information from a baseband circuit **307** needs be

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copied to a memory location only once before use by an application, the protocol stack **422**, or other software.

Because in the DPE **501** different layers and their threads may read and write the same queue and, thus, the same frame and block, methods and blocks of code which access the memory location defining the queue, frame, or block would normally need remain synchronized to guarantee coherency of the DPE **501** when making read-modify-write operations to the memory location. As discussed earlier, synchronization is the process in Java that allows only one thread at a time to run a method or a block of code on a given instance. By providing an alternative to Java or Java-like synchronization, i.e., by disabling interrupts, the DPE **501** provides that if different threads do read-modify write operations on the same memory location, the information in the memory location, for example, global variables, does not get corrupted.

As referenced below, it will be understood that the conceptual entities described above may be implemented as software data structures. Hereafter, conceptual entities (for example, queue) are distinguished from software data structures (for example, Queue) by the capitalization of the first letter of their respective descriptor. Although such distinctions are provided below, it is understood that those skilled in the art may, as needed, when viewing the Figures and description herein, interpret the software data structures and corresponding physical or conceptual entities interchangeably.

Referring now to Figures 6a-e, there are seen representations of Block, Frame, and Queue data structures. Referring now to Figures 6a, a frame may comprise a plurality of blocks **B**, each block comprising a fixed block size. A block **B** may comprise a completely full block of information or a partially full block of information. As described in Figure 13 below, a byte array comprising a contiguous portion of memory may be an element of Block. A partially filled block **B** may be referenced by a start and end offset. As illustrated in Figure 6b, after processing and reassembly of blocks **B** of a frame by a layer, a frame may no longer comprise contiguous information.

A frame may comprise multiple blocks **B** linked together by a linked list. The first block **B** in a block chain may reference the frame. Leading and trailing empty blocks **B** may be removed from a frame as needed. The number of blocks **B** in a frame may therefore change as processed by different layers. Adding or removing information to or from a block **B** may be implemented through Block class methods and Block class

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method data structures. In one embodiment, Block class may comprise the following variables:

- Private. Start offset of a payload in a block **B**. The payload can start anywhere in a block provided it is not after the end of the payload. This allows unused space at the start of the block in a frame.
- Private. End offset of payload in a block **B**. The payload can end anywhere in a block provided it is not before the start of the payload. This allows unused space at the end of the block in a frame.
- Private. Payload in a block **B**. The payload of a contiguous array of bytes in a block.
- Private. Next block **B** within in a frame. Null if the block is the last block in the frame. This reference may also be used to link blocks **B** in the free list of blocks.
- Private. Last block **B** in a frame if the first block of a frame, null otherwise. This variable may serve two purposes. First it allows efficient access to the tail of the frame. Second, it allows delimiting frames if multiple frames are chained together.

As illustrated in Figure 6c, information in a block **B** is at the end of the block. The information could also be at the start of the block. The first time information is written to a block **B** determines to which end of the block it will be put. A put to tail puts information at the start, and a put to head puts information at the end. As represented by the 3 blocks **B** comprising the frame in Figure 6d, information may be added before or after a block **B**.

Referring now to Figure 6e, and any other Figures as needed, a representation of a Queue class data structure is shown. Queue data structures may be used to manage frames. When a layer has finished processing a frame, an executing thread may put the frame onto a queue to make the frame available for processing by another layer, application, or hardware. The DPE **501** kernal.disableinterrupts-kernal.enableinterrupts classes, which disable and enable interrupts when information is queued onto or from a queue, in effect provide that synchronization occurs on the threads. A protocol stack may define more than one queue for each layer. The blocks **B** of a frame may be linked together using the next block reference within Block class and the last block references may be used to delimit the frames.

In one embodiment, member variables of the Queue Class may include:

- Private. Maximum size of the queue in blocks.

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- Private. Flow control low threshold in blocks.
- Private. Flow control high threshold in blocks.
- Private. Flow control flag.
- Private. First block in the queue.
- Private. Last block in the queue.
- Private. Consumer QueueEndpoint.
- Private. Producer QueueEndpoint.

Putting to and getting from queues can be a blocking or non-blocking event for threads as specified in a parameter in enqueue() and dequeue() methods of the Queue class that take frames on and off a queue. If non-blocking has been specified and a queue is empty before a get, then a null block reference may be returned. If non-blocking has been specified and a queue is full before a put, then a status of false may be returned. If the access to the queue is blocking, then the wait will always have a loop around it and a notify all instruction may be used. Waits and notifies can be for queue empty / full or for flow control. A thread may be unblocked if its condition is satisfied, for example, queue_not_empty if waiting on an empty queue and queue_not_full if waiting to put to a full queue.

Referring now to Figures 7a-b, there are seen block diagram representations of subsystems of the DPE implemented as a memory management subsystem, and a frame processing subsystem, respectively. With reference to the software data structures and description above, the subsystems may be implemented with the software data structures disclosed herein, including, but not limited to, Block, Frame, Queue, FreeList, QueueEndpoint. Figure 7a shows a representation of a memory management subsystem responsible for the exchange of Block handles/pointers between Queue, FreeList, and Frame. Figure 7b shows a representation of a processing subsystem responsible for the functions of inspecting a frame, modifying a frame, and forwarding a frame with Frame.

Referring now to Figures 7a and 8, and any other Figures as needed, there are seen representations of how memory management may effectuated by using a FreeList data structure that operates independent of a garbage collection mechanism, whereby Block handles/pointers are exchanged in a closed loop between FreeList, Frames, and Queue data structures, and such that the DPE **501** may operate under real-time constraints without losing reference to the blocks **B**.

The Block data structure is used to transfer basic units of information (i.e., blocks **B**). At any point in time, a block **B** uniquely belongs either to FreeList if it is free, Frame if it is currently held by a protocol layer, or Queue if it is currently across a thread

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boundary. More than one block **B** may be chained together into a block chain to form a frame. An instance of the Frame class data structure is a container class for Block or a chain of Blocks. More than one frame may also be chained together. The Block data structure may comprise two fields to point to the next block **B** and the last block **B** in a block chain. The next block **B** after the last block of a block chain indicates the start of the next block chain. A block chain may comprise a payload of information embodied as information to be transported and a header that identifies what the information is or what to do with it.

Referring now to Figures 7b, and any other Figures as needed, Queue may be modified with QueueEndpoint. Blocks **B** in a block chain may be freed or allocated to or from FreeList with QueueEndpoint. All blocks **B** to be used are allocated at system startup inside FreeList, allowing the memory for chaining blocks **B** to be available in real time and not subject to garbage collection.

The Queue data structure may be used to transfer a block chain from one thread to another in a FIFO manner. Queue exchanges Blocks with Frame by moving a reference to the first block of a chain of Blocks from Frame to Queue or vice versa. Queue is tied to two instances of QueueEndpoints.

The Frame data structure comprises a basic container class that allows protocols to inspect, modify, and forward block chains. Frame may be thought of as an add/drop MUX for blocks **B**. All block chain manipulations may be done through the Frame data structure in order to guarantee integrity of the blocks **B**. The Frame data structure abstracts Block operations from the protocol stack. To process information provided by more than one frame simultaneously, Frame instances are private members of QueueEndpoint instances.

Unlike instances of Queue, which may contain multiple chains of Blocks, instances of Frame may contain one chain of Blocks. All frames and queues may be allocated at startup, just like blocks; however, unlike blocks **B** that are allocated as actual memory, Frame and Queue may be instantiated with a null handle that can be used later to point to a chain of blocks.

FreeList comprises a container class for free blocks **B**. FreeList comprises a chain of all free blocks **B**. There is typically only one FreeList per protocol stack **422**. Operations on instances of Frame that allocate or release blocks **B** interact with the FreeList. All blocks **B** within the freelist preferably have the same size. The FreeList

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may cover all layers of a protocol stack, from a physical hardware layer to an application layer. FreeList may be used when allocating, freeing, or adding information to/from a frame. In one embodiment, synchronization may be provided on the instance of FreeList. Every time a block **B** crosses a thread boundary, interrupts are disabled and then enabled, for example, every time a block **B** goes into the freelist or a queue, or a queuendpoint, layer, or thread boundary is crossed.

Referring to Figure 8, and any other Figures as needed, there is seen a representation of an illustration of multiple queues interacting with queueendpoint threads. As described herein, because a thread can be used to service multiple queues, on both transmit and receive, and because the Java threading model allows threads to wait on one and only one monitor, a queueendpoint preferably waits on one object (optionally itself) and all queues notify that object (optimally the queueendpoint).

Referring now to Figures 7b and 9, and any other Figures as needed, there is seen a frame processing subsystem responsible for dequeing a frame, inspecting its header, and consuming or forwarding the contents of a frame. A frame may be modified before being forwarded. InnerQueueEndpoint holds handles to instances of Queue, which may contain instances of Frame. InnerQueueEndpoint comprises its own thread to process Frame instances originating from Queue instances. Once it has completed its tasks, an InnerQueueEndpoint thread may wait for something to do. Notifications come from instances of Queue, which notify a destination QueueEndpoint that it just changed from empty to not empty, or a source QueueEndpoint that it crossed a low threshold or it that it changed from congested to not congested.

A queue may be bounded by two queueendpoints, and may be serviced by different threads of execution. Instances of Queue may provide an interface for notification that can be used by QueueEndpoint. Instances of Queue may also hold a reference to both queueendpoints, which the DPE **501** can use for notifications when queue events occur. Queue may specify control thresholds (hi-low) as well as a maximum number of blocks **B** to help to debug for conditions that could deplete the freelist. Flow control ensures that the other end of a communication path is notified if an end can't keep up, i.e., if a queue is filling up it can be emptied. InnerQueueEndpoint is responsible for creating, processing, or terminating block chains.

QueueEndpoint class may contain two fields "queueCongested" and "queueNotEmpty". QueueEndpoint may comprise an array with which it can readily

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access queueCongested and queueNotEmpty, where the status elements of the array are shared with respective queues. A queue may set one of these fields, which may be used to notify a queueendpoint that it has a reason to inspect the queue. QueueEndpoint allows optimizations of queue operations, for example, queueendpoints are able to determine which queue needs to be serviced from notifications provided by a queue. The DPE **501** provides a means by which every queue need not be polled to see if there is something to do based on a queue event. Previously, with standard Java techniques, to see if a queue would be empty or full, a query would have been made through a series of synchronized method calls, which would implicate the previously discussed contention and latency issues. By making decisions through an internal data structure, method calls may be replaced by direct field access of data structures.

Referring now to Figure 10, and any other Figures as needed, there is seen a representation of a hardware interface to the DPE. At the hardware level, transfers of information to/from a receive or transmit FIFO buffer of a baseband circuit **307** or other hardware used to transfer information may occur through Interrupt Service Routines (ISRs) and Direct Memory Access (DMA) requests that interface to the DPE **501** through the Block data structure. At the lowest hardware level, a framer may operate on the information from the FIFO. The framer may comprise hardware or software. In one embodiment, a software framer comprises interrupt service threads that are activated by hardware interrupts when information is received by the FIFO from input **531** or output **530** streams. The Frame data structure is filled or emptied with information from an output **530** or input **531** stream at the hardware level by the framer in block **B** sized increments. The queueendpoint closest to the hardware services hardware interrupts and DMA requests from peripherals by a QueueEndpoint interface to the transmit and receive buffers **312, 311** which may be accessed by the software support layer's kernel. QueueEndpoint registers to a particular hardware interrupt by making itself known to the kernel. QueueEndpoint is notified by the interrupts it is registered to. The kernel has a reference to a QueueEndpoint in its interrupt table, which is used to notify a thread whenever a corresponding interrupt occurs.

Referring now to Figure 11 and other Figures as needed there is seen an embodiment as described herein. Circuit **300** may utilize a software protocol stack **422** and DPE **501,** as described previously herein, when communicating with peripherals or devices. In one embodiment, the communications may occur over a baseband circuit **307**

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that is compliant with a Bluetooth™ communications protocol. Bluetooth™ is available form the Bluetooth Special Interest Group (SIG) founded by Ericsson, IBM, Intel, Lucent, Microsoft, Motorola, Nokia, and Toshiba, and is available as of this writing at www.bluetooth.com/developer/specification/specification.asp. It is understood that although the specifications for the Bluetooth communications protocol may change from time to time, such changes would still be within the scope and spirit of the present invention. Furthermore, other wireless communications protocols are within the scope and skill of the present invention as well as those skilled in the art, including, 802.11, HomeRF, IrDA, CDMA, GSM, HDR, and so called 3rd Generation wireless protocols such as those defined in the Third Generation Partnership Project (3GPP). Although described above in a wireless context, communications with circuit **300** may also occur using wired communication protocols such as TCP/IP, which are also within the scope of the present invention. In other embodiments, wireless or wired data transfer may be facilitated as ISDN, Ethernet, and Cable Modem data transfers. In one embodiment, a radio module **308** may be used to provide RF wireless capability to baseband circuit **307**. In one embodiment, radio module **308** may be included as part of the baseband circuit **307**, or may be external to it. Bluetooth technology is intended to have low power consumption and utilize a small memory footprint, and is, thus, well suited for small resource constrained wireless devices. In one embodiment, circuit **300** may include baseband circuit **307** and processor core **302** functionality on one chip die to conserve power and reduce manufacturing costs. In one embodiment, the circuit **300** may include the baseband circuit **307**, processor core **302**, and radio module **308** on one chip die.

In the prior art, access to peripheral's/device's functionality may be accomplished through lower level languages. For example, in previously existing hardware accelerators that implement Java, Java "native methods" (JNI) require an interface written in, for example, a C programming language, before the native methods can access a peripheral functionalities. In contrast to the prior art, the embodiments described herein provide applications or other software residing on or off circuit **300** direct access to the functionality and features of peripherals or devices, for example, access to the data reception/transmission functionality of baseband circuit **307**.

In one embodiment, memory **362** of circuit **300** may be embodied as any of a number of memory types, for example: a SRAM memory **309** and/or a Flash memory **304**. In one embodiment, the memory **362** may be defined by an address space, the

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address space comprising a plurality of locations. In one embodiment, the software data structures described previously herein (indicated generally by descriptor **310**) may be mapped to the plurality of locations. In one embodiment, the software data structures **310** may span a contiguous address space of the memory **362**. Data received by baseband circuit **307** may be tied to the data structures **310** and may be accessed or used by an application program or other software. In one embodiment data may be accessed at an application layer program level through API **419** As described herein, in one embodiment the software data structures **310** may comprise objects. In one embodiment, the objects may comprise Java objects or Java-like objects. In one embodiment, the data structures **310** may comprise one or more Queues, Frames, Blocks, ByteArrays and other software data structures as described herein.

In one embodiment, circuit **300** may comprise a receive **312** (Rx) and transmit **311** (Tx) buffer. In one embodiment, the receive **312** (Rx) and transmit **311** (Tx) buffers may be embodied as part of the baseband circuit **307**. As described further herein, information residing in the baseband receive **312** (Rx) and transmit **311** (Tx) buffers may be tied to the data structures **310** with minimal software intervention and minimal physical copying of data, thereby eliminating the need for time consuming translations of the data between the baseband circuit **307** and applications or other software. In one embodiment, an application or other software may utilize the received information directly as stored in the locations in memory **362**. In one embodiment, the stored information may comprise byte-codes. In one embodiment, the byte-codes may comprise Java or Java-like byte-codes. In other embodiments, it is understood that information as described herein is not limited to byte-codes, but may also include other data, for example, bytes, words, multi-bytes, and information streams to be processed and displayed to a user, for example, an information stream such as an audio data stream, or database access results. In one embodiment, the information may comprise a binary executable file (binary representations of application programs) that may be executed by processor core **302**. Unlike prior art solutions, the embodiments described herein enable transparent, direct, and dynamic transfer of data, reducing the number of times the information needs to be copied/recopied before utilization or execution by applications, the protocol stack, other software, and/or the processor core **302**.

As previously described, the software data structures **310** in memory **362** may be constructs representing one or more blocks **B** in queues **524a-b, 525a-b** that act as FIFOs

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for the information streams **530, 531**. Data or information received by radio module **308** may be communicated to the baseband circuit **307** from where it may be transferred from the receive **312** buffer to a queue **524a-b, 525a-b** by the DMA controller **305**; or may originate in a queue **524a-b, 525a-b** from where it may be transferred by the DMA controller **305** to the transmit buffer **311** and from the transmit buffer to the radio module **308** for transmission. Setup of a transfer of data may rely on low level software interaction, with "low level software" referring to software instructions used to control the circuit **300**, including, the processor core **302**, the DMA controller **305**, and the interrupt request IRQ controller **306**. Preferably, no other software interaction need occur during a DMA transfer of data between baseband circuit **307** and memory **362**. From the point of view of the DMA controller **305**, data in a block **B** of a queue **524a-b, 525a-b** is in memory **362**, and the baseband circuit **307** is a peripheral. DMA transfers may occur without software intervention after the low level software specifies a start address, a number of bytes to transfer, a peripheral, and a direction. Thereafter, the DMA controller **305** may fill up or empty a receive or transmit buffer when needed until a number of units of data to transfer has been reached. Events requiring the attention of low level software control may be identified by an IRQ request generated by IRQ controller **306**. Type of events that may generate an IRQ request include: the reception of a control packet, the reception of the first fragment of a new packet of data, and the completion of a DMA transfer (number of bytes to transfer has been reached).

In a receive mode, the baseband receive buffer **312** may hold data received by the radio module **308** until needed. In one embodiment, circuit **300** may comprise a framer **313**. In one embodiment, the framer **313** may be embodied as hardware of the baseband circuit **307** and/or may comprise part of the low level software. The framer **313** may be used to detect the occurrence of events, which may include, the reception of a control packet or a first fragment of a new packet of data in the receive buffer **312**. Upon detection, the framer **313** may generate an IRQ request. In one embodiment, when receiving, an application or other software in memory **362** may use high level software protocols to listen to a peer application, for example, a web server application on an external device acting as an access point for communicating over a Bluetooth link to the baseband circuit **307**. Low level software routines may be used to set up a data transfer path between the baseband circuit **307** and the peer application. Data received from a peer application may comprise packets which may be received in fragments. The framer

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313 may inspect the header of a fragment to determine how to handle it. In the case of a control packet, low level software may perform control functions such as establishing or tearing down connections indicated by the start or end of a data packet. If a fragment is marked as a first fragment of a packet, the framer 313 may generate an interrupt allowing the low level software to allocate the fragment in an input stream to a block **B**. The framer may then issue DMA 305 requests to transfer all the fragments of the packet from the baseband receive buffer 312 to the same block **B**. If a block in the queue 525a-b fills up, the DMA 305 may generate an interrupt and the low level software may allocate another block **B** to a queue. Upon reception of another fragment, marked as a first fragment of another packet, the framer 312 may generate another interrupt to transfer the data to another block **B** in the same queue.

In a transmit mode, the baseband circuit 307 transmit buffer 311 may receive data from an application or other software executing under control of the processor core 302, and when received, may send the data to the radio module 308 in its entirety or in chunks at every transmit opportunity. In a time division multiplexed system, a transmit time slot may be viewed as a transmit opportunity. When a queue 524a-b, in an output stream receives a block **B** of data from an application or other software, the low level software may configure the DMA 305 and tie that queue to the baseband transmit buffer 311. The baseband transmit buffer 311, if empty, may issue a request to get filled up by the DMA 305. Every time the baseband transmit buffer 311 is not full or reaches a predetermined watermark, it may issue another DMA request until the first block **B** that was allocated in the queue in the transmit chain has been completely transferred to the buffer, at which point the DMA 305 may request an interrupt. The low level software may service the interrupt by providing the DMA 305 with another block **B** as filled with data from an application or other software. In one embodiment, the processor core 302 may be switched into a power saving mode between reception or transmission of two data packets. In one embodiment, when transmitting, a web application program may communicate using high level software protocols via baseband circuit 307 with other applications, software, or peripherals or devices, for example, a web server application located on an external device. Layered on top of this communication may be a high level HTTP protocol. In one embodiment, the external device may be a mobile wireless device or an access point providing a wireless link to web servers, the Internet, other data networks, service provider, or another wireless device.

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In one embodiment, the memory **362** may comprise a Flash memory **304**, which could be used to store application programs, VM executive, or APIs. The contents of the Flash memory **304** may be executed directly or loaded by a boot loader into RAM **309** at boot-up. In one embodiment, after startup, an updated application, VM, and/or API provided by an external radio module **308** could be uploaded to RAM **309**. After a step of verifying the operability of the uploaded software, the updated software could be stored to the Flash memory **304** for subsequent use (from RAM or Flash memory) upon subsequent boot-up. In one embodiment, updated applications, software, APIs, or enhancements to the VM may be stored in Flash memory or RAM for immediate use or later use without a boot-up step.

Referring to Figure 12 and other Figures as needed, there is seen represented an information transfer into a software data structure. In one embodiment, circuit **300** and a DMA **305** are configured to allow the transfer of data from a peripheral or device directly into a software data structure. Once data is transferred into the data structure **310**, it may be utilized by an application program, other software, or hardware without any further movement of the data from its location in memory **362**. For example, if the data comprises Java or Java-like byte-codes, the byte-codes may be executed directly from the their location in memory. By reducing or eliminating the transfers of data before use of the data, fewer processor instructions may be executed, less power may be consumed, and circuit **300** operation may be optimized. In one embodiment, a data transfer may occur in the following steps:

1. A packet of data from a peripheral or device may be received and stored in a receive buffer **312** of a device or peripheral. The peripheral or device may comprise an on or off circuit **300** peripheral (on circuit shown). In one embodiment, the peripheral or device may comprise baseband circuit **307**.

2. Reception of data in the receive buffer **312** may generate a DMA **305** request. The DMA request may flush the receive buffer **312** directly into a data structure **391**.

3. After the DMA **305** transfer of the data, the processor core **302** may be notified to hand the data off to an application or other software.

Although a DMA **305** is described herein in one embodiment as being used to control the direct transfer and execution of data from a peripheral or device with a minimal number of intervening processor core **302** instruction steps, it is understood that the DMA **305** comprises one possible means for transferring of data to the memory, and

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that other possible physical methods of data transfer between a peripheral or device and the memory **362** could be implemented by those skilled in the art in accordance with the description provided herein. One such embodiment could make use of an instruction execution means, for example, the processor core **302**, to execute instructions to perform a read of data provided by a peripheral or device and to store the data temporarily prior to writing the data to the memory **362**, for example, in a programmable register in the processor core **302**. In one embodiment, the programmable register could also be used to write data directly to a data structure **310** in memory **362** to effectuate operations using the data in as few processor instruction steps as possible. In contrast to the DMA embodiment described previously, in which large blocks of data may be transferred to memory **362** with one DMA instruction, in the this embodiment, the processor core **302** may need to execute two instructions per unit of data stored in the peripheral or device receive buffer **312**, for example, per word. The two instructions may include an instruction to read the unit of data from the peripheral or device and an instruction to write the unit of data from the temporary position to memory **302**. Although, compared to the DMA embodiment described above, two processor instructions per unit of data could consume more power and would use processor cycles that could be used for other processes, execution of two instructions, as described herein, is still fewer than the number of instructions that need to be executed by the prior art. For example, the methodology of Figure 2 requires the transfer of a unit of data from a peripheral or device to memory, including at least the following steps: a transfer of the data from the FIFO **198** to a register in the processor core **196**, a transfer of the data from the core to the receive buffer **192**, a transfer of the data from the buffer to the processor core **196**, and finally, a transfer of the data from the core into a Java object **191**, which would necessitate the execution of at least four processor instructions (read-write-read-write) per unit of data.

Referring to Figure 13 and other Figures as needed, there is seen an embodiment as described herein. A software data structure **391** may comprise a Block data structure, as described herein previously. In one embodiment, the Block data structure may comprise a Java or Java-like software data structure, for example, a Block object. In one embodiment, the Block object may comprise a ByteArray object. After instantiation, the Block object's handle/pointer may be referenced and saved to a FreeList data structure. The handle may be used to access the ByteArray object. With the ByteArray object

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pushed to the top of the stack (TOS), the base address of the ByteArray object may be referenced by a pointer.

In one embodiment, the (TOS) value may be stored in a memory mapped DMA buffer base address register. To do so, circuit **300** may include registers that may be read and written using an extended byte-code instruction not normally supported by standard Java or Java-like virtual machine instruction sets, for example, with an instruction providing functionality similar to a PicoJava register store instruction. A ByteArray object of a Block object may be defined as comprising a predefined size, for example Byte[ ] a=new Byte [20] may set aside 20 contiguous byte-size memory locations for the ByteArray object. The predefined size may be written to a DMA "word count register" to specify how many transfers to conduct every time the DMA is triggered to service a peripheral or device, for example, the baseband circuit **307**. With one DMA channel dedicated to each peripheral or device, the word count register would need to be initialized only once, whereas the DMA buffer base address register would need to be modified for every new Block object, for example:

```
void Native setUpDMA( nameOfByteArray, sizeOfByteArray ) {
write nameOfByteArray to the DMA memory buffer register
write sizeOfByteArray to the DMA word count register
return
}
```

whereby a caller could call setUpDMA as follows:

```
setUpDMA( aByteArray, sizeOF(aByteArray))
```

In one embodiment, a ByteArray data structure may be set up to receive data from a peripheral or device in the following steps:

a-An application or other software **394** may obtain a handle of, or reference to, a Byte Array data structure which could, for example, be stored as a field in a data structure, for example a Block data structure, or which could be present in a current execution context as a local variable.

b-The handle may be pushed onto a stack **393**, for example, on a stack cache or onto a stack in memory, thereby becoming the top of stack (TOS) element.

c-The TOS element may be written to an appropriate DMA **305** buffer base address register.

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d-A peripheral or device **395** may initiate a DMA transfer, writing information to or from the peripheral or device directly into the pre-instantiated ByteArray data structure as specified by the DMA buffer base address register.

In one embodiment, circuit **300** may operate as or with a wireless device, a wired device, or a combination thereof. In one embodiment, the circuit **300** may be implemented to operate with or in a fixed device, for example a processor based device, computer, or the like, architectures of which are many, varied, and well known to those skilled in the art. In one embodiment, the circuit **300** may be implemented to work with or in a portable device, for example, a cellular phone or PDA, architectures of which are many, varied, and well known to those skilled in the art. In one embodiment, the circuit **300** may be included to function with and/or as part of an embedded device, architectures of which are many, varied, and well known to those skilled in the art.

While some embodiments described herein may be used with data comprising Java or Java-like data and byte-codes, and Java or Java-like objects or data structures including, but not limited, those used in J2SE, J2ME, PicoJava, PersonalJava and EmbeddedJava environments available from Sun Microsystems Inc, Palo Alto, it is understood that with appropriate modifications and alterations, the scope of the present invention encompasses embodiments that utilize other similar programming environments, codes, objects, and data structures, for example, C# programming language as part of the .NET and .NET compact framework, available from Microsoft Corporation Redmond, Washington; Binary Run-time Environment for Wireless (BREW) from Qualcomm Inc., San Diego; or the MicrochaiVM environment from Hewlett-Packard Corporation, Palo Alto, California. The Windows operating systems described herein are also not meant to be limiting, as other operating systems/environments may be contemplated for use with the present invention, for example, Unix, Macintosh OS, Linux, DOS, PalmOS, and Real Time Operating Systems (RTOS) available from manufacturers such as Acorn, Chorus, GeoWorks, Lucent Technologies, Microware, QNX, and WindRiver Systems, which may be utilized on a host and/or a target device. The operation of the processor and processor core described herein is also not meant to be limiting as other processor architectures may be contemplated for use with the present invention, for example, a RISC architecture, including, those available from ARM Limited or MIPS Technologies, Inc. which may or may not include associated Java or other semi-compiled/interpreted language acceleration mechanisms. Other wireless

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communications protocols and circuits, for example, HDR, DECT, iDEN, iMode, GSM, GPRS, EDGE, UMTS, CDMA, TDMA, WCDMA, CDMAone, CDMA2000, IS-95B, UWC-136, IMT-2000, IEEE 802.11, IEEE 802.15, WiFi, IrDA, HomeRF, 3GPP, and 3GPP2, and other wired communications protocols, for example, Ethernet, HomePNA, serial, USB, parallel, Firewire, and SCSI, all well known by those skilled in the art may also be within the scope of the present invention. The present invention should, thus, not be limited by the description contained herein, but by the claims that follow.

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What is claimed is:

1. A method of manipulating data, comprising the steps of:
providing a peripheral;
providing a memory, the memory defined by an address space, the address space comprising a location;
mapping a data structure to the location;
receiving data with the peripheral; and
storing the data to the location.

2. The method of claim 1, the step of storing comprising a step of transferring the data directly from the peripheral to the location.

3. The method of claim 1, the step of storing comprising a DMA transfer of the data from the peripheral to the location.

4. The method of claim 2, further comprising a step of executing the data directly from the location.

5. The method of claim 4, the data comprising streaming data.

6. The method of claim 4, the data comprising a binary executable file.

7. The method of claim 1, the data structure comprising a Java-like data structure.

8. The method of claim 1, the data structure comprising an object.

9. The method of claim 8, the object comprising an array object.

10. The method of claim 9, the array object comprising a byte array object.

11. The method of claim 8, further comprising the step of providing an execution means for executing instructions, and the step of storing the data comprising execution of no more than two of the instructions.

12. The method of claim 11, the execution means comprising a processor, and the instructions comprising a processor read instruction and a processor write instruction.

13. The method of claim 12, the data comprising a Java object.

14. The method of claim 1, the data comprising byte-codes.

15. The method of claim 14, the byte-codes comprising Java-like byte-codes.

16. The method of claim 15, further comprising the step of providing an application program; and the step of performing operations on the Java-like byte-codes with the application program directly from the location.

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17. The method of claim 1, the step of receiving comprising receiving the data as wireless data.

18. The method of claim 1, further comprising a step of operating on the data with an application layer program directly from an address space comprising a contiguous address space.

19. The method of claim 1, further comprising a step of executing the data, wherein the data is stored in only one memory location before executing the data.

20. The method of claim 19, wherein the location comprises a more than one location and the locations located contiguously in the address space.

21. A communications apparatus, comprising:
a peripheral, the peripheral receiving data;
a memory, the memory defined by an address space, the address space comprising a location, the location comprising a data structure; and
a data transfer portion for transferring the data directly from the peripheral to the data structure.

22. The apparatus of claim 21, the data structure comprising a Java-like data structure.

23. The apparatus of claim 21, the data structure comprising an object.

24. The apparatus of claim 23, the object comprising a byte array object.

25. The apparatus of claim 21, further comprising a processor, the processor executing processor instructions, the transfer of data from the peripheral to the location occurring in no more than two of the processor instructions.

26. The apparatus of claim 21, the data transfer portion comprising a DMA controller.

27. The apparatus of claim 21, the data comprising byte-codes.

28. The apparatus of claim 27, the byte-codes comprising Java-like byte-codes.

29. The apparatus of claim 21, the peripheral comprising a wireless baseband.

30. The apparatus of claim 21, the data comprising streaming data.

31. The apparatus of claim 21, the wireless baseband comprising a Bluetooth compatible wireless baseband.

32. The apparatus of claim 21, the wireless baseband selected from a group comprising: Bluetooth, 802.11, HomeRF, IrDA, CDMA, GSM, HDR, and 3GPP compatible basebands.

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33. The apparatus of claim 23, further comprising:
a program execution unit;
an application program, the application program operating under control of the program execution unit, and the application program operating on the data directly from the location.

34. The apparatus of claim 33, the application program comprising a Java-like application program.

35. The apparatus of claim 33, the data comprising a binary executable file.

36. The apparatus of claim 33, the data comprising streaming data.

37. A communications apparatus, comprising:
a peripheral, the peripheral receiving data;
a memory, the memory defined by an address space, the address space comprising a location, the location comprising an object; and
a data transfer portion for transferring the data directly from the peripheral to object.

38. The apparatus of claim 37, the object comprising a Java object.

39. The apparatus of claim 37, the object comprising a byte array object.

40. The apparatus of claim 39, the data transfer portion comprising an execution means for executing instructions, the execution means transferring the data with no more than two instructions.

41. A communications apparatus, comprising:
a peripheral, the peripheral receiving data;
a memory, the memory defined by an address space, the address space comprising a data structure; and
a data transfer portion for transferring the data directly from the peripheral to the data structure.

42. The apparatus of claim 41, the data transfer portion comprising a processor, the processor executing processor instructions, the transfer of data requiring no more than two of the processor instructions to transfer the data from the peripheral to the data structure.

43. The apparatus of claim 41, the data comprising Java-like byte-codes and the data structure comprising a Java-like object.

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44. The apparatus of claim 43, the peripheral comprising a baseband.

45. The apparatus of claim 43, the apparatus comprising a wireless communications apparatus.

46. The apparatus of claim 44, the apparatus comprising a die, the die comprising the execution means and the baseband.

47. The apparatus of claim 46, the baseband comprising a Bluetooth compatible baseband.

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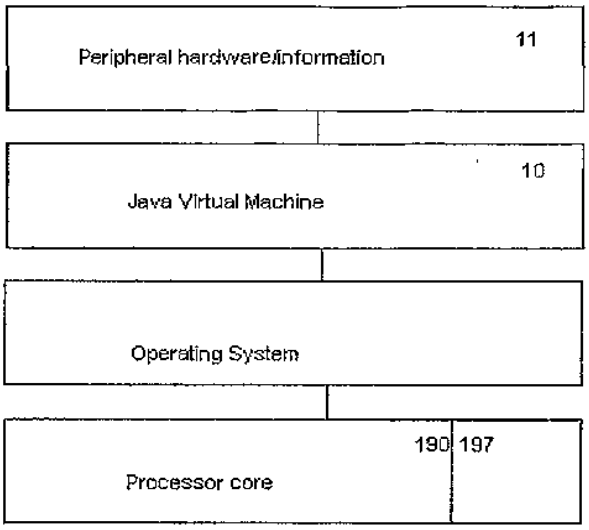


Figure 1

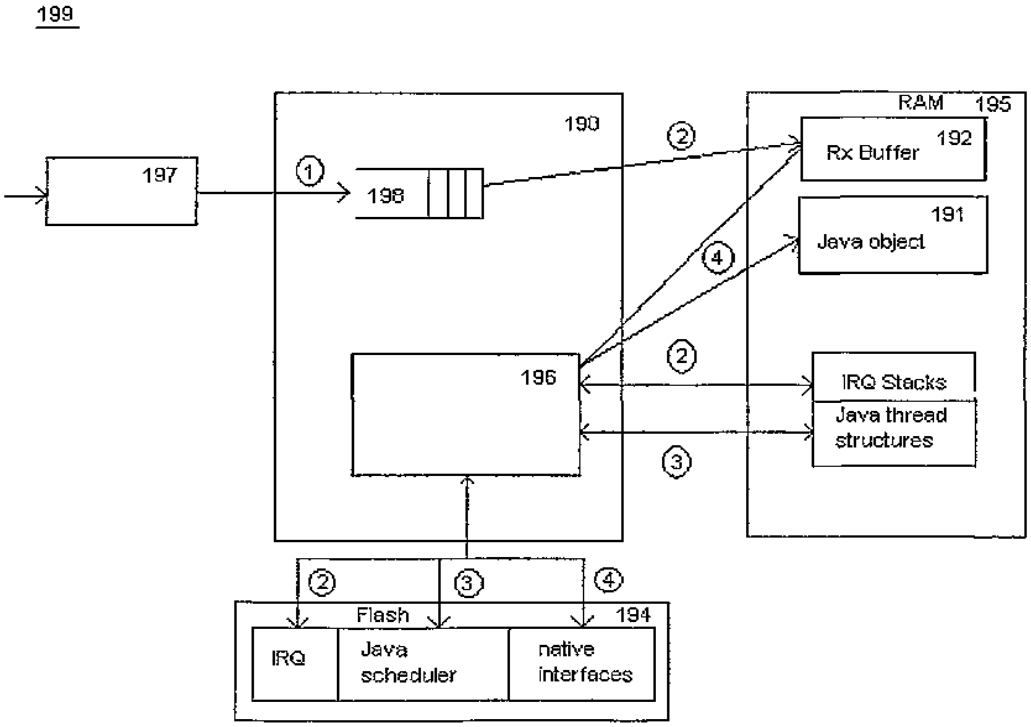


Figure 2

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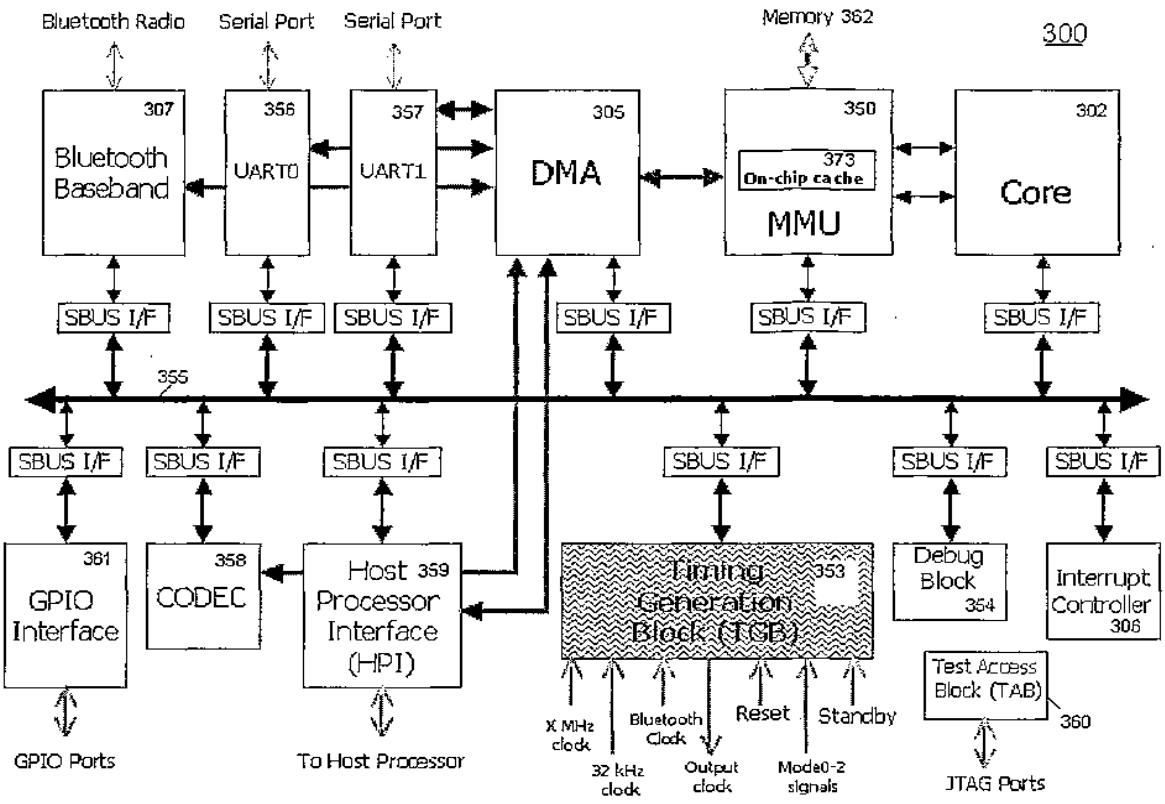

Bluetooth Radio
Serial Port
Serial Port
Memory 362
300
307
Bluetooth Baseband
356
UART0
357
UART1
305
DMA
350
373
On-chip cache
MMU
302
Core
SBUS I/F
355
361
GPIO Interface
358
CODEC
Host 359 Processor Interface (HPI)
Timing Generation Block (TGB) 353
Debug Block 354
Interrupt Controller 306
Test Access Block (TAB) 360
GPIO Ports
To Host Processor
X MHz clock
32 kHz clock
Bluetooth Clock
Output clock
Reset
Standby
Mode0-2 signals
JTAG Ports

Figure 3a

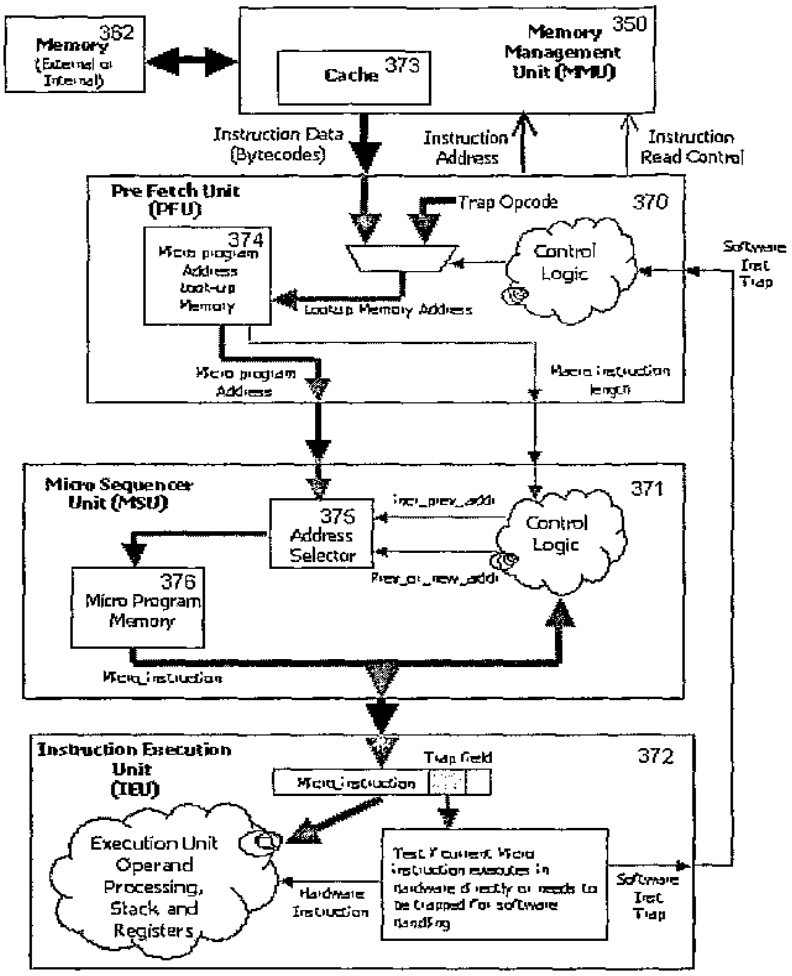


Figure 3b

Upon a trapped instruction which is not directly executed in hardware:

1) Current Opcode is loaded into a register used to handle vector table bases (in IEU)
2) Some registers are swapped
3) Some registers are pushed onto the stack
4) Software execution transfers via the vector table setting
5) Current opcode is translated via software into a sequence of opcodes that can be executed directly in hardware
6) This opcode sequence is then executed in place of the current opcode

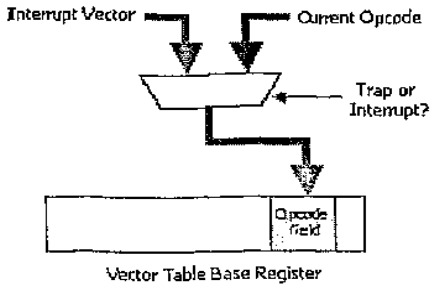


Figure 3c

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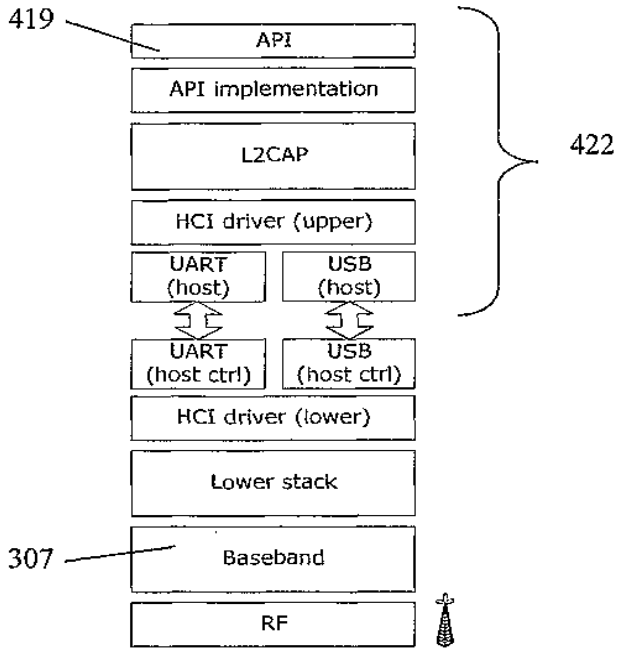

419
API
API implementation
L2CAP
HCI driver (upper)
UART (host)
USB (host)
422
UART (host ctrl)
USB (host ctrl)
HCI driver (lower)
Lower stack
307
Baseband
RF

Figure 4

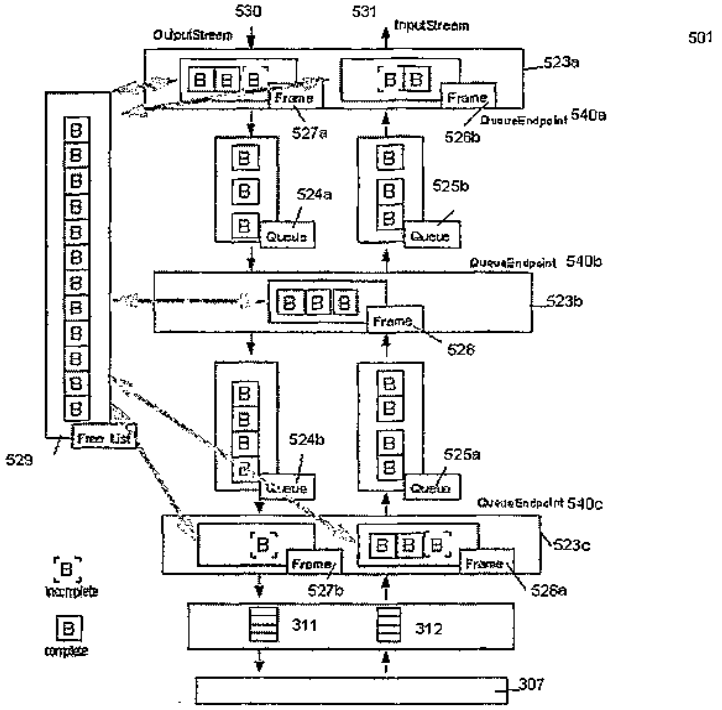


Figure 5

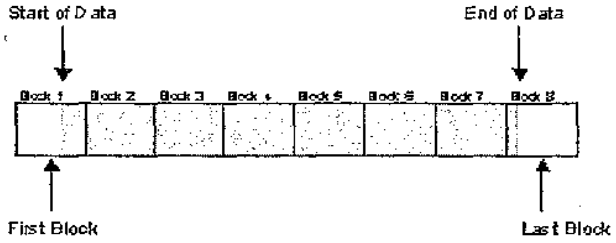


Figure 6a

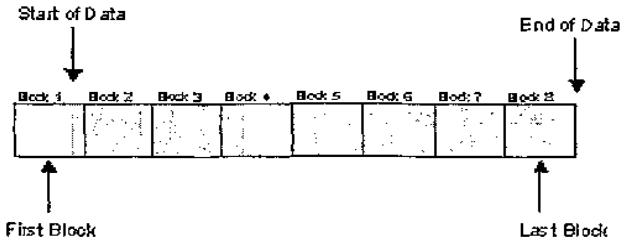


Figure 6b

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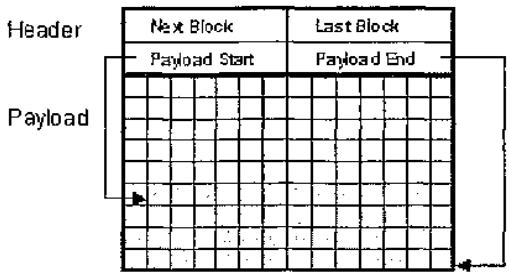


Figure 6c

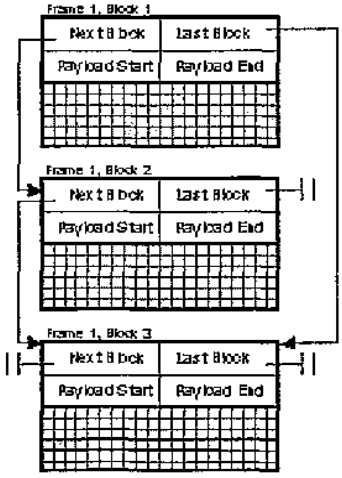


Figure 6d

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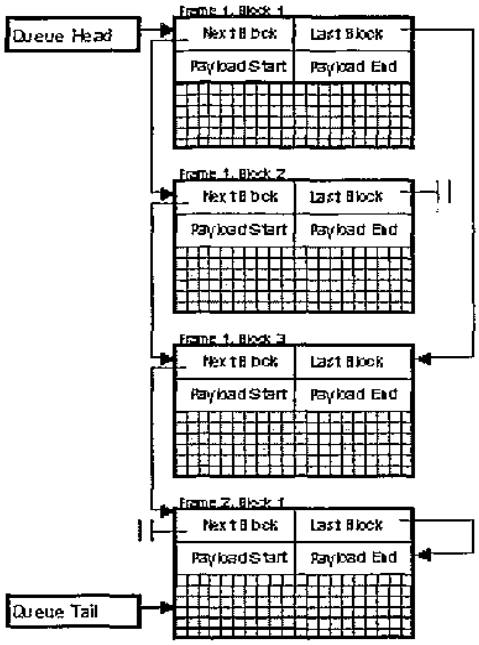


Figure 6e

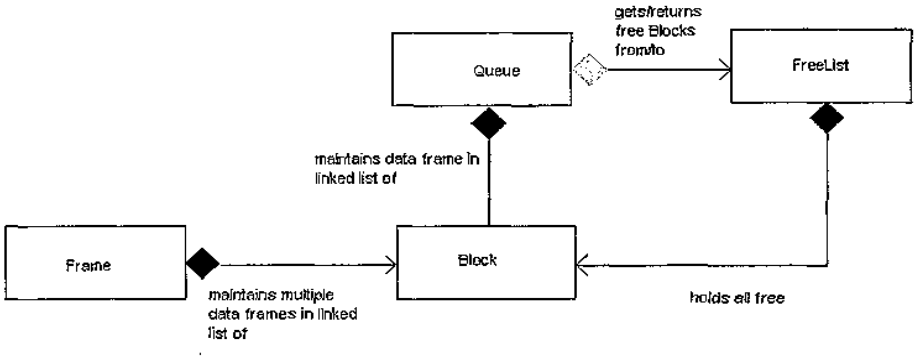


Figure 7a

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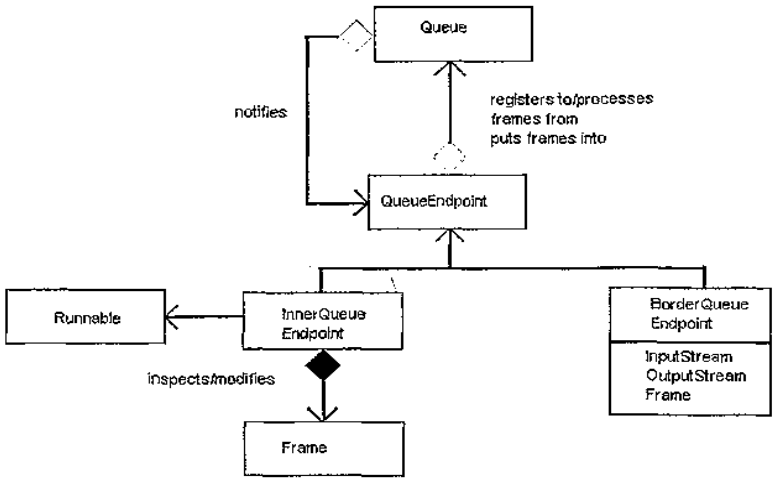


Figure 7b

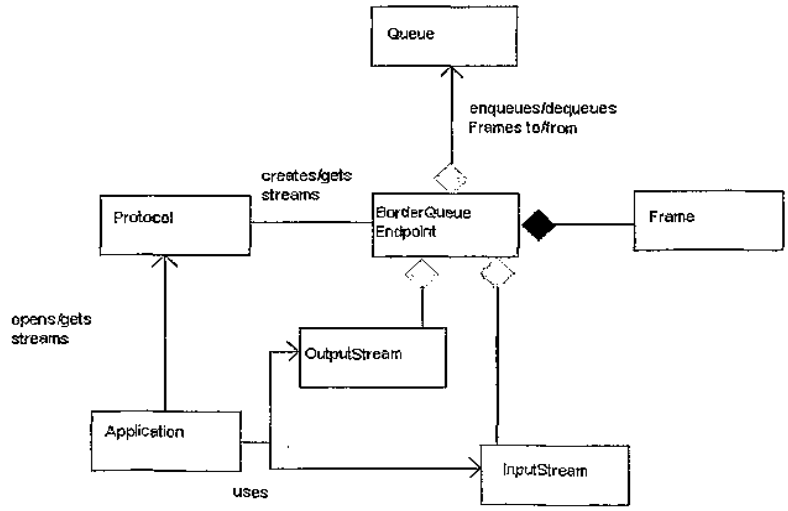


Figure 7c

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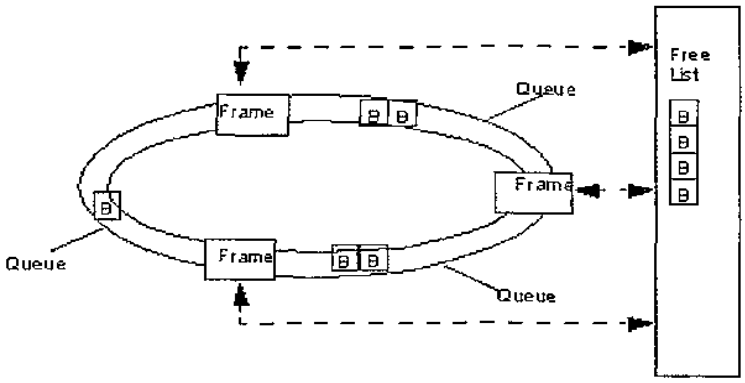


Figure 8

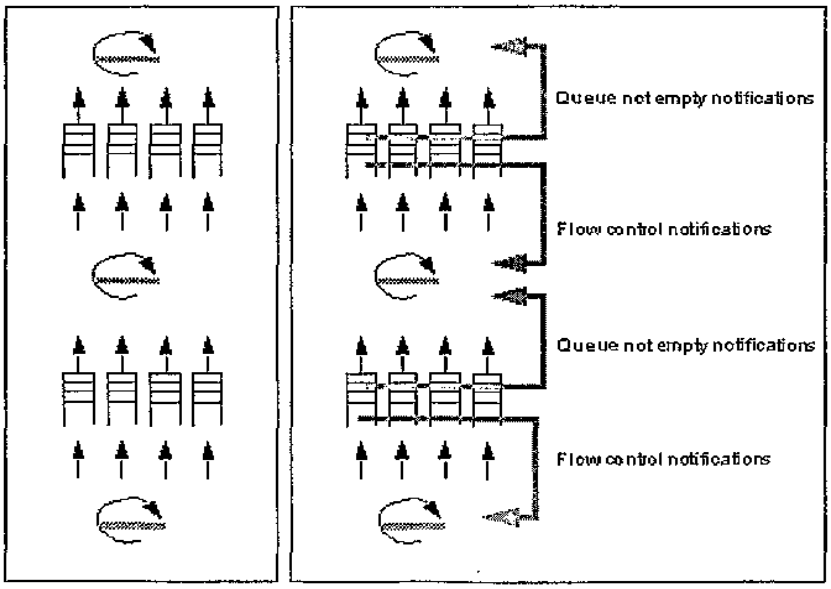


Figure 9

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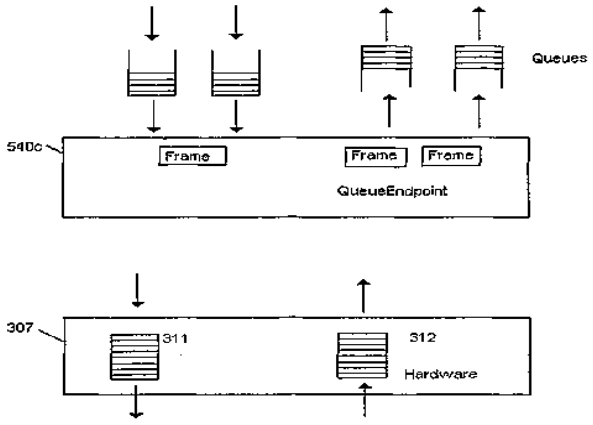


Figure 10

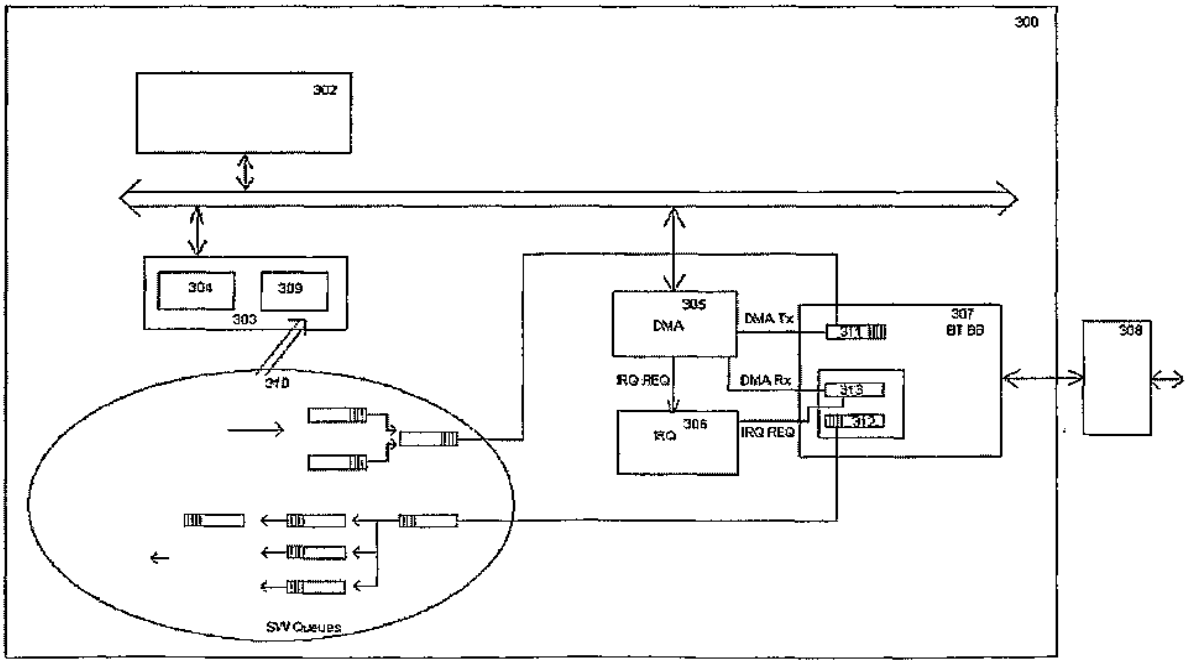


Figure 11

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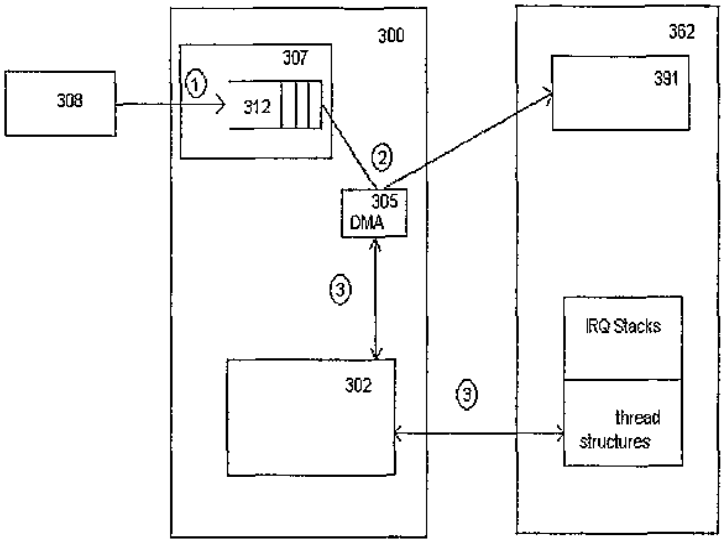


Figure 12

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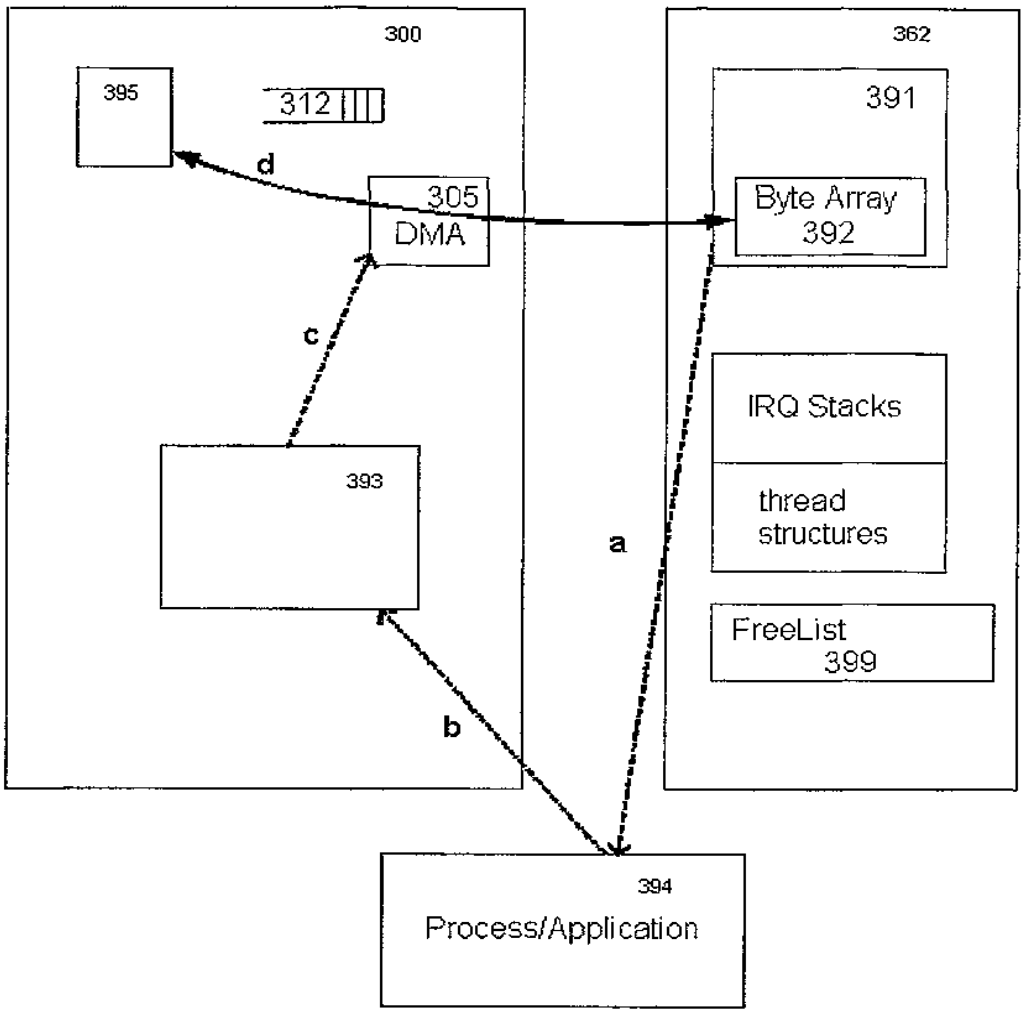

300
362
395
312
391
d
305
DMA
Byte Array
392
c
IRQ Stacks
393
thread
structures
a
FreeList
399
b
394
Process/Application

Figure 13

System and method for device-to-device pervasive digital output

Application Number	01821101	**Application Date**	2001.10.31
Publication Number	1488106	**Publication Date**	2004.04.07
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International Classification	G06F15/16		
Applicant(s) Name	Flexiworld Technologies, Inc.		
Address			
Inventor(s) Name	William. Ho. Chang;Christina. Ying. Liu		
Patent Agency Code	11219	**Patent Agent**	lu yi zhong qiang

Abstract

An electronic system and method of pervasive output allow an information apparatus to output digital content conveniently to virtually any output device. The information apparatus includes an output manager that may be implemented as application software, a client application, or device driver. The output manager may be capable of communicating with, managing and synchronizing data (516) or software components with an output device or an output controller associated with the output device. An output controller is installed in or connected to an output device, such as a printer, to enable the output device to communicate and negotiate services (514) with an information apparatus such as mobile computing device. The information apparatus may communicate with the output controller to obtain device dependent data or software components such as device specific printer driver.

» Machine Translation » Close

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[19] 中华人民共和国国家知识产权局

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[56] 参考文献

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[74] 专利代理机构 中原信达知识产权代理有限责任公司

代理人 陆 弋 钟 强

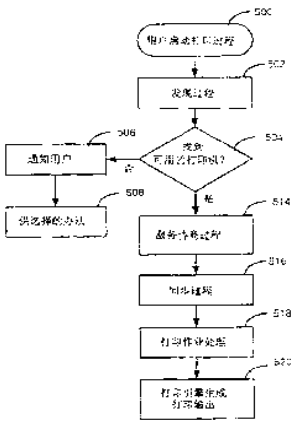
权利要求书 16 页 说明书 42 页 附图 13 页

[54] 发明名称

用于设备到设备的普适数字输出的控制器及管理器

[57] 摘要

一种普适输出的电子系统及方法，使得信息装置可以方便地向基本上任何输出设备输出数字内容。该信息装置包括输出管理器，该输出管理器可以以应用软件、客户应用程序、或设备驱动程序实现。输出管理器能够与输出设备或同输出设备相关的输出控制器一起与数据或软件组件通信、管理并同步数据(516)或软件组件。输出控制器安装在输出设备如打印机之中或与输出设备相连，以使输出设备可以与信息装置如移动计算设备通信并协商服务(514)。信息装置可以与输出控制器通信，以得到设备相关的数据或软件组件，如由设备确定的打印机驱动程序。



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1. 一种数据输出控制器，其控制信息装置与选中的输出设备之间的交互，选中的输出设备呈现从信息装置存取的数据内容，该控制器包括：

用于管理信息装置与选中的输出设备之间的通信信道的装置；

用于通过通信信道向信息装置提供与选中的输出设备相关的至少一个属性以及一个或多个设备相关的软件组件以使数据内容能够由选中的输出设备呈现的装置；和

用于通过通信信道接收至少部分地符合至少一个属性的数据内容的装置；和

用于向选中的输出设备提供要呈现的至少部分符合的数据内容的装置。

2. 如权利要求 1 的控制器，其中至少一个属性是响应于被确定为信息装置上不可用的至少一个属性而通过通信信道提供的。

3. 如权利要求 1 的控制器，进一步包含用于通过通信信道提供使得数据内容能够在选中的输出设备上呈现的一个或多个输出设备驱动程序组件的装置。

4. 如权利要求 3 的控制器，其中一个或多个输出设备驱动程序组件是响应于被确定为信息装置上不可用的一个或多个设备驱动程序组件而通过通信信道提供的。

5. 如权利要求 1 的控制器，其中一个或多个组件包括软件代码。

6. 如权利要求 1 的控制器，其中一个或多个组件包括软件应用程序。

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7. 如权利要求 1 的控制器，其中一个或多个组件的每个是从包括设备驱动程序、打印机驱动程序、输出驱动程序、或用户接口的组中单独选出的一个或多个。

8. 如权利要求 1 的控制器，其中与选中的输出设备相关的属性的每个是从包括设备标识、设备批次、设备型号、设备类型、设备输入数据格式、设备输入语言、设备特征集、设备规格、设备服务质量、设备服务类型、设备服务可用性、和设备服务费用、设备验证、设备安全、设备分辨率、设备位深度、设备色空间、设备色彩数、设备色彩表、和设备半色调表的组中单独选出的一个或多个。

9. 如权利要求 1 的控制器，进一步包括用于搜索信息装置并一旦在搜索中发现就与其建立通信信道的装置。

10. 如权利要求 8 的控制器，进一步包括用于将选中的输出设备的可用性以及与选中的输出设备相关的至少一个属性一起广播的装置。

11. 如权利要求 1 的控制器，进一步包括用于被动地等待信息装置的发现并一旦有发现就建立与信息装置的通信信道的装置。

12. 如权利要求 1 的控制器，进一步包括用于提供信息装置或其操作者的验证的装置。

13. 如权利要求 1 的控制器，进一步包括用于计算输出设备呈现数据内容所需的支付的装置。

14. 如权利要求 1 的控制器，进一步包括用于处理输出设备呈现数据内容所需的支付的装置。

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15. 如权利要求 1 的控制器，具有用于安装在输出设备中的结构。

16. 如权利要求 1 的控制器，具有外部连接至一个或多个输出设备的结构。

17. 如权利要求 1 的控制器，其中通信信道是无线通信信道。

18. 如权利要求 17 的控制器，其中无线通信是无线电通信。

19. 如权利要求 17 的控制器，其中无线通信是红外通信。

20. 如权利要求 1 的控制器，其中选中的输出设备是打印机。

21. 如权利要求 1 的控制器，进一步包括用于将至少部分符合的数据内容处理并转换为与选中的输出设备兼容的输出数据的装置。

22. 如权利要求 1 的控制器，进一步包括用于将至少部分符合的数据内容转换为与输出设备、打印机、打印机引擎、输出引擎、显示器引擎、或打印机控制器之一兼容的输出数据的装置。

23. 如权利要求 1 的控制器，进一步包括用于执行至少一个光栅图像处理操作的装置。

24. 如权利要求 1 的控制器，其中数据内容相应于输出作业，该控制器进一步包含用于排队并存储要提供给输出设备的一个或多个输出作业的装置。

25. 如权利要求 1 的控制器，进一步包括用于存储与一个或多个输出设备相关的一个或多个组件的装置。

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26. 如权利要求 1 的控制器，进一步包括用于从信息装置得到验证信息以验证允许信息装置访问选中的输出设备的装置。

27. 一种控制数据输出控制器的方法，其控制信息装置与选中的输出设备之间的交互，选中的输出设备呈现从信息装置存取的数据内容，该方法包括：

管理信息装置与选中的输出设备之间的通信信道；

通过通信信道提供与选中的输出设备相关的至少一个属性以及一个或多个设备相关的软件组件，以使数据内容能够由选中的输出设备呈现；以及

通过通信信道接收至少部分地符合至少一个属性的数据内容；以及

向选中的输出设备提供要呈现的至少部分符合的数据内容。

28. 如权利要求 27 的方法，其中至少一个属性是响应于被确定为信息装置上不可用的至少一个属性而通过通信信道提供的。

29. 如权利要求 27 的方法，进一步包含通过通信信道提供使得数据内容能够在选中的输出设备上呈现的一个或多个输出设备驱动程序组件。

30. 如权利要求 29 的方法，其中一个或多个输出设备驱动程序组件是响应于被确定为信息装置上不可用的一个或多个设备驱动程序组件而通过通信信道提供的。

31. 如权利要求 27 的方法，其中一个或多个组件包括软件代码。

32. 如权利要求 27 的方法，其中一个或多个组件包括软件应用程序。

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33. 如权利要求 27 的方法，其中一个或多个组件的每个是从包括设备驱动程序、打印机驱动程序、输出驱动程序、或用户接口的组中单独选出的一个或多个。

34. 如权利要求 1 的方法，其中与选中的输出设备相关的属性的每个是从包括设备标识、设备批次、设备型号、设备类型、设备输入数据格式、设备输入语言、设备特征集、设备规格、设备服务质量、设备服务类型、设备服务可用性、和设备服务费用、设备验证、设备安全、设备分辨率、设备位深度、设备色空间、设备色彩数、设备色彩表、和设备半色调表的组中选出单独的一个或多个。

35. 如权利要求 27 的方法，进一步包括搜索信息装置并一旦在搜索中发现就与其建立通信信道。

36. 如权利要求 35 的方法，进一步包括将控制器的可用性以及与选中的输出设备相关的至少一个属性一起广播。

37. 如权利要求 27 的方法，进一步包括被动地等待信息装置的发现并一旦有发现就建立与信息装置的通信信道。

38. 如权利要求 27 的方法，进一步包括提供信息装置或其操作者的验证。

39. 如权利要求 27 的方法，进一步包括计算输出设备呈现数据内容所需的支付。

40. 如权利要求 27 的方法，进一步包括处理输出设备呈现数据内容所需的支付。

41. 如权利要求 27 的方法，其中通信信道是无线通信信道。

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42. 如权利要求 41 的方法，其中无线通信是无线电通信。

43. 如权利要求 41 的方法，其中无线通信是红外通信。

44. 如权利要求 27 的方法，其中选中的输出设备涉及打印设备、显示设备、投影设备和音频输出设备之一。

45. 如权利要求 27 的方法，进一步包括将至少部分符合的数据内容处理并转换为与选中的输出设备兼容的输出数据。

46. 如权利要求 27 的方法，进一步包括将至少部分符合的数据内容转换为与输出设备、打印机、打印机引擎、输出引擎、显示器引擎、或打印机控制器之一兼容的输出数据。

47. 如权利要求 27 的方法，进一步包括执行至少一个光栅图像处理操作。

48. 如权利要求 27 的方法，其中数据内容相应于输出作业，该方法进一步包含排队并存储要提供给输出设备的一个或多个输出作业。

49. 如权利要求 27 的方法，进一步包括存储与一个或多个输出设备相关的一个或多个组件。

50. 如权利要求 27 的方法，进一步包括从信息装置得到验证信息以验证允许信息装置访问选中的输出设备。

51. 一种数据输出控制器，其控制信息装置与选中的输出设备之间的交互，选中的输出设备呈现从信息装置存取的数据内容，该控制器包括：

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用于管理信息装置与选中的输出设备之间的无线通信信道的装置；

用于通过通信信道向信息装置提供与选中的输出设备相关的至少一个组件以使数据内容能够由选中的输出设备呈现的装置；和

用于通过通信信道接收至少部分地符合至少一个组件的数据内容的装置；和

用于向选中的输出设备提供要呈现的至少部分符合的数据内容的装置。

52. 如权利要求 51 的控制器，其中至少一个组件是响应于被确定为信息装置上不可用的至少一个组件而通过通信信道提供的。

53. 如权利要求 51 的控制器，其中至少一个组件包括软件代码。

54. 如权利要求 51 的控制器，其中至少一个组件包括软件应用程序。

55. 如权利要求 51 的控制器，其中至少一个组件的每个是从包括设备驱动程序、打印机驱动程序、输出驱动程序、或用户接口的组中单独选出的一个或多个。

56. 如权利要求 51 的控制器，其中至少一个组件的每个是从包括设备标识、设备批次、设备型号、设备类型、设备输入数据格式、设备输入语言、设备特征集、设备规格、设备服务质量、设备服务类型、设备服务可用性、和设备服务费用、设备验证、设备安全、设备分辨率、设备位深度、设备色空间、设备色彩数、设备色彩表、和设备半色调表的组中单独选出的一个或多个。

57. 如权利要求 51 的控制器，进一步包括用于搜索信息装置并一旦在搜索中发现便建立信道的装置。

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58. 如权利要求 57 的控制器，进一步包括用于将选中的输出设备的可用性以及与选中的输出设备相关的至少一个组件一起广播的装置。

59. 如权利要求 51 的控制器，进一步包括用于被动地等待信息装置的发现并一旦有发现就建立与信息装置的通信信道的装置。

60. 如权利要求 51 的控制器，进一步包括用于提供信息装置或其操作者的验证的装置。

61. 如权利要求 51 的控制器，进一步包括用于计算输出设备呈现数据内容所需的支付的装置。

61. 如权利要求 51 的控制器，进一步包括用于处理输出设备呈现数据内容所需的支付的装置。

62. 如权利要求 51 的控制器，具有用于安装在输出设备中的结构。

63. 如权利要求 51 的控制器，具有外部连接至一个或多个输出设备的结构。

64. 如权利要求 51 的控制器，其中无线通信是无线电通信。

65. 如权利要求 51 的控制器，其中选中的输出设备的每个是从包括打印设备、显示设备、投影设备和音频输出设备的组中单独选出的一个。

66. 如权利要求 51 的控制器，进一步包括用于将至少部分符合的数据内容处理并转换为与选中的输出设备兼容的输出数据的装置。

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67. 如权利要求 51 的控制器，进一步包括用于将至少部分符合的数据内容转换为与输出设备、打印机、打印机引擎、输出引擎、显示器引擎、或打印机控制器之一兼容的输出数据的装置。

68. 如权利要求 51 的控制器，进一步包括用于执行至少一个光栅图像处理操作的装置。

69. 如权利要求 51 的控制器，其中数据内容相应于输出作业，该控制器进一步包含用于排队并存储要提供给输出设备的一个或多个输出作业的装置。

70. 如权利要求 51 的控制器，进一步包括用于存储与一个或多个输出设备相关的一个或多个组件的装置。

71. 如权利要求 51 的控制器，进一步包括用于从信息装置得到验证信息以验证允许信息装置访问选中的输出设备的装置。

72. 一种控制数据输出控制器的方法，其控制信息装置与选中的输出设备之间的交互，选中的输出设备呈现从信息装置存取的数据内容，该方法包括：

管理信息装置与选中的输出设备之间的无线通信信道；

通过通信信道向信息装置提供与选中的输出设备相关的至少一个组件以使数据内容能够由选中的输出设备呈现；以及

通过通信信道接收至少部分地符合至少一个组件的数据内容；以及

向选中的输出设备提供要呈现的至少部分符合的数据内容。

73. 如权利要求 72 的方法，其中至少一个组件是响应于被确定为信息装置上不可用的至少一个组件而通过通信信道提供的。

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74. 如权利要求 72 的方法，其中至少一个组件包括软件代码。

75. 如权利要求 72 的方法，其中至少一个组件包括软件应用程序。

76. 如权利要求 72 的方法，其中至少一个组件涉及设备驱动程序、打印机驱动程序、输出驱动程序、或用户接口的一个或多个。

77. 如权利要求 72 的方法，其中至少一个组件涉及设备标识、设备批次、设备型号、设备类型、设备输入数据格式、设备输入语言、设备特征集、设备规格、设备服务质量、设备服务类型、设备服务可用性、和设备服务费用、设备验证、设备安全、设备分辨率、设备位深度、设备色空间、设备色彩数、设备色彩表、和设备半色调表的一个或多个。

78. 如权利要求 72 的方法，进一步包括搜索信息装置并一旦在搜索中发现就与其建立通信信道。

79. 如权利要求 D7 的方法，进一步包括将选中的输出设备的可用性以及与选中的输出设备相关的至少一个组件一起广播。

80. 如权利要求 72 的方法，进一步包括被动地等待信息装置的发现并一旦有发现就建立与信息装置的通信信道。

81. 如权利要求 72 的方法，进一步包括提供信息装置或其操作者的验证。

82. 如权利要求 72 的方法，进一步包括计算输出设备呈现数据内容所需的支付。

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83. 如权利要求 72 的方法，进一步包括处理输出设备呈现数据内容所需的支付。

84. 如权利要求 72 的方法，其中无线通信是无线电通信。

85. 如权利要求 72 的方法，其中选中的输出设备的每个是从包括打印设备、显示设备、投影设备和音频输出设备的组中单独选出的一个。

86. 如权利要求 72 的方法，进一步包括将至少部分符合的数据内容处理并转换为与选中的输出设备兼容的输出数据。

87. 如权利要求 72 的方法，进一步包括将至少部分符合的数据内容转换为与输出设备、打印机、打印机引擎、输出引擎、显示器引擎、或打印机控制器之一兼容的输出数据。

88. 如权利要求 72 的方法，进一步包括执行至少一个光栅图像处理操作。

89. 如权利要求 72 的方法，其中数据内容相应于输出作业，该方法进一步包含排队并存储要提供给输出设备的一个或多个输出作业。

90. 如权利要求 72 的方法，进一步包括存储与一个或多个输出设备相关的一个或多个组件。

91. 如权利要求 72 的方法，进一步包括从信息装置得到验证信息以验证允许信息装置访问选中的输出设备。

92. 在有权访问数据内容的信息装置中，一种用于控制数据输出管理器的方法，该数据输出管理器用于管理向选中的输出设备输出数

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据内容，该方法包括：

管理信息装置与选中的输出设备之间的通信信道；

通过通信信道接收与选中的输出设备相关且使得数据内容能够由选中的输出设备呈现的一个或多个组件；

使数据内容符合输出数据，该输出数据与具有一个或多个组件的选中的输出设备相关；以及

通过通信信道将符合的数据内容引导至选中的输出设备，以将其呈现。

93. 如权利要求 92 的方法，其中通信信道包括无线通信信道。

94. 如权利要求 92 的方法，其中一个或多个组件包括设备相关的组件。

95. 如权利要求 92 的方法，其中一个或多个组件包括软件应用程序。

96. 如权利要求 92 的方法，其中一个或多个组件包括一个或多个设备驱动程序。

97. 如权利要求 96 的方法，其中一个或多个设备驱动程序包括打印机驱动程序。

98. 如权利要求 95 的方法，其中特征化输出设备的设备相关组件是从含有数据、信息、数据标识符、和信息标识符或它们的组合的组中选出的。

99. 如权利要求 98 的方法，其中数据或信息包括设备标识、设备类型、设备批次、设备型号、设备类型、设备输入数据格式、设备输入语言、输出数据类型、设备分辨率、设备位深度、设备色空间标识

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符、设备色彩数、色彩表、和半色调表的一个或多个。

100. 如权利要求 98 的方法，其中数据或信息是从含有至少一个服务属性的组中选出的，至少一个服务属性表明至少一个特征集、设备规格、支付信息、验证信息、安全设置、服务质量信息、作业状态、作业优先级、作业排队或它们的组合。

101. 如权利要求 92 的方法，其中一个或多个组件包括软件代码。

102. 如权利要求 101 的方法，其中软件代码包括压缩及解压缩方法、文件转换、图形表示、图形呈现、图像处理操作、图像增强操作、色空间变换及数据转换、编码及解码技术、色彩匹配及管理方法、图像变换、内插及半色调技术的一个或多个。

103. 如权利要求 94 的方法，其中设备相关的组件是从含有至少一个用户接口控件的组中选出的，至少一个用户接口控件用于控制色彩、打印质量、打印份数、每页卡片数、每张的页数、双面、纵向或横向、安全信息、标识信息、支付信息或它们的组合的至少一个参数及调节。

104. 如权利要求 92 的方法，其中数据内容位于信息装置中。

105. 如权利要求 92 的方法，进一步包括从不同于信息装置的数据源中得到数据内容。

106. 如权利要求 92 的方法，进一步包括从位于信息装置上的数据源应用程序中得到数据内容。

107. 如权利要求 106 的方法，其中数据源应用程序不执行用于控制数据输出管理器的方法。

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108. 如权利要求 106 的方法，其中数据源应用程序执行用于控制数据输出管理器的方法。

109. 如权利要求 106 的方法，其中数据内容是通过包括在信息装置中的操作系统而从数据源应用程序中得到的。

110. 如权利要求 106 的方法，其中数据内容是通过对象模型从数据源应用程序中得到的。

111. 如权利要求 92 的方法，进一步包括发现可用于呈现数据内容的一个或多个输出设备。

112. 如权利要求 111 的方法，其中发现一个或多个输出设备包括根据预定义的选择规则自动选择一个或多个输出设备之一。

113. 如权利要求 111 的方法，其中发现一个或多个输出设备包括将输出服务请求发送至一个或多个输出设备。

114. 如权利要求 111 的方法，其中发现一个或多个输出设备包括一个或多个输出设备满足输出服务需求。

115. 如权利要求 111 的方法，其中信息装置以无线通信发现一个或多个输出设备。

116. 如权利要求 111 的方法，进一步包括得到发现的一个或多个输出设备的每一个的输出设备信息。

117. 如权利要求 116 的方法，进一步包括根据发现的一个或多个输出设备的每一个的输出设备信息而在信息装置上呈现信息，并从用

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户得到对选中的输出设备的选择。

118. 如权利要求 111 的方法，其中发现一个或多个输出设备包括信息装置发送输出服务请求并等待来自一个或多个输出设备的每一个的响应。

119. 如权利要求 111 的方法，其中发现一个或多个输出设备包括一个或多个输出设备公布它们的可用性，以及信息装置联系一个或多个输出设备中的每一个。

120. 如权利要求 111 的方法，其中发现一个或多个输出设备包括信息装置从服务节点得到关于一个或多个输出设备的信息，以及信息装置联系一个或多个输出设备中的每一个。

121. 如权利要求 92 的方法，其中信息装置包括移动计算设备、数字相机、膝上型计算机、台式计算机、和移动电话的至少一个。

122. 如权利要求 92 的方法，其中输出设备至少包括打印设备、显示设备、投影设备、和音频输出设备之一。

123. 如权利要求 92 的方法，其中输出设备至少包括标识引擎和呈现引擎之一。

124. 如权利要求 92 的方法，其中输出设备至少包括打印机引擎和输出引擎之一。

125. 如权利要求 92 的方法，其中无线通信至少包括无线电通信和红外通信之一。

126. 如权利要求 92 的方法，其中输出数据至少包括图像数据、

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图形数据、文本数据、视频数据、音频数据、页面描述语言、置标语言、和指令之一。

127. 如权利要求 126 的方法，其中输出数据进一步至少包括安全数据和验证数据之一。

128. 如权利要求 92 的方法，其中输出数据包括压缩的数据。

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用于设备到设备的普适数字输出的控制器及管理器

技术领域

本发明涉及设备同步和数字输出以及，具体而言，为信息装置提供普适（pervasive）输出。

背景技术

信息装置既指静态计算机也指移动计算设备（普适设备）。信息装置的例子包括但不限于：台式计算机、膝上型计算机、掌上计算机、个人数字助理（PDA）、可上网蜂窝电话、智能电话、传呼机、因特网仪表、电子图书、数字手柄（digital pad）、网络板（web pad）、以及数字捕获设备（如数码相机和摄像机）。输出设备 140 可以包括传真机、打印机、复印机、图像或视频显示设备、投影机、以及音频输出设备。

为简化及方便，下面的说明书中以打印机代指输出设备，以打印代指输出过程。但是应当理解，术语“打印机”和“打印”是用作简化说明书的特定例子，或者可以理解为它们是一个示例。这里使用的“打印”应适用于输出设备的定义或扩展至更大的范围，而不应构成对本发明的范围及实践的限制。

受到不断增长的带宽及处理能力以及不断增长的无线移动设备和用于普适设备的可用软件应用的推动，数以百万计的用户正在或将要使用他们的普适计算设备生成、下载并传输内容及信息。但是，普适设备的小显示屏幕不能提供好的观看体验。所以，需要使用户可以容易地从他们的普适计算设备向任一输出设备输出内容及信息。例如，人们需要从他们的普适信息装置直接便捷地输出，而无需依靠与用于打印的静态计算机（如台式个人计算机）同步。

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为了示例，一位在飞机场在手持电脑中接收到电子邮件的信息工作者需要走到附近的打印机或传真机去打印他的电子邮件。另外，移动工作者也需要从他的移动设备中打印他的工作计划表、预约簿、名片、以及飞行时间表的副本。在另一个例子中，在便利店、加油站、或书报亭停下的旅游者需要将他刚使用他的可上网无线电话（信息装置）从因特网下载的地图的副本打印出来。在另一个例子中，刚使用PDA（信息装置）结束了股票交易或完成了电子商务交易的人需要打印出他的交易确认、发票或收据的副本。在另一个例子中，用数码相机拍照的用户需要将照片方便地在附近的打印机上打印出来。

通常，输出设备（如打印机）通过有线连接如电缆线与信息装置相连。通过使用例如无线电通信或红外通信，也可能得到无线连接。无论连接是有线的还是无线的，用户必须首先在信息装置中安装对应于特定打印机型号及批次的打印机驱动程序。使用由设备相关的或特定的驱动程序，信息装置可以处理将内容或数字文档输出至打印机输入空间。打印机输入空间相应于打印机理解的输入类型（这里指打印数据）。例如，打印机输入空间或打印数据可以包括能够由特定的打印机批次及型号所理解或使用的打印机特定的输入格式（如图像、图形、文件、数据格式）、编码、页面描述语言、置标语言、指令、协议或数据。

打印数据可以是专用的或公开的标准或二者之结合。因此，通常打印机输入空间或打印数据是设备相关的。不同的打印机型号可能确定它们自己的输入，该输入由打印机制造商为了最佳操作根据规范而设计或采用。于是，不同的打印机为了精确打印通常需要使用特定的打印机驱动程序。设备驱动程序（本例中是打印机驱动程序）可以控制、管理、通信、并向打印机输出打印数据。有时不使用打印机或设备驱动程序，而是应用软件可以包括设备驱动特征，作为它的一部分。本例中的应用程序可以处理文档并与输出设备直接通信，而无需使用

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设备驱动程序。打印数据是发送至打印机的输出数据。然而，这里使用的术语“打印数据”是应用于或扩展为对施加于包括显示设备、投影设备及音频设备的任一输出设备的输出数据的更大范围及定义，且不应将其构造为对本发明的范围及实践的限制。

打印机驱动程序或应用程序的安装可以例如使用由打印机制造商提供的 CD 或软盘手动安装而实现。或者用户可能能够从网络下载特定的驱动程序或应用程序。对于家庭或办公用户，这个安装过程可以在任何地方进行，根据驱动程序的类型以及用户对计算设备及网络的熟练程度，该过程可能持续几分钟至几小时不等。即使对于即插即用型驱动程序的安装，用户仍然需要对每一打印机执行多步骤过程。这个安装和配置过程增加了对终端用户的复杂度及工作量，否则终端用户可将时间用于其它多产或可享受的工作。而且，这有可能促使许多不熟练的用户不向他们的家用计算机或网络添加新的外设（如打印机、扫描仪等），以避免安装和配置的不便。因此，需要为用户提供更为方便或简单的将数字内容输出至输出设备的途径，而没有手动寻找并安装新的设备驱动程序或打印机驱动程序的不便。如果需要，则打印机驱动程序的安装应当更加自动化且对终端用户透明。

另外，现有的打印方法可能对移动设备用户造成比家庭及办公室计算机用户高得多的挑战及困难。对于预安装设备相关的驱动程序的需求与移动（普适）计算及输出的概念相矛盾。例如，移动用户可能需要在飞机上或飞机场、加油站、便利店、书报亭、旅馆、会议室、办公室、家中等打印电子邮件、PowerPoint®演示文档、网页、或其它文档。用户在这些地点几乎不可能找到与用户的基站的批次及型号相同的打印机。因此，用户可能不得不每次在这些地点打印之前，安装并配置打印机驱动程序。或者，预安装所有可能的用户信息装置可用的数以百计甚至数以千计的打印机驱动程序通常也不是可行的选择。移动信息装置通常具有有限的内存及存储能力。因此，用户当前需要每次在以上不同位置打印之前，安装并配置打印机驱动程序。而且，

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用户不会希望仅仅为了在飞机场打印一页电子邮件而寻找驱动程序或将其下载并安装。这必然是不想要且不鼓励地促进普适或移动计算的过程。因此，需要更加方便或自动化的打印方案，以使用户只需走向打印机便可容易地打印数字文档，而无需安装或预安装特定的打印机驱动程序。

网络打印可以在局域网（LAN）中部分解决上述问题。最初促成网络打印是为了允许人们共享网络中的打印资源。打印机通常使用网络适配器或网卡与网络相连。打印服务器可以用于管理打印作业（如脱机打印）。不同的客户可以将打印作业发送到打印服务器来排队、排序并管理。每一网络打印机的驱动程序可以存储在网络中（例如，在应用服务器中）并可由客户下载。

上面的结构经常用于局域网（LAN）中，如办公楼中。具有与该网络相连的移动或静止计算设备的办公室员工可以将打印作业发送至与同一网络相连的任一打印机。他或者在他的设备中预安装了所需的打印机驱动程序，或者可以在打印到特定打印机之前从 LAN 中下载驱动程序。但是一旦办公室员工离开办公楼，或者离开他的有线或无线网络覆盖区域，他就再也不能打印到他想要的任一打印机了。

在一个例子中，已经证明了局域网打印的想法可以进一步扩展至更大的公众网络因特网。在理想状况中，每一打印机和每一计算设备（信息装置）都与同一网络例如因特网相连。但是在现实中，将网络打印扩展至大的超级网络或因特网仍是不可行的。

而且，网络打印的一个缺点是较高的成本。为了将输出设备及信息装置与同一网络相连，需要安装附加的硬件和软件。因此，输出设备的成本会显著增加。除了硬件和软件成本，还需要服务费用以保持到如因特网这样的大型网络的连通性。另外，大型永久网络基础设施需要被建设并构造为适用于每一地点。

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除了成本，网络打印的另一缺点是可靠性。网络打印需要在网络的硬件、软件及服务链的任一环节中都完美运行。如果链环的任一组件因为任一原因而运行减缓或不充分，则打印服务可能不可用、中断或导致不精确。

最后，网络打印的另一缺点是安全性的问题。如果机密文档或信息在达到用户面前的打印机之前必须通过整个网络，那么用户将感到不安全。可能会担心机密文档在连接的网络的任一片段中被截取、检查、复制或存储。还有可能担心文档实际上不在希望的打印机上而是在另一打印机上被打印。这个问题可能由例如目录服务软件中的错误、未更新或损坏的软件组件、不一致或不兼容的软件和/或硬件版本、或者人、软件、网络、或硬件错误的任何组合而引起。在从网络向信息装置下载软件组件（如打印机驱动程序）时也有此风险。该软件组件可能被破坏、崩溃或携带恶意攻击或病毒或被黑客篡改。破坏的软件组件可以破坏或崩溃用户的信息装置。最后，一些内部组织或局域网将拒绝试图达到它们的打印机以及其它在防火墙保护下的输出设备的未知文档。因此更希望信息的通信及交换是局部地在用户的信息装置及选择的输出设备之间进行的，都在用户的观察及检查范围之内。

因此，本发明提供了数字打印的便捷方法，用户无需为了打印而在信息装置上预安装设备相关的打印机驱动程序。

该发明可以提供用于打印的简单、优化且方便的过程。与现有的打印不同，用户无需手工从 CD、软盘安装打印机驱动程序，或从存在的静态网络的某处下载该驱动程序。使用本发明的设备及过程，通过在信息装置及具有本发明的输出控制器的打印机之间简单且自动化的同步过程，可以将所有软件组件、数据、或打印机驱动程序加载至信息装置。因此，拥有装备了本发明的输出管理器的信息装置的移动用户事实上可以在任何时间、任何地点，普适地打印至任一打印机。

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进一步，对于信息装置和输出设备，本发明可以提供一种方便的方法，使用户可以信息装置打印到任一与静态永久网络具有或没有连接的打印机。通过信息装置与输出设备之间的本地通信及同步，不必为了静态网络的连通性而安装硬件和软件。因此可以减少打印成本。

另外，本发明可以提供比现有的远程网络打印方法或过程更可靠的打印方法。通过在信息装置及输出设备之间局部通信，打印过程不依赖于网络链环的各元素的完美运行。该链环可以包括例如网络连接、网络服务器、应用服务器、服务提供商及应用提供商。因此，由于处理及通信涉及更少的元素，所以在本发明下成功打印的可能性大大提高。

本发明可以进一步提供比现有的网络打印过程及技术更安全的打印过程。从用户面前的输出设备中上载或下载数据或如打印机驱动程序这样的软件组件提供了比处理来自网络中远程位置的组件更安全的感觉。人们会感到存储在大型网络中的组件更易遭受破坏（如被病毒感染）。网络中因人或软件或硬件错误而引起的错误模块或组件也会破坏信息装置的运行。另外，将机密数字文档或打印的数据直接发送至用户面前的打印机提供了比文档通过具有多个用户及服务器的大型网络而传输更高的安全感。在现有网络打印中，文档被截取、检查、复制、存储或最终在错误打印机上打印的可能性要大得多。

根据本发明，普适输出的电子系统及方法使得信息装置可以将数字内容方便地输出至实际上的任何输出设备。信息装置可以具有中央处理单元、输入/输出控制单元、存储单元、内存单元、以及有线或无线通信单元或适配器。信息装置优选地还包括输出管理器，其可由应用软件、客户应用程序、或设备驱动程序（对于打印机是打印机驱动程序）而实现。输出管理器可以含有对包括例如位于主机信息装置的一个或多个通信芯片集的硬件及软件组件的管理及控制能力。

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信息装置中的输出管理器可以与配置了本发明的输出控制器的输出设备一起通信、管理并同步数据或软件组件。输出设备的例子包括但不限于：打印机、传真机、复印机、图像或视频显示设备、监视器、显示屏幕、投影仪、以及音频输出设备。

输出控制器可以是位于输出设备中的电路板、卡或软件组件。输出控制器也可以与输出设备外部相连，作为外部组件或“盒”。输出控制器可以由嵌入式处理器、软件、固件、ASIC、DSP、FPGA、片载系统、特殊芯片集、等等中的一种或组合而实现。在另一实施例中，输出控制器的功能可以通过与输出设备外部相连的 PC、工作站或服务器上运行的应用软件而提供。

输出控制器可以包括处理单元、内存/存储单元和通信适配器单元等等。输出控制器的存储及内存单元可以存储设备驱动程序、软件组件或对象封装设备相关的数据、算法、及代码。设备相关的数据可以是例如关于输出设备及输出控制器的参数及信息。软件组件及对象可以封装例如代码或可执行算法，该代码或可执行算法是将图像或文档描述符或语言转换或编码为与特定输出设备相兼容的打印数据或输出数据所需要的。输出管理器可以管理将数据和/或软件组件从输出控制器上载到信息装置的过程，从而例如使得信息装置生成打印数据或输出数据，并将其准确地发送至输出设备或输出控制器。

输出数据（或当输出设备是打印机时的打印数据）可以是特定的数据、指令、页面描述语言、置标语言、图形和/或图像文件格式等等。打印数据还可能利用一个或多个编码技术的压缩而编码或压缩。进一步，打印数据可以使用一个或多个公开标准或一个或多个专用技术及格式、或它们的组合。输出数据（或对于打印机的打印数据）指从信息装置发送至输出设备的电子数据。

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本发明的数字内容输出过程的一个实现包括以下步骤。

1. 用户请求打印来自他的/她的信息装置的数字内容。

2. 信息装置通过发现过程检测可用的输出设备。

3. 在服务协商过程中，信息装置和与可用输出设备相关联的输出控制器交换服务信息。然后用户可以根据提供的服务信息，选择一个或多个输出设备。

4. 作为同步过程的一部分，信息装置与输出控制器通信，以确定并上载必需的组件，以使能够输出至特定的输出设备。然后，上载的组件或数据可以在信息装置中安装或配置。

5. 要输出的数字内容由一个或多个组件处理，以与输出设备兼容。该一个或多个组件包括具有输出管理器、输出控制器及输出设备的信息装置。

6. 打印机引擎或显示引擎或音频引擎生成最终输出。

在本发明的输出过程中，位于信息装置中的输出管理器可以参与、协调并管理主机信息装置及输出控制器之间的信息/组件的通信及交换。

附图说明

图 1 是可以实现现有发明的过程及设备的输出系统的框图。

图 2A 和图 2B 是显示无线通信单元的硬件组件的典型结构的框图。

图 3A-3C 显示了关于信息装置的输出管理器的不同结构及实现。

图 4A-4F 显示了关于打印机或输出设备的输出控制器的不同结构及实现。

图 5 是本发明的普适输出过程的流程图。

图 6 是图 5 的输出过程中可包括的服务协商过程的典型实施方式的流程图。

图 7 是图 5 的输出过程中包括的打印作业过程的不同可能结构的

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流程图。

图 8A-8G 显示了信息装置的显示设备上不同时间表现的一系列图形化用户界面（GUIs）。

图 9A-9B 是现有打印系统或打印机的框图。

具体实施方式

图 1 是显示一种电子通信系统的组件的示例框图，该系统可以提供本发明的操作系统，且包含了具有处理能力的计算设备即信息装置 100。如图 1 所示，信息装置 100 的例子可以包括但不限于：台式个人电脑（PC）、膝上型计算机、掌上计算机、手持或移动设备、个人数字助理（PDA）、智能电话、可视电话、机顶盒、电子图书、因特网板（pad）、数码相机、因特网仪表、传呼机等。

信息装置 100 可以包含现有技术的组件（未显示），如：处理单元、内存单元、存储器单元以及输入/输出控制单元。信息装置 100 还可以包含用于与用户交互的接口（未显示）。接口可以由软件或硬件或二者的组合而实现。这种接口的例子包括但不限于鼠标、键盘、触控式或非触控式屏幕、一个或多个按钮、软按键、指示笔、扬声器、麦克风等。

信息装置 100 可以是专用的单任务设备（如电子邮件终端、web 终端、电子图书等）或具有多重特征及功能的通用计算设备。这些多重的特征及功能可以由一个或多个安装在信息装置 100 中的软件应用程序（如图 3 中的应用程序 302）实现，该信息装置 100 可以拥有或不拥有操作系统。信息装置 100 的另一个例子是具备本发明的处理能力及特征集的数码相机 112。

一些信息装置 100（如专用设备）可以被制造商预先配置了固定的功能及特征。其它信息装置 100 可以允许用户安装附加的硬件元件和应用软件（如图 3 中的应用程序 302），以扩展或改变其功能。信息

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装置 100 的功能及应用程序的例子可以包括例如：电子邮件、消息、语音通信、web 浏览、图像获取、文本处理、图形应用程序、文档或图像编辑、以及输出功能等。

信息装置 100 的功能及特征集可以以软件或硬件或二者的组合而实现。当特征以软件实现时，这个软件可以由制造商或用户安装。可以使用在嵌入式处理器上运行的嵌入式软件实现应用软件，也可在特定的操作系统上运行应用软件。应用程序及特征集的某些或全部或组合也可以以硬件或在硅片上实现。一些功能或特征集可以在特殊的芯片集中实现，且可以包含一个或多个以下部分或它们的组合：例如特定用途集成电路（ASIC）、现场可编程门阵列（FPGA）、数字信号处理器（DSP）、片载系统、固件等。

信息装置 100 可能包含或不包含操作系统。在具有操作系统的实施方式中，操作系统可能为软件应用程序提供多种应用编程接口（API）或对象模型（如图 3 中的 API 300），以使软件应用程序与设备驱动程序接口并通信。信息装置 100 中的设备驱动程序控制外设并与其通信，外设如打印机、复印机、传真机、显示器、屏幕等。正如下面参考图 3A 描述的，几个不同的应用程序可以通过使用由操作系统提供的 API 或接口或对象模型，共享公用的设备驱动程序。正如下面参考图 3B 和 3C 描述的，在不具有操作系统或操作系统不支持或提供设备驱动程序 API 的实施方式中，各应用程序不得不实现自己的设备驱动程序或自己的输出及通信能力。例如，要向打印机输出数字文档，则各应用程序不得不实现自己的打印机特定驱动、处理和/或通信能力。

在一个实现中，信息装置 100 包括通常以软件实现的输出管理器 308（图 3A-3C）。该输出管理器 308 可以实现为或包含于客户应用程序中、或作为独立的应用程序、或作为另一应用软件 302B（图 3B）的一部分、或实现为设备驱动程序（例如在打印机作为输出设备的情

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况，是打印机驱动程序）的形式，它可以可以被一个或多个应用软件程序 302 调用、共享或使用（图 3A-3C）。

输出管理器 308 的一个任务是管理并协调信息装置 100 与一个或多个输出控制器 120 之间的通信。输出管理器 308 可以例如实现公开标准的或专用的通信协议，以直接或间接作用、管理、或使用由位于主机信息装置 100 中的硬件元件提供的功能。这种硬件元件可以包括例如处理单元、内存单元和通信芯片集（未显示）。输出管理器 308 可以包括一个和多个下列特征及功能：

• 输出管理器 308 可以与包含于主机信息装置 100 中的一个或多个软件应用程序 302 通信或交互，以向这些软件应用程序 302 提供普适输出能力或特征。从软件应用程序 302 传递至输出管理器 308 的信息的类型可以是例如需要输出的数字文档或数字内容数据。在一些例子中，应用软件 302 可以把输出管理器 308 作为独立的应用程序（如图 3C 所示）或应用程序整体的部分（如图 3B 所示）而调用或启动。输出管理器 308 和应用软件 302 之间可能的通信及管理的例子可以包括消息、对象模型、实例、进程调用、程序唤起及 API 等，它们可能或可能不是由操作系统提供的。

• 输出管理器 308 可以管理并保持与输出控制器 120 的有线或无线通信。输出管理器 308 可以与由它的主机信息装置 100 的硬件元件实现的功能相互作用。例如，输出管理器 308 可以管理信息装置 100 中的通信单元并与其交互。正如下面详细描述的，图 2A 和 2B 显示了使用无线适配器的通信单元的例子。用户可以通过输出管理器 308 通过主机信息装置 100 提供的用户接口，与输出管理器 308 交互。

• 输出管理器 308 可以帮助发现可用的输出设备 140、检验通信连接、确认设备对于服务的有效性或兼容性、或向一个或多个设备发送或广播服务请求。

• 输出管理器 308 可以与输出控制器 120 通信，以确定必需的软件组件、数据、或可能的需要从输出控制器 120 上载到主机信息装置 100 以使普适输出成为可能的由信息或参数决定的任何其它设备。软

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件组件可以是例如设备驱动程序、应用程序、特殊代码或算法、可执行对象或设备决定的数据、参数、信息等。

• 输出管理器 308 可以与输出控制器 120 配合，以将需要的组件或数据从输出控制器 120 上载到它的主机信息装置 100，使得用户可以普适地将数字内容输出至该输出控制器 120 或与它相关的输出设备 140。

• 输出管理器 308 可以执行光栅图像处理操作（例如光栅化、色彩管理、半色调操作）或将数字内容从原始格式转换为适宜输入特定的输出控制器 120 或输出设备 140 的打印数据。数字内容可以由信息装置 100 创建、存储或接收。例如，输出管理器 308 可以将数字文档信息从某种格式或语言转换为用于输出的特定的打印数据或中间格式或语言，如 PostScript、PCL、EMF、XML、TIFF、JPEG、RTL 等。

• 输出管理器 308 可以协调或管理主机信息装置 100 和输出控制器 120 之间的通信，以将打印数据发送或发射至输出控制器 120。

输出控制器 120

输出控制器 120 可以实现为软件或硬件，且可以连接至输出设备 140 或结合入输出设备 140。输出控制器 120H 说明了安装或结合在输出设备 140 内的电路板或卡形式的硬件实现，所述输出设备 140 如打印机、复印机、传真机、显示屏等。在另一结构中（未显示），输出控制器 120 可以实现为安装或结合在输出设备 140 内的软件应用程序或组件。输出控制器 120G 说明了一种硬件实现，其形式为单独连接至一个或多个输出设备 140 的外部元件或“盒”。

无论输出控制器 120 外部连接至或内部安装于输出设备 140，它可以实现为执行这里描述的输出控制器 120 的特征集及功能的硬件、软件或二者兼有。在输出设备 140 是打印机的情况下，输出控制器 120 有时也可以被称为打印服务器。下面参考图 4 描述输出控制器 120 的示例结构及实施方式。

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作为一个例子，输出控制器 120 可以实现为连接至一个或多个输出设备 140 的计算机。例如，现有的 PC、工作站或服务器可以适用于输出控制器 120。在这种情况中，可以使用在连接至输出设备 140 的计算机（PC、服务器或工作站）内安装的应用软件实现输出控制器 120 的功能。

安装在输出设备 140 中或与其相连的输出控制器 120，如打印机，使输出设备 140 能够与信息装置 100 通信并协商服务。在一种实施方式中，信息装置 100 可以与连接至打印机的输出控制器 120 或安装在打印机内部以得到设备相关的数据或软件组件如设备特定打印机驱动程序的输出控制器 120 通信。例如位于信息装置 100 中的输出管理器 308 这样的应用程序可以安装并配置上载的组件或数据，使得信息装置 100 直接打印至该打印机。下面参考图 5 描述输出进程的例子。

输出控制器 120 的功能和特征集可以包括以下的一个或多个：

• 向客户端提供服务——输出控制器 120 可以积极地搜索包括信息装置 100 或输出管理器 308 或其它通信单元在内的可用客户端，客户端输出服务将提供给这些可用客户端。二者择一或者结合地，输出控制器 120 可以被动地等待被包括信息装置 100 在内的一个或多个客户端发现，以向客户端提供输出服务。

• 协商与信息装置 100 的服务——作为协商要提供的输出服务的一部分，输出控制器 120 可以同信息装置 100 通信并交换信息。例如，在与信息装置 100 的通信中，输出控制器 120 可以向信息装置 100 通知对于所选的输出设备 140 如打印机的构成、型号、标识、版本、输入语言类型、设备驱动软件类型、提供的服务类型、可上载的组件的类型等。在另一个例子中，信息装置 100 可以将一条或多条消息发送至输出控制器 120，该输出控制器询问信息装置 100 在需要的情况下需要将什么软件组件或数据从输出控制器 120 上载，以使得输出至特定的输出设备 140 成为可能。

• 提供安全功能，如验证及加密——验证用于阻止对服务的多余

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访问，而加密用于阻止窃听。安全程序可以在输出控制器 120 或输出设备 140 和信息装置 100 之间的通信的不同步骤及阶段，由软件、硬件或二者的组合实现。

• 付费或交易管理及服务——用户在例如向打印机 140 或其它输出设备 140 提供输出时，可以被要求支付服务费。输出控制器 120 可以有根据顾客请求或享受的服务而计算并处理付费的能力。输出控制器 120 可以处理多种形式的付费，例如：现金、电子现金、信用卡、借贷卡、电子卡、智能卡、虚拟现金等。

• 存储能力——输出控制器 120 可以包括内存或存储单元，并可以在其中存储以下的一个或多个：应用软件、设备或打印机驱动程序、软件组件、设备相关的数据或参数、用户接口等。在输出设备 140 或输出控制器 120 中存储的软件组件或数据可以上载至信息装置 100，以使信息装置 100 或输出管理器 308 驱动输出设备 140。软件组件可以是可执行的或部分可执行的程序或数据。

• 与信息装置 100 同步——在信息装置 100 中的输出控制器 120 或输出管理器 308 确定能够输出或打印所需要的组件（软件组件、数据、信息或参数）之后，输出控制器 120 可以与输出管理器 308 协调，以将输出控制器 120 的内存或存储单元中存储的组件上载至信息装置 100。

• 提供管理工具——多个信息装置 100 可以同时或在重叠时间请求来自相同输出设备 140 的服务。输出控制器 120 可以提供管理工具，如打印作业的队列及脱机打印、服务质量等。

如上所述，输出控制器 120 可以以多种方式实现，并可以包括硬件、软件、或二者的组合。例如在硬件实现中，输出控制器 120 可以包括使用一种或多种硬件类型如 ASIC、DSP、FPGA、固件、片载系统、及通信芯片集的组件。输出控制器 120 还可以包括具有软件组件的嵌入式处理器或嵌入式应用软件，以实现它的特征集和功能。输出控制器 120 可以含有或不含有操作系统。

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输出控制器 120 通常包括可以存储一个或多个软件应用程序、软件组件和数据的内存或存储单元（ROM、RAM、闪存、磁盘驱动器——未显示）。一些软件应用程序可以在输出控制器 120 内运行，以执行它的功能（如，同信息装置 100 通信）。

输出控制器 120 的内存或存储单元还可以存储数据和一个或多个软件组件，在与输出管理器 308 通信期间，所述数据和一个或多个软件组件可被上载到信息装置 100 或与其同步。软件组件可以是能够在信息装置 100 上运行的设备驱动程序或完整的应用软件。一旦这样的软件组件被上载并安装，信息装置 100 就可以驱动或输出至特定的输出设备 140。

软件组件还可以是部分的设备驱动程序或部分的应用程序软件或部分的软件程序。软件组件可以是可执行的或部分可执行的程序、对象或代码。软件组件可以封装信息、算法、和数据。可以包括在软件组件中的算法的例子包括压缩/解压缩方法、文件转换、图形表现及渲染、图像处理及增强操作、色空间变换及数据转换、编码/解码技术、色彩匹配及增强方法、图像变换、内插方法、半色调技术、用户接口软件代码等。可以包括在软件组件中的数据的例子包括例如：色彩表、色空间信息、半色调表、输出设备类型、输出分辨率、位深度、输入类型、格式或语言、通信协议类型、输出状态、设备标识及签名、图形、图像及文本描述等。

这种软件组件可以上载至输出管理器 308，以方便打印数据或输出数据的通信及生成，所述打印数据或输出数据对于输出控制器 120 或输出设备 140 适合、兼容或最优。输出控制器 120 和输出管理器 308 管理并协商要上载至信息装置 100 的合适的组件。

并非所有情况都需要将整个或全部驱动程序或应用程序上载至输出管理器 308 或信息装置 100。在一些实施方式中，仅上载一个软件

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组件就足够了。例如，许多喷墨打印机通常使用一位或多位 CMYK 打印技术，有时具有相似的分辨率。信息装置 100 可以预先安装较通用的打印机驱动程序，这个打印机驱动程序包含软件代码、算法及数据的设备无关的部分，它们是公用的或者可以用于整个这一类打印机。设备无关的代码可以包括例如：适用于整个这一类打印机使用的数字文档的光栅化过程（包括半色调和色彩管理方法）和图像增强。在这个例子中，仅上载较小的软件组件或数据是可行的，其中上载的软件组件或数据包括了对于特殊的打印机或输出设备 140 的设备相关的组件。设备相关的部分或组件或数据可以包括但不限于：对于打印机或输出设备 140 特定的色彩表、半色调表、输出分辨率、位深度、压缩/解压缩方法、色空间变换、编码算法或变换软件。

在输出控制器 120 的内存单元中存储的用于上载至信息装置 100 的软件组件的另一个例子是用于获取用户对打印或输出操作的偏好的安装向导或用户接口。在打印情况下的用户偏好的例子包括但不限于：色彩及打印质量参数调整、打印份数、每页的卡片（card）数目、每张（sheet）的页数、双面打印、纵向（portrait）或横向（landscape）、安全信息等。

一旦软件组件或数据被上载或安装于信息装置 100 中，信息装置 100 可以驱动或输出至输出设备 140。例如，信息装置中的应用程序 302 可以将数字文档或图像打印到打印机。

为了驱动特定的输出设备 140，不同的信息装置 100 可能需要上载不同的软件组件。因此，可以在输出控制器 120 的内存或存储元件中存储用于多个信息装置 100、操作系统及平台类型的多种软件组件和数据或设备驱动程序。

输出控制器 120 可能包含用来管理应用程序的嵌入式操作系统。有了操作系统，输出控制器 120 的一些或全部功能和特征集可以实现

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为应用软件。可以将附加的应用软件安装或升级到新版本，以例如提供附加功能或故障修复。

输出控制器 120 可以包含用户接口，允许用户配置并管理输出控制器 120 提供的功能。输出控制器 120 的用户接口可以使用例如下列设施而实现：显示屏、软按键、按钮、鼠标、指示笔及键盘，以使用户与输出控制器 120 提供的功能进行交互并对其进行管理。这种功能的例子可以包括以下任一种或全部：开关电源、状态显示或指示、取消当前作业、或重定向现有作业等。

输出控制器 120 通常还包括通信或适配器单元，它使输出控制器 120 可以通过无线或有线连接与包括信息装置 100 在内的其它设备通信。下面参考图 2 描述无线适配器或通信单元的示例结构。

当输出控制器 120 实现为固件或嵌入式应用程序时，对输出控制器 120 的功能的配置和管理可选地通过例如使用主机（未显示）中的控制器管理软件而实现。主机可以是台式个人电脑（PC）、工作站、或服务器。主机可以本地的或通过网络连接至输出设备 140 或控制器 120。主机和输出控制器 120 之间的通信可以通过无线或有线通信而实现。主机中的管理应用软件可以管理输出控制器 120 的设置、配置、和特征集。进一步，主机配置应用程序可以在输出控制器 120 中下载或安装应用软件、软件组件或数据，用于对输出控制器 120 的特征和能力进行升级、更新、和/或改进。

一个实现中的输出设备 140 包括或连接到上述输出控制器 120。因此，输出控制器 120 提供的功能和特征集被自动包括为输出设备 140 的部分功能。然而，输出设备 140 可以实现或包含至少部分提供输出控制器 120 的特征和功能的其它控制器或应用程序。

因此，输出设备 140 可以包括输出控制器 120 提供的一些或全部

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功能和特征。

输出设备 140

无论输出介质是基片（如纸）、显示图像、投影机、或者声音，输出设备 140 都是能够输出数字内容的电子系统。输出设备 140 的典型例子可以是在基片上输出包含文本、图形、图像或任一组合的数字文档的打印机。输出设备 140 还可以是能够显示静止图像或视频的显示设备，例如但不限于：电视、显示器、投影机等。输出设备 140 页可以是能够输出声音的设备。任何可以播放或读出音频（如音乐）或数据（如文本或文档）格式内容的设备也是可能的输出设备 140。这里经常以打印机（包括传真机、复印机等）指代示例性的输出设备 140。然而应当理解，本发明也同样应用于除打印机之外的输出设备 140。

图 9A 是现有的打印系统或打印机 900A 的框图，该打印系统或打印机 900A 具有三个基本组件：光栅图像处理器（RIP）902、内存缓冲器 904、和标识引擎 906。光栅图像处理器将数字内容转换为适合打印的位图；内存缓冲器 904 保持已经适于打印的光栅化的图像；以及标识引擎 906 将着色剂转移至基片（如纸）。

标识引擎 906 可以使用多种不同的技术之一将光栅化的图像转换到纸或其它介质，换言之，将着色剂转移至基片。可能使用的不同标记或打印技术包括击打或非击打式打印。击打式打印的例子可以包括点阵、电传打字、菊花轮式等。非击打式打印技术可以包括喷墨、激光、静电、热、染料升华等。

打印机 900 的标识引擎 906 和存储缓冲器 904 形成打印机引擎 908，打印机引擎 908 还可以包括用于解码及信号转换等的附加电路和组件（未显示），如固件、软件和/或芯片或芯片集。向打印机引擎 908 的输入通常是由光栅图像处理器 902 生成的最终光栅化的打印数据。这种输入通常是设备相关的且对打印机是特定的。打印机引擎 908

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可以获得该设备相关的输入并生成输出页。

光栅图像处理器（RIP）902 可以位于打印设备自身内（如图 10A 所示）或在外部实现为硬件、软件或二者的组合。作为例子，RIP 可以实现为信息装置中的软件应用程序或设备驱动程序。RIP 还可以位于本发明的打印控制器、打印服务器或输出控制器中。光栅图像处理操作的例子还包括图像和图形解释、光栅化、分段、色空间转换、图像增强、色彩校正、半色调等。

当 RIP 902 位于输出设备 140 中时，RIP 902 通常包含于打印控制器 910 中，该打印控制器 901 可以例如将输入打印数据解释、转换和/或光栅化为打印机引擎 908 可以理解的最终格式、语言或指令。具有较快打印速度的激光打印机是这一类的一个例子。例如，PostScript 打印机控制器 910 可以包含 postscript 解释器（未显示）和光栅图像处理器 902（RIP）。Postscript 解释器解释 postscript 语言，且光栅图像处理器 902 可能处理数字文档并将其转换为可以为打印机引擎 908 所接受的打印机特定的格式、语言或指令。在这个例子中，可能在信息装置 100 中需要设备相关的打印机驱动程序（如 postscript 驱动程序，未显示），以将数字文档从它的原始格式转换为可被打印机控制器 910 所接受的打印数据（如，以 PostScript 形式）。

页面描述语言的另一例子是来自 HP（Hewlett Packard）的 PCL（打印机命令语言）。与 postscript 相同，装备了 PCL 打印机控制器 910 的打印机可以将 PCL 作为输入。信息装置 100 通常需要具有 PCL 打印机驱动程序，以驱动或打印到装备了 PCL 控制器的打印机。

尽管上面的说明使用 PostScript 和 PCL 作为例子，但多种其它页面描述语言、标记语言、图像格式、图形格式、及文件格式也可以用作到打印机 900 或输出设备 140 的输入打印数据 920。除了 PostScript 和 PCL 之外的其它可能输入的例子可能包括但不限于：EMF、XML、

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HTML 等。一些打印机制造商还可以使用专用或非专用的对于打印数据 920 的页面描述语言、置标语言、文件格式、图形和图像格式、色空间、元文件、编码、解码、压缩或解压缩等的组合。发送至具有打印机控制器 910 的打印机的打印数据 920 通常是数字文档的中间描述，它在发送至用于输出的打印机引擎之前需要进一步的解释、处理和/或转换。打印机控制器 910 可能将输入中间打印数据信息解释并处理为可以被打印机引擎 908 理解的最终格式。不考虑打印数据 920 的类型，用户通常不得不在他们的信息装置 100 中预先安装设备特定的驱动程序，以输出可以被特定的打印机 140 所接受的合适的语言、格式或文件。

一些输出设备 900B 不具有打印机控制器 910，如图 9B 所示。一个典型的例子是低成本喷墨打印机。这个例子中的 RIP 可以实现为信息装置 100 中本发明的软件应用程序 302 或设备驱动程序或输出管理器 308。因此，可以在输出到这样的打印机的信息装置 100 中发生光栅化过程。设备特定的驱动程序或应用程序可能需要位于信息装置 100 中，以将数字文档从它的原始格式光栅化并转换为可以被特殊的打印机引擎 908B 理解的最终的打印数据 920B（如具有每象素一个或多个比特的压缩 CMKY 数据）。

在本发明中，对于打印机 900B，RIP 可以整合在信息装置 100 中的输出管理器 308 或应用软件 302 之内。或者，RIP 还可以整合为任一输出控制器的一部分或一个功能，如结构 120D、120E 和 120F 所示。

输出控制器 120 可能与输出设备 140 外部相连，或在内部整合入输出设备 140。如果输出设备 140，如打印机，已经包括了打印机控制器 910，则输出控制器 120 可与打印机控制器 910 作为两个独立的控制器而串行地或级联地实现。或者，输出控制器 120 可以与打印机控制器结合为一体，成为“联合控制器”120C。联合控制器（如 120C 或 120F）具有本发明的打印机控制器 910（如输入解释和/或光栅图像

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处理）和输出控制器 120 二者的功能。输出控制器 120 和打印机控制器 910 的其它结构和实施方式也是可能的。下面参考图 4 描述输出控制器的多种可能的结构和实施方式。

通信单元

具有输出控制器 120 的信息装置 100 之间的通信链路 150 和 160 无论是外部相连和/或内部整合都可能有多种实现方式。在一种实现中，信息装置 100 通过例如红外或无线电链路这样的无线连接与输出控制器 120 通信。无线连接技术的例子包括但不限于：IrDA、家庭 RF（Home RF）、蓝牙、IEEE 802.11、HiperLan 2 等。但是本发明中也可以实现如串行接口、并行接口、USB 接口、火线（IEEE 1394）、以太网和令牌网等这样的无线连接。适配器对可以合并入每一通信节点（如信息装置 100 和输出控制器 120），以通过执行信号转换进行通信。

在输出控制器 120 作为外部元件或“盒”而安装的情况（如图 4A 所示），也可以使用无线或有线适配器实现输出控制器 120 和输出设备 140 之间的通信链路 170。

图 2A 和图 2B 是显示可以包含在信息装置 100、输出控制器 120 或输出设备 140 之中的无线通信适配器的两种示例结构和实施方式的框图。参考图 2A，可能实现无线电适配器 200 以使得可以通过无线电链路在设备之间传输数据/语音。使用与天线 216 耦合的 RF 收发器 214 来接收并发送无线电频率信号。RF 收发器 214 还进行无线电信号和电子信号之间的转换。RF 收发器 214 通过接口 212 连接到 RF 链路控制器 210。接口 212 可以执行如模数转换、数模转换、调制/解调以及其它数据转换功能。

RF 链路控制器 210 实现实时低层（如物理层）协议处理，使主机（如信息装置 100、输出控制器 120、输出设备 140 等）可以在无线电链路上通信。链路控制器 210 执行的功能可以包括但不限于：错

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误检测/校正、功率控制、数据分组处理、数据加密/解密以及其它数据处理功能。

可以使用多种无线电链路，包括一组在 2.4GHz 不需执照的频带中操作的竞争技术。这个组现在包括蓝牙、家庭射频（Home RF）、和基于 IEEE 802.11 标准的实现。其中每一种技术都有不同的协议集，且它们都提供了对无线局域网（LAN）的解决方案。这些技术之间的冲突会限制对这些协议的同时使用。可以预期，将出现新的局域无线技术或者现存的局域无线技术将会聚。然而，本发明中可以实现所有这些现存的和未来的无线技术，以在不同设备中不受限制地传输数据，因此不脱离本发明的范围。

在当前可用的无线技术中，蓝牙需要相对低的能耗。蓝牙有其自己的协议栈，且是为近距离（10 米）、点到多点语音和数据传递而设计的。它基于扩频的跳频方案。使用了 79 个跳频，从最低频 2402MHz 开始，79 个跳频的每一个都比其相邻的较低频率高 1MHz。可用蓝牙的设备在皮网（piconet）上运行，在皮网中使用相同的跳频方式或顺序的几个设备在点到多点系统（皮网）中相连。每一皮网中的一个设备（主机）决定如何将带宽分配到其它设备（从设备）。可以同时处理多达 10 个 8 台设备的皮网。

参考考图 2B，可以实现红外适配器 220，使得数据可以通过红外传输在设备之间传输。红外适配器 220 可以依照红外数据协会（IrDA）标准及规范方便地安装。通常，IrDA 标准用于向要正常使用电缆来连接的设备提供无线连接技术。IrDA 标准是点到点（与蓝牙中的点到多点相对）、窄角、专设（ad-hoc）的数据传输标准，被设计为在 0～1 米距离以最多 4Mbps 的速度操作。

红外适配器 220 的结构可以根据需要的数据传输速度而改变。图 2B 显示了红外适配器 220 的一个实施例。收发器 226 接收/发射 IR 信

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号并进行 IR 信号与电信号之间的转换。UART（通用异步收发报机）222 执行串行化/解串行化、串行数据流与数据字节之间的转换这些功能。UART 222 通过编码器/解码器（ENDEC）224 连接到 IR 收发器 226。这种结构通常适合于以相对低的速度传输数据，例如 115.2kbps 或更低。对于较高的数据传输速率，可能需要其它元件（如分组成帧器、锁相环）。

图 2A 和 2B 显示了无线适配器的示例结构。这样的适配器实现为设备（如信息装置 100、输出控制器 120、输出设备 140 等），以使在它们之间可以无线通信。但是在本发明中也可通过使用合适的适配器和结构而实现有线链路，如并行接口、USB、固件接口、以太网及令牌环网络。

不同的输出管理器结构及过程

图 3A-3C 显示了输出管理器 308 的不同实施方式。图 3A 显示了输出管理器 308 的示例结构，其中输出管理器 308 的主机信息装置 100 包括操作系统。这种信息装置 100 可以包括但不限于：台式 PC、膝上型 PC 和手持或掌上电脑等。操作系统提供了 API 或对象模型 300，使软件应用程序 302 可以与不同的设备管理应用程序接口并通信，有时称这些设备管理应用程序为设备驱动程序。这种情况中的输出管理器 308 的特征为设备管理应用程序或设备驱动程序之一。不同的软件应用程序 302A 可以通过使用操作系统提供的 API 300 而共享相同的输出管理器 308。

如图 3A 所示，电子邮件应用程序 302 A1、文档生成应用程序 302 A2 和因特网浏览应用程序 302 A3（统称为应用软件 302）可以在信息装置 100 中包含的操作系统之上操作或通过该操作系统而操作。操作系统提供或支持 API 或对象模型 300，使这些软件应用程序 302 与输出管理器 308 提供的用途及服务通信并访问这些用途及服务。应用软件 302 和输出管理器 308 可以通过使用例如文件传输、元文件、消

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息、实例、程序调用等的多种方法互相通信，这些方法可能或可能没有由操作系统或它的 API 或对象模型 300 提供。输出管理器 308 与输出控制器 120 通信并同步，以使普适输出成为可能。因此，用户可以从任一这些软件应用程序 302（电子邮件、文档生成、因特网浏览等）中将数字内容输出到装备了或连接至输出控制器 120 的输出设备 140。

应当认识到，图 3 所示的三种软件应用程序 302（1）-302（3）仅仅是可能在信息装置 100 中包含的应用程序的例子。多种其它软件应用程序 302（如消息通信、数字图像、图形、视频、音频等）也可能存在于相同的信息装置 100 中，且它们都可能访问输出管理器 308 提供的用途。还应当认识到，其它设备管理应用程序或驱动程序也可能包含于信息装置 100 中。这些设备管理应用程序或驱动程序可以与输出管理器 308 相同的方式实现，从而它们可以由操作系统支持的其它软件应用程序访问。

图 3B 和 3C 显示了当信息装置 100 分别为不包括操作系统或包括功能较少的操作系统时的输出管理器 308 的示例结构，其中所述功能较少的操作系统不提供用于软件应用程序 302 交互的 API 或对象模型 300。这种信息装置 100 的例子可以包括但不限于：PDA、智能电话、传呼机、因特网板（pad）、电子邮件终端、数字及视频相机、电子图书以及其它专用设备等。在这种情况中，信息装置 100 中的每一软件应用程序 302 提供或实现使得普适输出成为可能的能力。如图 3B 所示，每一软件应用程序 302 B1-302 B3 结合了输出管理器 308 或包括输出管理器 308 的特征，以使普适输出成为可能。应当认识到，即使在有完整的操作系统的环境中，应用软件 302 仍可决定实现它自己的输出或设备管理能力（如图 3B 所示），且不依赖或使用操作系统提供的功能或 API 或对象模型 300，以方便访问作为独立应用程序的输出管理器。

图 3C 中显示了另一种实施方式，没有将输出管理器 308 整合入

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应用软件 302。软件应用程序 302 C1-302 C3 可以建立与输出管理器 308 的之间链路，该链路可用作能够在需要时由每一软件应用程序 302 调用或启动的帮助程序。

输出管理器 308 和其它软件应用程序 302 之间的信息的通信及交换可以由许多可用技术的一个或多个实现，这些技术如传递、传输或交换对象、消息、程序调用、文件、元文件等。通过应用软件 302 或输出管理器 308 或操作系统提供的 API 或对象模型集容易实现这些技术中的一些。严格的技术可能依赖例如应用程序的类型、平台、语言、以及开发者的偏好等。这可以被本领域普通软件工程师容易地实现并理解。

上面仅仅是输出管理器 308 的示例性实施方式。由于操作系统的特征集和能力的多样性，输出管理器 308 的其它实施方式也是可能的。作为一个例子，一些操作系统可以提供部分 API 或对象模型，以支持有限的输出能力。在这种情况中，软件应用程序 302 可以依赖有限的输出能力，以与设备管理应用程序交互，或者软件应用程序 302 可以使用图 3B 或 3C 中所示的结构或结构的组合，实现或部分合并其它想要的输出管理器 308 的输出特征。

图 4A-4F 显示了输出控制器 120 的多种供选择的结构和实现。如上所述，打印机 900A（图 9）可能在其中包括 RIP 902 或打印机控制器 910。该打印机 900A 通常比没有这些特征的打印机更强大且因此更昂贵。这种打印机 900A 的一个例子是高速激光打印机。输出控制器 120 可以与打印机是否包括打印机控制器无关地在打印机中以多种形式实现。

图 4A 显示，输出控制器 120 可以与一个或多个打印机（只显示了一个）外部级联）。信息装置 100 与输出控制器 120A 通信，然后输出控制器 120A 与输出设备如打印机 104A 通信。如上所述，输出控制

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器 120A 和打印机 140A 之间的通信链路可以是无线链路或有线链路。

图 4B 显示了另一实施方式，其中输出控制器 120B 作为一个或多个电路板或卡而安装在打印机 140B 内部。输出控制器 120B 可以与打印机控制器和打印机 140B 的其它组件共同存在。这种实施方式的一个例子是将输出控制器 120B 与打印机控制器顺序相连。

图 4C 显示了第三种实施方式，其中输出控制器 120 和打印机控制器 910 的功能联合，成为单独的控制器（称为“联合控制器”）120C。联合控制器 120C 是功能更强大的控制器。在该实施方式中，与图 4B 中显示的实行两个独立的控制器相比，有可能减少材料成本。例如，联合控制器 120C 可以共享相同的处理器、内存、及存储器，以运行两种类型的控制器的应用程序及功能，从而可以具有比提供两个独立控制器的方案更低的组件成本。

有些打印机不包括光栅图像处理器或打印机控制器 910，如图 9B 所示，因此通常会较为便宜。这种类型的打印机的一个例子是低成本桌面喷墨打印机。这种类型的打印机可以使用专用的或公开的输入格式。例如，喷墨打印机的输入可以包括每象素输入具有一个或多个比特的特定的专用压缩 CMYK 数据。信息装置 100 中包含的应用软件 302 或打印机驱动程序通常执行光栅图像处理。因此需要合适的设备驱动程序或应用软件在打印前在信息装置 100 上运行光栅图像处理。从而，输出控制器 120 可以在多种打印系统中实现，包括没有或没有完整的用于执行光栅图像处理功能的打印机控制器的打印机。

图 4D 显示了输出控制器 120D 的第四种实施方式，输出控制器 120D 安装在连接到打印机 140D 的外部元件或“盒”中，该打印机 140D 不包括打印机控制器或光栅图像处理器。在这种结构中，信息装置 100 中的应用软件 302 或设备驱动程序 308 将典型地执行光栅化功能。然而，光栅图像处理的一些或全部操作也可以在输出控制器 120D 中实

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现。任何从输出控制器 120D 发送至打印机 140D 的打印数据都优选地是可以被打印机 140D 的打印机引擎理解并处理的最终格式。在另一例子中，输出控制器 120D 和输出设备 140D 之间的连接可以是有线或无线的。例如，信息装置 100 和输出控制器 120D 之间的连接优选地是无线的。

图 4E 显示了输出控制器 120E 的第五实施方式，它作为一个或多个电路板或卡而整合在打印机 140E 内，并可以包含在嵌入式处理器上运行的软件和应用程序。与打印机 140D（图 4D）相同，打印机 140E 不包括打印机控制器或光栅图像处理能力。因此本实施方式中，信息装置 100 将典型地执行光栅化功能。然而，例如对于具有有限的处理及内存能力的信息装置 100，光栅图像处理还可以由输出控制器 120E 完全或部分提供，以加快其光栅图像处理操作速度。

图 4F 显示了第六实施方式，联合控制器 120F 将打印机控制器和输出控制器的功能综合为单独的外部联合控制器元件或“盒”120F。两个控制器功能可以共享公用处理器及公用内存空间，以运行两种类型的控制器的应用程序。在这种结构中，信息装置 100 或联合控制器 120F 可以执行或共享光栅图像处理功能。图 4F 所示的联合控制器 120F 的一个示例实施方式是使用外部计算设备（PC、工作站、或服务器），该外部计算设备运行包括输出控制器 120 和打印机控制器 910 的功能的一个或多个应用程序。

上面是输出控制器 120 的示例实施方式，但其它实施方式也是可能的。例如，输出控制器 120 的部分功能可以在外部“盒”中实现，而其余功能可以作为独立的电路板或与打印机控制器整合而位于输出设备 140 中。作为另一个例子，输出控制器 120 的功能可以在连接到同一输出设备 140 的多个外部盒中实现。作为再一个例子，同一输出控制器 120 可以连接到并服务于多个输出设备 140。

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图 5 显示了使用打印机作为基本输出设备 140 的输出过程的一个实施例。然而应当理解，下面描述的过程可以类似地应用到其它输出设备 140，如传真机、数字复印机、显示屏幕、监视器、电视、语音输出设备等。

步骤 500 表明用户启动来自信息装置 100 的输出。例如，用户可能需要打印或输出来自信息装置 100 的电子邮件、收据、确认、地图、照片、图形、网页、一张或多张 PowerPoint®幻灯片、或任何其它文档或数字内容。可以通过多种方式启动输出，如使用软按键、按钮、键盘、小键盘、鼠标、指示笔、软件 GUI、命令或语音命令等。下面参考图 8 描述一个示例用户接口，用户可以使用它启动来自信息装置 100 的过程。图 5 中显示的输出过程的步骤 500 以及一个或多个其它步骤可以由位于用户信息装置 100 中的输出管理器 308 实现。

步骤 502 是发现过程，其中例如信息装置 100 搜索可用的可以执行请求的输出或打印作业的输出设备 140，包括显示设备、打印机、复印机或传真机等（为了讨论简单，这里选择“打印机”）。位于信息装置 100 中的输出管理器 308 可以参与、协调并管理发现过程 502。作为发现过程 502 的一部分，信息装置 100 可以通过无线或有线连接，与连接到或包括于输出设备 140 的输出控制器 120 通信。

在一些情况下，发现过程 502 或它的一部分可以被跳过。例如，如果用户已经知道了输出被指向的输出设备或打印机，则可跳过发现过程 502。另一个例子中，用户可以将常用的打印机设为优选的缺省打印机，从而如果发现缺省打印机可用，则可以部分跳过发现过程。另一个可以部分或选择性地跳过发现过程 502 的例子包括直接的有线线路连接或红外通信。在这些情况中，用户可以将信息装置 100 直接连接到或物理地指向特定的输出设备 140，使得仅仅检查连接并建立设备间的通信便足够。

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发现过程 502 可以在多种情况中操作。在一个情况中，信息装置 100 通过有线或无线信号广播服务请求，例如打印。服务设备，例如装备了输出控制器 120 的输出设备 140“听”该信号、“读”请求、“看”它们是否可以提供请求服务，如果它们可以提供请求的服务则作出响应。换一种方法或者联合起来，所有服务设备可以周期性地或持续地广播或广告它们提供的服务。信息装置 100“听”这种广播，并确定它需要的服务。在第三种情况中，相同网络（如 LAN）的服务设备以控制点注册它们的服务。控制点是保持关于同一网络内所有服务设备的记录的计算系统（如服务器、控制器）。信息装置 100 可以联系控制点，以搜索它需要的服务。

发现过程 502 中可以实现多种协议。优选无线通信协议。而有线通信也可以实现。可应用的协议的例子可以包括但不限于：蓝牙、HAVi、Jini、问候（Salutation）、服务定位协议、以及通用即插即用等。发现过程中也可以实现其它专用协议或联合。

在发现过程 502 中，信息装置 100 可能发现或可能不发现可用来接收打印或输出作业的输出设备 140。可能影响输出设备 140 的有效性的示例因素可能包括但不限于：

• 物理距离——一些无线通信链路可能对通信设备之间的物理距离加以限制。物理距离的限制可能随不同的无线通信技术而不同。而有线通信也受到电缆或其它有线线路的可用性及长度的支配。

• 兼容性——参考图 5 的输出过程利用多种设备之间的通信及协调，所述多种设备例如具有输出管理器 308 的信息装置 100 以及与输出设备 140 相关联的输出控制器 120。兼容的硬件和软件组件可能需要位于每一通信节点（如信息装置 100 和输出设备 140）中。任何缺少的部分都可能造成兼容性的问题。其它因素也可能导致缺乏兼容性。例如，存储在输出控制器 120 的内存单元中的组件可能不支持信息装置 100 中包括的操作系统或应用软件 312。

• 安全验证——安全验证可以在多种通信步骤中实现，包括发现

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步骤 502。例如当输出服务被限制在一定的用户组或信息装置时，可能需要安全验证。当用户请求服务时，输出设备 140 或输出控制器 120 可以通过自动检测用户、输出管理器 308 或信息装置 100 提供的标识或其它信息而处理验证过程。作为这种证明过程的结果，由于没有向用户或设备授权访问，所以特定用户的信息装置 100 可能不能够发现可用的输出设备 140。

·用户特定的搜索标准——用户可能为发现过程 502 确定特定的搜索标准，如输出设备型号、提供的服务质量、服务收费的价格范围等。不满足用户标准或默认功能标准的输出设备 140 将不显示给用户。

步骤 506 表明如果发现过程 502 中没有发现可用的输出设备 140 则通知用户。可以通过信息装置 100 的用户接口，由应用程序如输出管理器 308 通知用户。信息装置 100 还可以提供更多的详细信息，如请求的服务不可用的原因。可能的原因的例子包括：在有限的服务距离内没有输出设备、没有兼容的硬件或软件组件、技术困难、不满足安全验证、未订阅服务、不符合搜索标准等。

步骤 508 表明当请求的服务当前不可用时提供可选择的方法。可以向用户提供可选择的方法，如取消服务请求、再次尝试、或当请求的服务可用或请求的输出设备 140 被确定或变得可用时通知用户。一个例子是，用户的信息装置 100 可能没有在当前的有线/无线网络中检测到任何可用的输出设备 140。于是打印请求在信息装置 100 中排队或注册。当用户进入具有可用打印机的新的网络时，或当新的兼容的打印机添加到当前网络时，或当打印机因为任何原因而变为可用时，将通过信息装置 100 将该可用性通知用户。于是用户例如仅需按下按钮，便可以将打印作业输出到新检测的或现在可用的打印机。这种检测及通知功能可以由软件程序或作为输出管理器 308 的一个特征而实现。该特征还可以以位于信息装置 100 中的硬件或硬件和软件的联合而实现。

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步骤 514 表明执行了服务协商，例如在发现过程 502 中发现了一个或多个可用的打印机。在服务协商过程 514 中，信息装置 100 与连接到或安装于可用的输出设备 140 的输出控制器 120 交换信息。输出管理器 308 可能与输出控制器 120 共同参与、协调或管理协商过程 514。交换的信息可能包括例如：

• 每一可用的输出设备 140 的类型、批次及型号，包括有关打印机引擎、技术及输出设备的规格的信息。

• 输出设备 140 的类型及参数，如支持的字体或国际字符编码、页面尺寸、分辨率、位深度、色空间、支持的色彩数、彩色或灰度等。

• 各个可用的输出设备 140 提供的服务类型及服务质量。

• 提供服务的条件（如服务收费、订阅收费）以及例如是否满足交易及服务收费。

• 各个输入设备 140 的使用或服务是否限定于一定的组，这种情况下，用户不得不提供验证信息，以在允许使用设备之前确定为该组的成员。

• 信息装置 100 的类型、批次及型号（包括操作系统）。

• 输出控制器 120 或其它设备作为输入而采用的输入格式、编码、语言、数据、色空间、和/或压缩的类型，例如 PostScript、PCL、RTL、XML 等。

• 需要从输出控制器 120 上载到信息装置从而使向特定输出设备输出成为可能的组件或数据的类型。

交换的信息可以由用户手动输入，或者可以自动检测和/或在信息装置 100 和输出控制器 120 之间同步，或者它可以由用户部分辅助或部分自动完成。可以通过信息装置 100 中的用户接口向用户提供交换的信息的一些或全部。用户可以监视该状态并批准特定的交易。下面参考图 6 描述服务协商过程 514 的一个实施例。根据在服务协商过程 514 中提供并得到的信息，用户可以选择一个或多个可以进行打印或输出作业的输出设备 140。

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步骤 516 表明，一旦确定并选择了输出设备 140，就执行同步过程。在同步过程 516 开始之前，信息装置 100 可以与选择的一个或多个输出设备 140 的一个或多个输出控制器 120 通信，以确定什么组件在需要的情况下需要上载到信息装置 100，以使打印或其它输出成为可能。如果在发现过程 502 和/或服务协商过程 514 中已经包含了充分的信息，则这个在信息装置 100 和一个或多个输出控制器 120 之间的通信可能不是必需的。如果信息装置 100 中已经存在了必要的组件（如，在服务协商步骤 514 中确定的），则同步过程 516 可以是可选的或可被部分跳过。

在确定了它们之后，可以从输出控制器 120 将必要的组件或部分组件或数据上载至信息装置 100。可能的组件的例子可以包括但不限于以下的一个或多个：数据、设备驱动程序、打印机驱动程序、应用软件、软件组件、元文件、用户接口等。输出管理器 308 可能参与、协调或管理同步过程 516。可以在同步过程 516 中实现加密技术以防止窃听。

新上载的组件可以被合并入位于用户的信息装置 100 中的输出管理器 308 中。换一种方法或者联合起来，新上载的组件可以作为独立的应用程序或作为输出管理器 308 的一部分而安装在信息装置 100 中。上载及安装的过程可以自动进行或者由用户手工完成，或者联合这两种方式。

同步过程 516 的部分或全部可以在一些情况中跳过。例如，信息装置 100 可能已经包括了输出至被选的一个或多个输出设备 140 所必需的所有软件组件及数据或驱动程序。这可能是由于已经从前面的同步过程 516 上载并未被删除的组件而引起的，或者由于用户在信息装置 100 中预安装了所有输出所需的组件。在这些情况下，没有正在上载的软件组件，且可能向用户通知了可能跳过同步过程 516 的状态。或者同步过程 516 可能对用户透明地自动跳过。

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步骤 518 表明执行了打印或输出作业处理。在步骤 518 中，处理了打印请求或打印作业，且数字内容或文档可能被转换为最终格式，以发送至用于输出的输出设备 140。在步骤 518 的开始，可能向用户提供了选择或改变或输入打印或输出偏好的选项，如版面、打印份数、彩色/灰度、打印质量参数等。这些选项可能包括或提供预配置的用户偏好或厂家缺省值。一些选项、参数及偏好可能是设备相关的，而其它的可能是设备无关的。例如，可能在同步或上载了来自输出控制器 120 的设备相关的组件或信息之后提出设备相关的参数及偏好。设备无关的参数及偏好也可以类似设备相关的参数及偏好那样被上载并同步，或者可能在信息的同步和上载之前，作为输出管理器 308 的一部分而预安装。

参考图 4A-4F，输出控制器 120 可以以多种方式实现。输出控制器 120 的不同实施方式可能影响这里描述的过程。在信息装置 100 的应用程序 312 中包含或生成的原始数字文档或内容可以在转换为用于输出的打印机引擎可以接受的最终打印数据之前，由不同位置中的不同应用程序（应用软件 312、输出管理器 308、输出控制器 120、打印机控制器）处理。例如，用于将它转换为适合输出设备 140 的打印数据的数字文档的光栅图像处理可能根据输出系统和输出设备等的实施方式、结构、以及类型，完全或部分发生于应用软件 312、输出管理器 308、输出控制器 120、或打印机控制器中。下面参考图 7 更为详细的描述在步骤 518 中实现的不同的处理过程和实施例。

步骤 520 表明，打印机引擎或显示引擎 908 生成最终输出。在步骤 520 中，步骤 518 的处理结果被发送至输出设备 140 的打印机引擎或显示引擎 908，以生成在例如基片上的最终输出。可能需要存储缓冲器来在输出之前暂时存储打印数据。可以使用或调用固件、DSP、ASIC、FPGA、片上系统、软件、或其组合，来将数字数据转换为适合打印机引擎或显示引擎 908 的信号。

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在成功打印或显示打印作业或输出作业之后，可以向用户提供选择（未显示），以删除在同步过程 516 期间上载到信息装置 100 的组件。当信息装置 100 的存储空间有限时，这个选择特征是有用的。该选择特征的一个实施方式是提供输出管理器 308 中的设置，其中用户具有以下选择：（1）总是保留上载的数据或组件；或者（2）在完成打印作业时、或在退出应用程序时、或关闭信息装置时、或经过一定时间后，总是自动删除上载的数据或组件；或者（3）总是询问用户是否删除或保留上载的组件或数据。

上面的描述显示了输出过程 501 的一个示例实施例。在上述描述中，打印机指代输出设备 140，但是应当理解，输出过程 501 可以容易地应用于其它输出设备，如传真机、数字复印机、显示屏幕、电视、监视器、投影机、语音输出设备等。

以较少或附加步骤实现的普适输出过程也是可能的。例如，如果用户已经知道哪一或哪些打印机要输出内容，则可跳过步骤 502 的发现过程。在另一个例子中，如果向打印服务提供了费用，则可以向上述输出过程 501 增加付费处理步骤。在这种情况下，输出控制器 120 可以以多种可能的形式，如信用卡、银行卡、现金、电子现金、智能卡等，提供服务，例如计算付费量或收集付费。付费信息（如信用卡号或其它信用标识或付费）可以存储在信息装置 100 中，并按照用户的选择释放给输出控制器 120。然而，向输出过程 501 增加附加过程或跳过一个或多个步骤不脱离本发明的精神及范围。

图 6 显示了服务协商过程 514 的实施例。其中，假设发现过程 502 中已经确定了可用的输出设备 140。在服务协商过程 514 中，信息装置 100 与输出控制器 120 或输出设备 140 交换信息。服务协商过程 514 可能包括以下一个或多个：

（1） 可能向用户提供了关于可用的输出设备 140 的信息。

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（2） 用户可能根据提供的信息选择想要的输出服务。

位于信息装置 100 中的输出管理器 308 可能与输出控制器 120 一起参与、协调并管理服务协商过程 514。

在步骤 600 中，可能在信息装置 100 向用户提供了关于在发现过程 502 中确定的一些或所有可用的输出设备 140 的信息。这里提供的信息可能包括以下一个或多个：

- 发现的可用输出设备的总数。
- 各个可用的输出设备的型号及批次。
- 输出设备的类型及性能。
- 各个可用输出设备提供的服务类型及服务质量。
- 提供服务的条件。例如，是否需要服务费或订阅费以及收费方法。
- 对各个输出设备的使用是否限制于特定的组。
- 在需要的情况下需要上载到信息装置以使到被选的输出设备的输出成为可能的组件或信息。

可以通过信息装置 100 上的用户接口，如 GUI 或语音或其它接口，向用户提供在发现过程 502 期间采集的信息。

在步骤 602 中，根据提供的一些或全部信息，用户可以选择一个或多个输出设备来进行打印请求或打印作业。另一方面，用户可以选择拒绝提供的输出服务，并选择不将文档或内容输出至任何设备。在这种情况中，可以向用户提供供选择的方法，如前面参考步骤 508 所述（图 508）。

验证步骤 604 时可选的，但是如果例如输出设备 140 的使用限定于一组用户，则它可能是必需的。在这种情况中，用户可能不得不提供验证信息，以确定他/她本人为使用该服务的授权组的一部分。验证

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方法的例子可能包括用户的名称、密码、个人身份号码（PIN）、ID 号码、签名、密钥（物理或数字的）、生物测定、指纹、语音等。信息装置 100 的 ID 号码或 IP 地址也可用于验证信息。这种验证信息可以由用户手动提供，或由输出控制器 120 或输出设备 140 自动检测。

应当理解，图 6 仅提供了本发明的服务协商过程 514 的一个实施例。具有较少或附加步骤的服务协商过程 514 也是可能的。例如如果没有限制输出设备 140 的使用，则步骤 604（验证）可能是不必要的。另一个例子是，如果涉及服务费用，则可能向协商过程 514 中增加一个或更多步骤，如信用确认、付费、押金、有条件转让、以及收据处理。然而，所有这些以及其它可能的变动不脱离本发明的精神及范围。

图 7 显示了可以实现为输出或打印作业处理步骤 518 的一部分的不同处理过程。对于这个描述，以打印机指代输出设备 140，以打印数据指代输出数据。应当理解，打印机只是输出设备的一个实施例。显示、投影及音频设备也是本发明范围内的输出设备。不能将代替输出设备的打印机的使用以及代替输出数据的打印数据看成将下面的讨论的范围限定于打印设备。

在步骤 700 中，输出管理器 308 处理输入数据文档或内容 701，并将其转换为可以传输至输出控制器 120、联合控制器（120C、120F）或直接到打印机引擎 908 的打印数据 703。在该步骤中可以发生光栅化、译码、编码、解码等。在一个实施方式中，打印数据 703 可能利用中间格式或语言，以便于数字文档或内容 701 传输至输出控制器 120。该中间格式或语言可以是输出控制器 120 能够理解的预定义的输入格式或语言。在步骤 700 中也可能输出管理器 308 将数字文档 701 经过很少的处理，简单地以其原始格式传递至输出控制器 120。在另一示例实施方式中，输出管理器 308 可能将数字内容或文档 701 处理（如光栅图像处理）为兼容输出设备 140 的输入需要的最终打印数据或输出数据格式。可以使用加密技术，以保证信息装置 100 和输出设

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备 140 之间的通信安全。

如上所述，步骤 700 生成的输出数据或打印数据（在打印机的情况下）703 可以是多种格式。在一个实施例中，打印数据 703 可以是适合直接发送至打印机引擎的最终格式。在这种情况下，输出控制器 120 进行很少的处理或不进行处理。这种结构的一种示例使用可以在不具有打印机控制器的低成本喷墨打印机中实现。在该例中，打印数据 703 可以是能够直接发送至打印机引擎 908 的压缩的 1 比特或更多的 CMYK 数据格式，用于步骤 702 中所示的最终输出。或者打印数据 703 可以被发送至输出控制器 120，用于步骤 704 中所示的可能的可选特征如缓冲、队列、和打印作业管理。

在另一实施例中，输出管理器 308 可能生成需要进一步处理的中间格式、语音、或指令的打印数据 703。这种格式、语言或指令的例子可能包括但不限于：页面描述语言（如 PostScript、PCL）、元文件（如 EMF）、置标语言（如 XML、HTML）、图像或图形格式（TIFF、GIF、PNG、JPEG 压缩）等。中间格式还可能包括页面描述语言、置标语言、元文件、图像及图形格式、编码及解码、压缩及解压缩中的专用方案。上述中间格式可以独立或联合使用。

正如上面参考图 4 所描述的，输出控制器 120 可以以多种方式实现。输出控制器 120 的不同实施方式可能影响这里参考图 7 描述的处理过程。

如步骤 702 所示，打印数据 703 几乎或完全没有经过进一步处理，便被从输出控制器 120 或打印机控制器 910 直接发送至打印机或显示引擎 908，用于最终输出。在这种情况下，打印数据或输出数据 703 优选地是可以被打印机或显示引擎 908 所理解的最终格式或语言，其中打印机或显示引擎 908 是选中的一个或多个输出设备 140 的一部分。

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还可以如步骤 704 所示，打印数据 703 被发送至连接到或安装于选中的打印机或输出设备 140 的输出控制器 120。在一个实施例中，打印数据 703 可以是能够被打印机或显示引擎 908 理解并处理的最终格式或语言。在这种情况下，输出控制器可以在几乎或完全没有进一步处理而将输入打印数据 703 传递至打印机或显示引擎 908 之前，将其缓冲。在另一实施例中，打印数据 703 可以是打印机或输出引擎 908 不能理解的中间格式或语言。因此，输出控制器 120 可以处理打印数据并将其转换为能够发送至打印机引擎（或者在其它类型的输出设备的情况下，发送至其它输出引擎）的最终格式、语言或指令。

不考虑输入打印数据 703 的格式，输出控制器 120 可以执行附加的管理功能，如付费处理、服务确认、验证、打印作业管理、队列、假脱机、服务质量等。

如步骤 706 和 708 所示，打印数据 703 可以在为了最终输出而发送至打印机引擎 908 之前，由输出控制器 120（步骤 706 中）和打印机控制器 910（步骤 708 中）分别处理。例如，一些打印机，例如高速激光打印机，已经包括了具有处理某些类型输入，如 PostScript、PCL、及 XML 等的能力的打印机控制器 910。在这种情况下，输出控制器 120 可能处理打印数据 703 或将其转换为打印机控制器 910 需求的输入 707。或者在另一实施方式中，如果打印数据 703 已经是兼容的且能够为打印机控制器 910 所理解的一种格式或语言，则输出控制器 120 可以简单地缓冲打印数据 703 并根据需要，几乎或完全不经过处理，将其直接发送至打印机控制器 910。在步骤 708 中，如果例如译码、解码、以及光栅图像处理操作还没有由输出控制器 120 或由输出管理器 308 执行，则打印机控制器 910 可以对输入打印数据 707（例如页面描述语言）执行这些功能。打印机控制器 910 的处理结果可能被发送至打印机引擎 908，用于最终输出。

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如步骤 710 所示，结合了输出控制器 120 和打印机控制器 910 的功能的单独的联合控制器 120F、120C（如图 4C 和 4F 所示）可以处理打印数据。为各个控制器提供特征的应用程序可以共享相同的资源，如处理器、内存空间、存储单元等。在这种结构中，如果打印数据 703 还不是打印机引擎请求的格式或语言，则联合控制器（120C、120F）可以进一步在步骤 710 中处理打印数据 703。联合控制器（120C、120F）除了将输入打印数据 703（以前面所述的一种或多种中间格式）转换为请求的打印机引擎 908 格式、语言或指令用于输出以外，可能需要额外执行译码、加码及光栅化操作。如果打印数据 703 已经是能够为打印机引擎 908 所理解的格式、语言或指令，则联合控制器（120C、120F）可以简单的缓冲打印数据 703 并按照需要将其发送至打印机引擎 908，用于输出。

类似的，除了处理打印数据，输出控制器 120 和联合控制器（120C、120F）可以执行诸如付费处理（如果应用了服务收费）、打印作业管理、队列、脱机等功能。

图 8A-8E 显示了不同时间在信息装置 100 的显示屏幕 800 上实施的一系列示例图形用户接口（GUI），以显示参考图 5 描述的输出过程 501 的一个实施方式。显示的用户接口可以在具有或不具有操作系统的信息装置 100 中实现。这里显示的用户接口仅仅是一个例子，在本发明的范围内还可以实施其它用户接口。

参考图 8A，用户使用电子邮件应用程序在信息装置 100 上接收电子邮件。在屏幕 800 的底部显示对于用户可用的功能。打印是其中一个功能，以“打印”功能控件或图标 802 来显示。用户可以通过选择显示的图标而调用该功能。用户可以通过使用例如以下的任何一个或组合来作出选择：键盘、小键盘、鼠标、指示针、软按键、按钮、软件命令、触摸屏等。用户还可以通过例如下拉菜单、语音命令等作出这样的选择。

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当用户选择“打印”功能控件 802 时，调用了参考图 5 描述的输出过程。结果向用户通知所有能够进行打印或输出作业的可用打印机，如果这些可用打印机存在的话。如果没有检测到可用的打印机，则还可以通知用户并向用户提供参考图 5 的步骤 506 和 508 所描述的供选择的方法。

假设在该例子中，发现过程步骤 502 找到了三个可用的打印机。在图 8B 中，屏幕 810 通知用户各个可用打印机的批次及型号。用户可以通过例如选择“更多信息”控件或在各打印机名称之后显示的箭头符号 814，得到关于各个可用打印机的进一步的信息。这里提供的进一步的信息包括但不限于：各个打印机提供的服务选项、提供的服务质量、在收费情况下的服务收费、可接受的收费方法、以及该打印机的使用是否限定于某一组。

如果限定打印机由某一组使用，则用户可能在能够选择该打印机之前被请求提供识别信息。例如，要使用位于公司办公建筑走廊中的打印机，用户必须确定自己是该公司的雇员。有可能需要请求信息装置的 ID 号码、密码或个人身份号码用来授权。识别信息可以由用户手动提供，或者由输出控制器 120 或输出设备 140 自动检测。如果打印机提供了付费服务，则可以额外请求一定的付费过程步骤，为了简便起见没有在图中显示它们。

当用户在服务协商过程 514 中成功地选择的想要的输出设备或服务之后，信息装置 100 可以与输出控制器 120 通信，以确定需要上载至信息装置 100 以使打印成为可能的数据或软件组件，如果这些数据或软件组件存在的话。位于信息装置 100 中的输出管理器 308 可能参与、协调或管理信息装置 100 和输出控制器 120 的应用程序之间的通信。

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在这个特定的例子中，如图 8C 所示，正如屏幕 820 上显示的，信息装置 100 和输出控制器 120 之间的通信确定了打印机驱动程序需要被上载。向用户提供了选择，是否继续该过程。由于该过程可以对用户透明地实现，所以该信息和选择是可选的。信息装置 100 可以向用户提供的其它可选信息包括例如上载所需时间的估计值。

上面的描述给出了需要上载的打印机驱动程序组件的例子。也可能是其它组件或组合，这可能包括例如一部分打印机驱动程序、数据、软件组件、或用户接口。例如一部分打印驱动程序或组件可能仅包括设备相关的软件组件和特定于输出设备的数据。设备驱动程序的设备无关的代码及数据可能先前已经安装在信息装置 100 中，并因此无需上载。也有可能由于打印到选中的输出设备 140 所需的所有组件已经位于信息装置 100 中，所以无需上载组件。假设在这个例子中，用户同意上载驱动程序，图 8D 显示了当进行同步过程 516 时的接口的例子。

当同步过程 516 结束时，屏幕 840 如图 8E 显示给用户。用户可以使用屏幕 840 选择偏好，如页面范围、份数、每页卡片数、彩色或灰度、页面布局参数等。选择“特性”控件或按钮 842，可以向用户提供更多的设备相关的选项，如色彩及色调调整、半色调参数、双面、分辨率、水印等。

步骤 518 和 520 可以在用户结束选择任何偏好之后进行。用户在选择图 8E 中的确认控件或“OK”按钮 844 之后，等待得到来自选择的一个或多个打印机 140 的打印输出或其它输出。图 8F 显示了用于步骤 518 和 520 的打印过程的接口。

在成功结束打印作业之后，可以向用户提供对保留或删除打印机驱动程序或软件组件或同步的设备相关的数据的选择，它们是在前面的步骤中上载到信息装置 100 的。这个选择对于具有有限内存空间的

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移动信息装置 100 或者不常用特定输出设备 140 的用户是有益的。频繁使用选中的打印机的用户可能希望保留安装的打印机驱动程序、软件组件、或数据，从而当再次使用该打印机时可以跳过对上载组件进行同步。

图 8A-8E 仅显示了图 5 所示的输出过程的一个例子。而上面的描述包含很多特征，它们不应当被构造为对本发明的范围的限定，而应作为它的示例性的实施例。也可以实现其它用户接口及实施例。该过程还可以以更多或更少的步骤实现。作为一个例子，可以将安全确认、验证、及付费处理增加到图 8A-8E 所示的步骤中。作为另一个例子，由于在用户选择想要的一个或多个打印机时自动进行载入过程，所以可以跳过图 8C 显示的步骤。但是，这些以及其它可能的改动不脱离本发明的范围。

因此，本发明的范围不应由显示的实施例确定，而应由所附的权利引擎及它们的等同物确定。

已经参考图解的实施例描述并解释了本发明的原理，可以认识到，在不脱离该原理的前提下，可以在安排及细节上对图解的实施例进行改动。考虑到本发明的原理可能应用的许多可能实施例，应当认识到，详细的实施例仅是说明性的，不应作为对本发明范围的限定。所有这样的实施例都落在随附的权利要求及其等同物的范围及精神之内。

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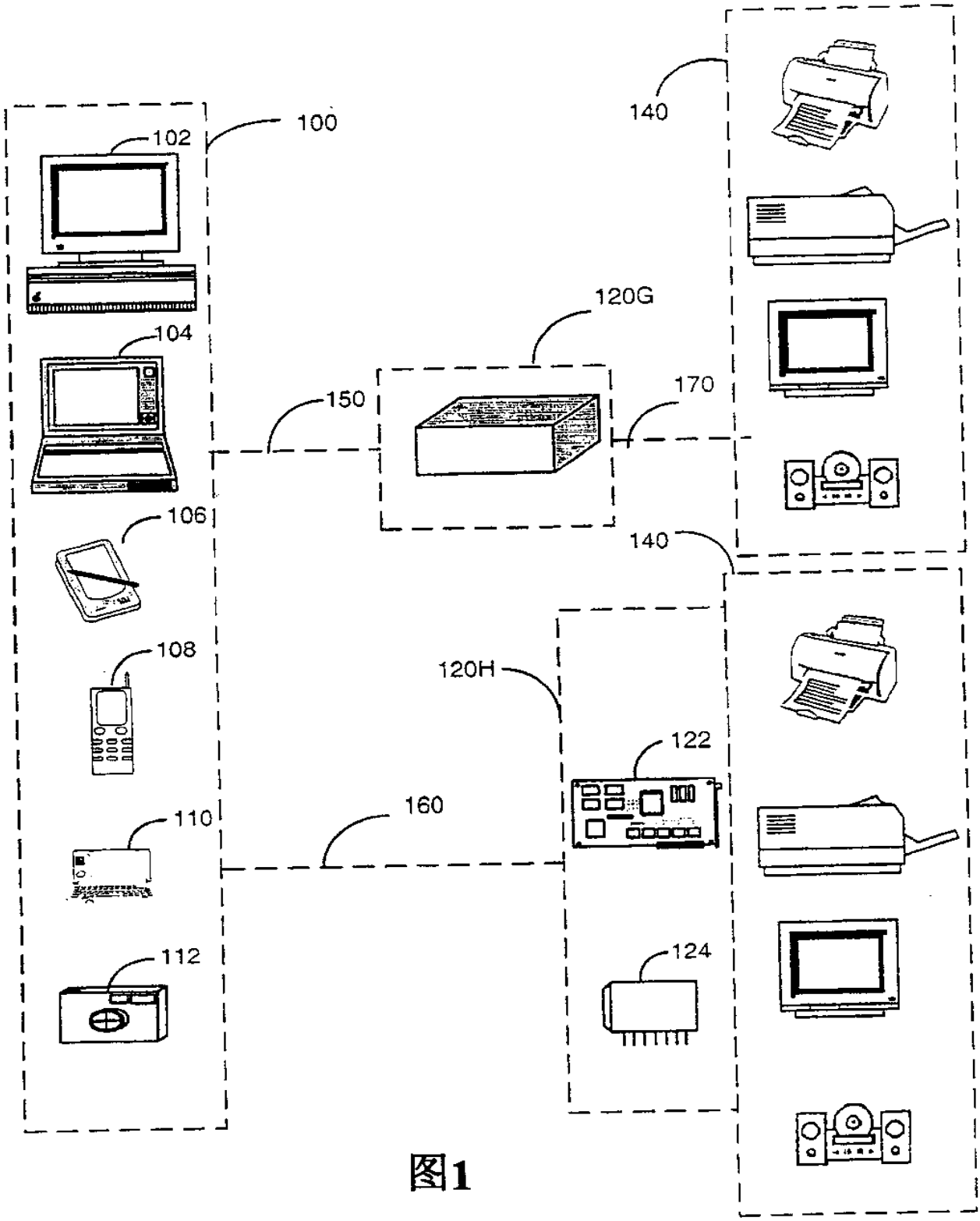

100
102
104
106
108
110
112
120G
120H
122
124
140
140
150
160
170

图1

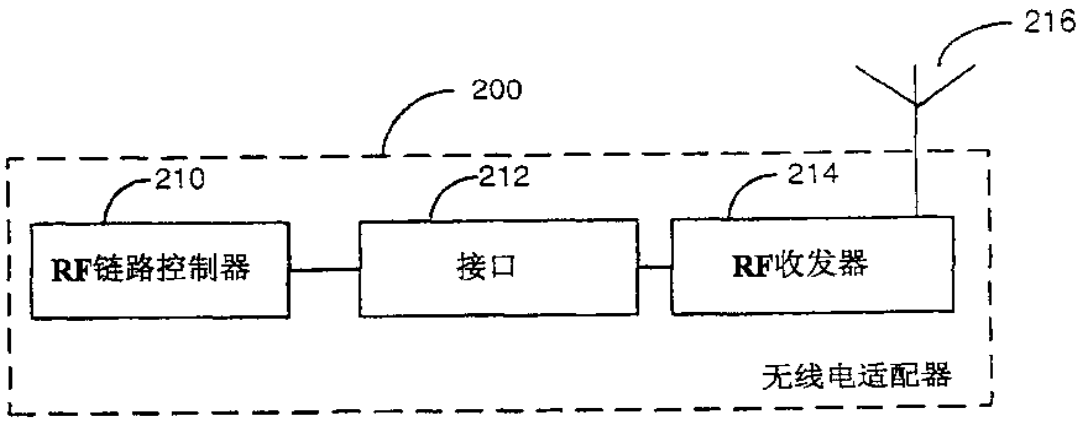


图2A

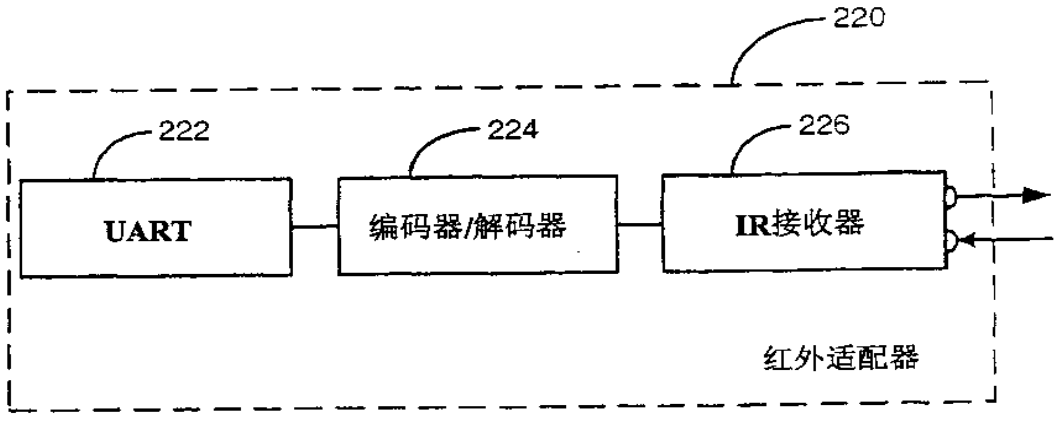


图2B

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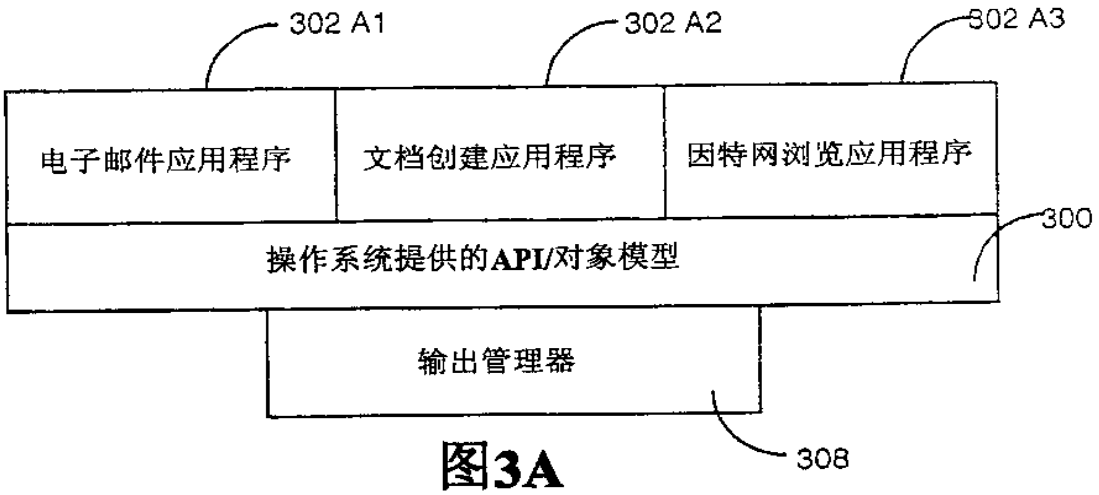

302 A1
302 A2
302 A3
电子邮件应用程序
文档创建应用程序
因特网浏览应用程序
300
操作系统提供的API/对象模型
输出管理器
308

图3A

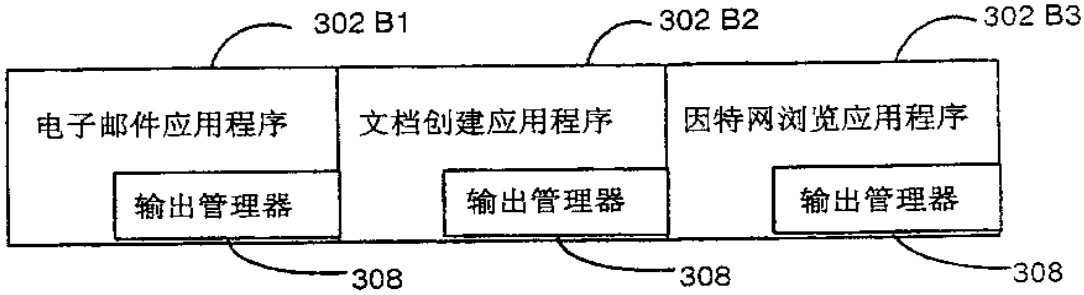

302 B1
302 B2
302 B3
电子邮件应用程序
文档创建应用程序
因特网浏览应用程序
输出管理器
输出管理器
输出管理器
308
308
308

图3B

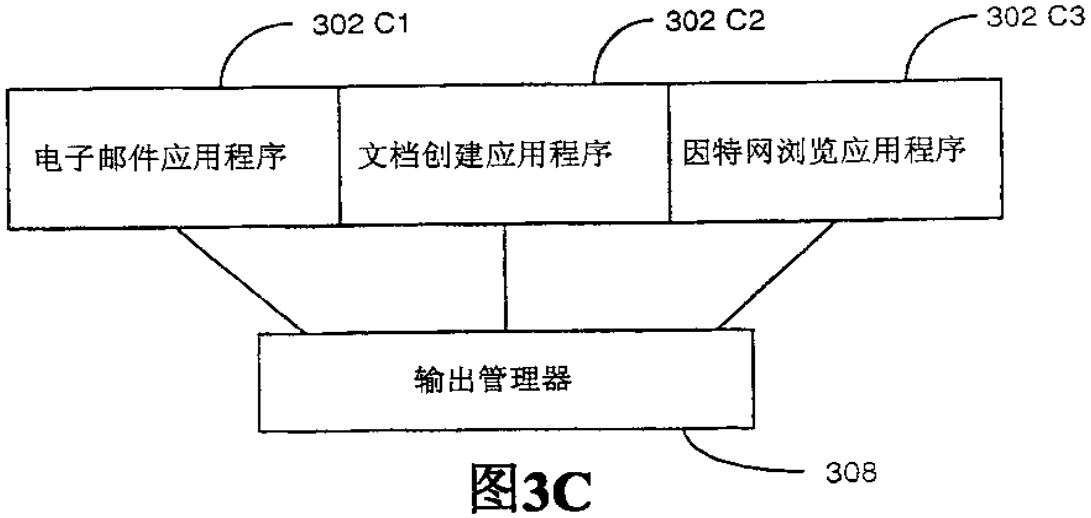

302 C1
302 C2
302 C3
电子邮件应用程序
文档创建应用程序
因特网浏览应用程序
输出管理器
308

图3C

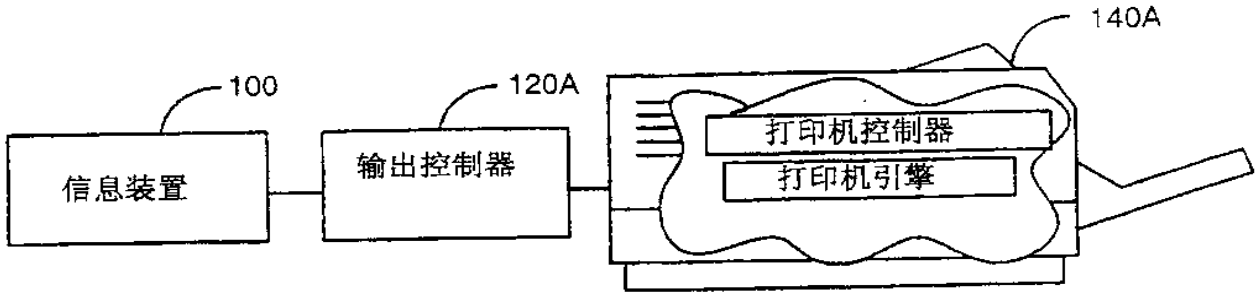

140A
100
120A
信息装置
输出控制器
打印机控制器
打印机引擎

图4A

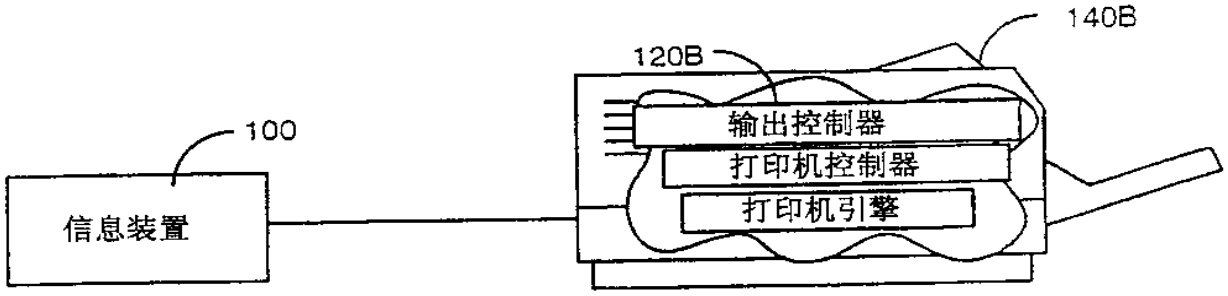

140B
120B
100
信息装置
输出控制器
打印机控制器
打印机引擎

图4B

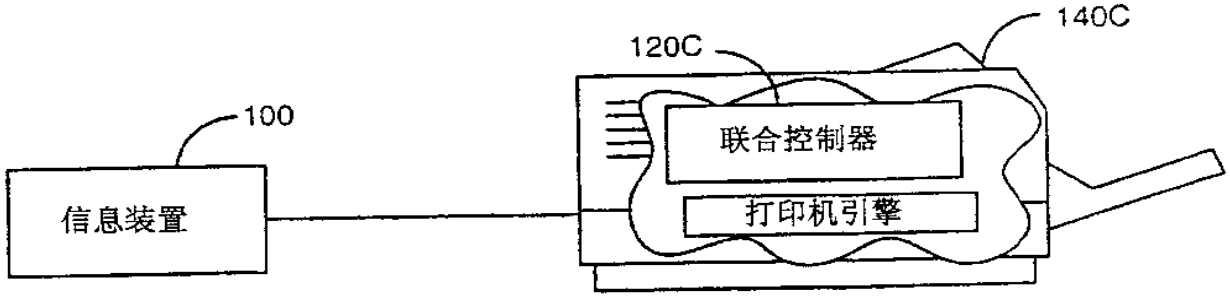

140C
120C
100
信息装置
联合控制器
打印机引擎

图4C

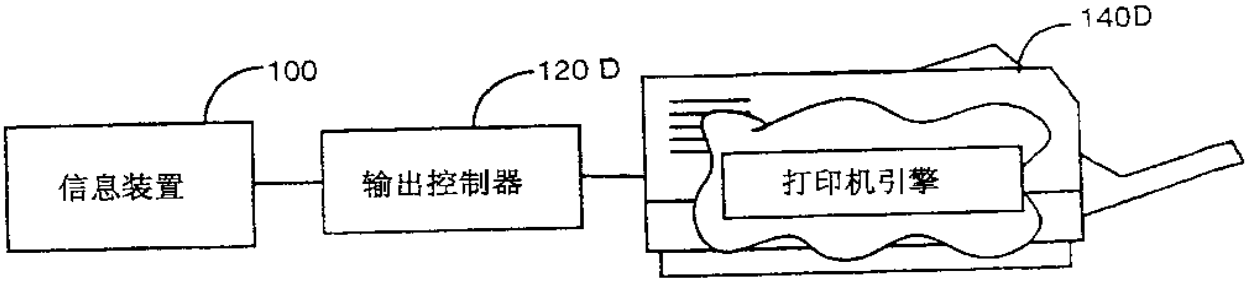


图4D

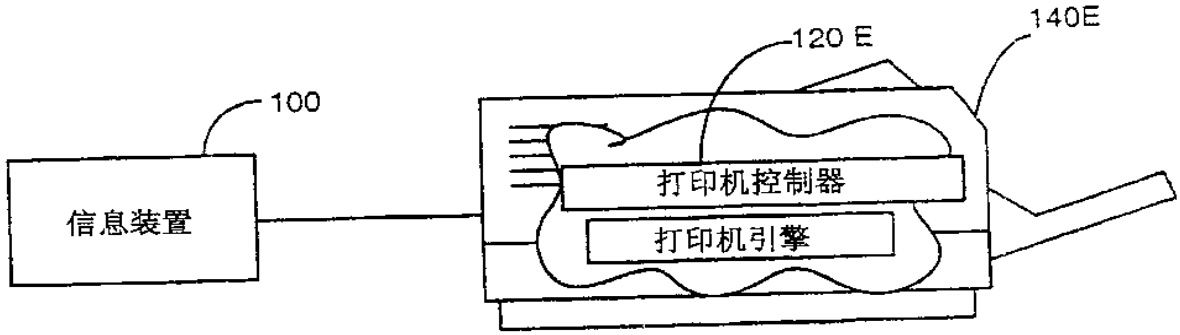


图4E

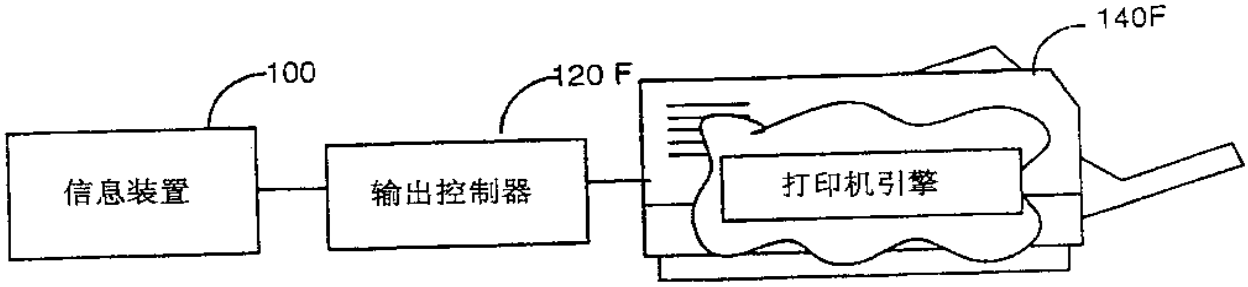


图4F

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

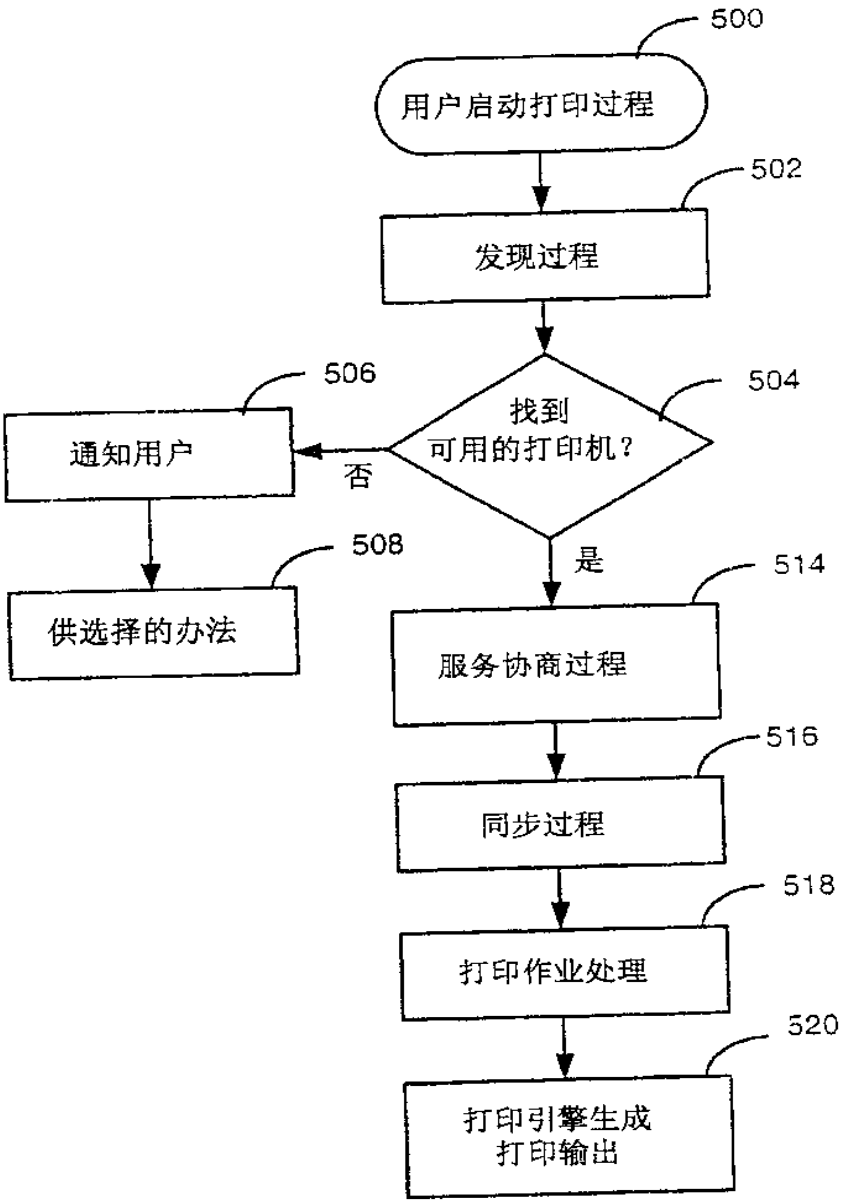


图5

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

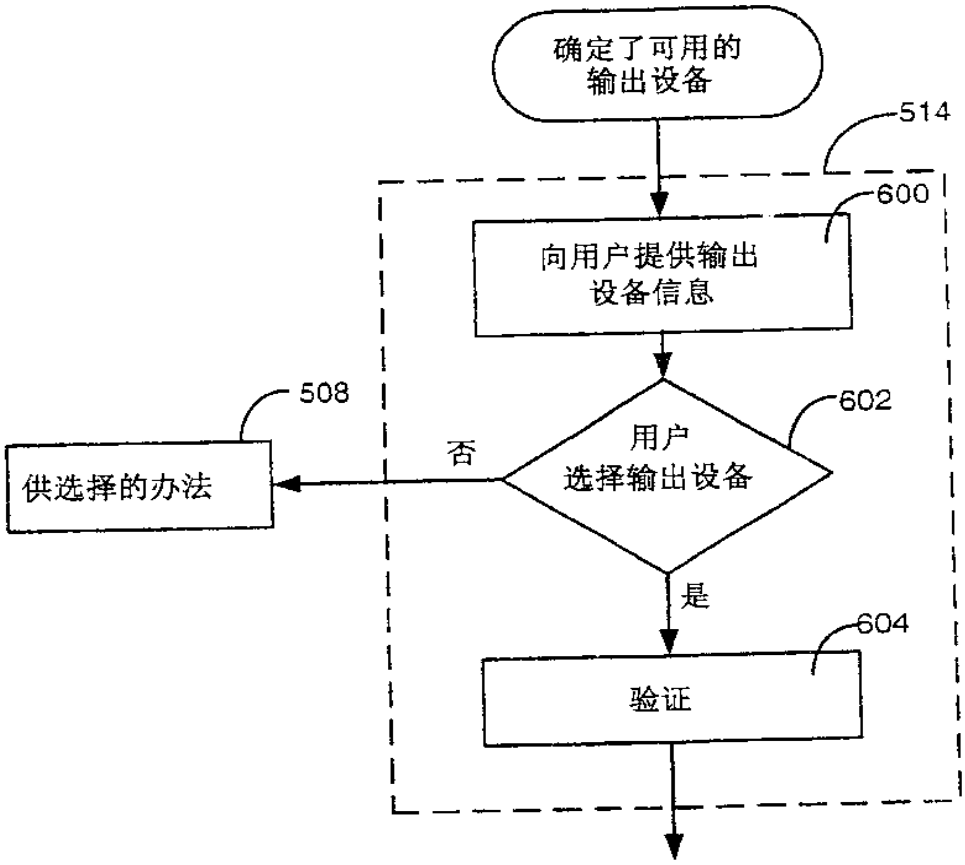


图6

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

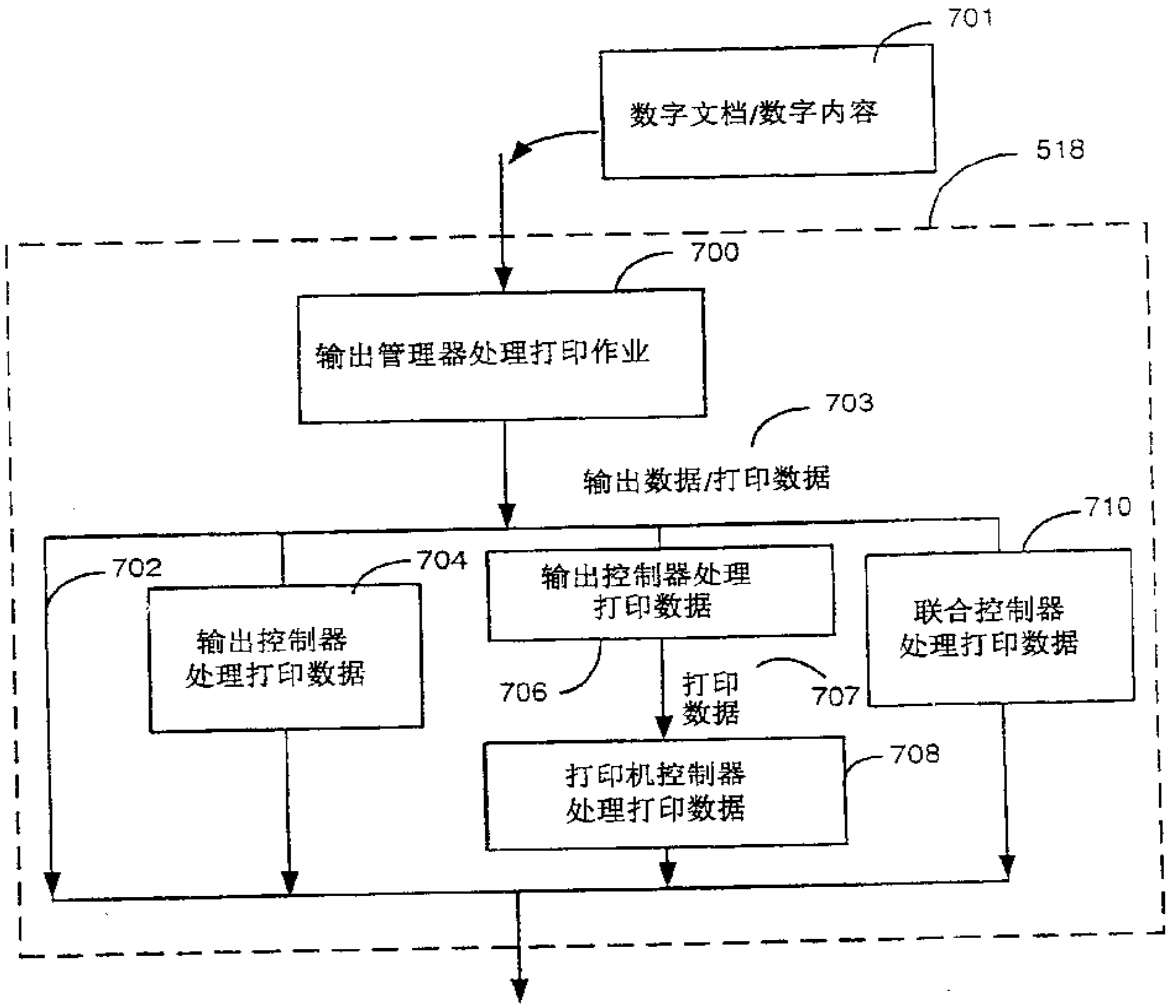


图7

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

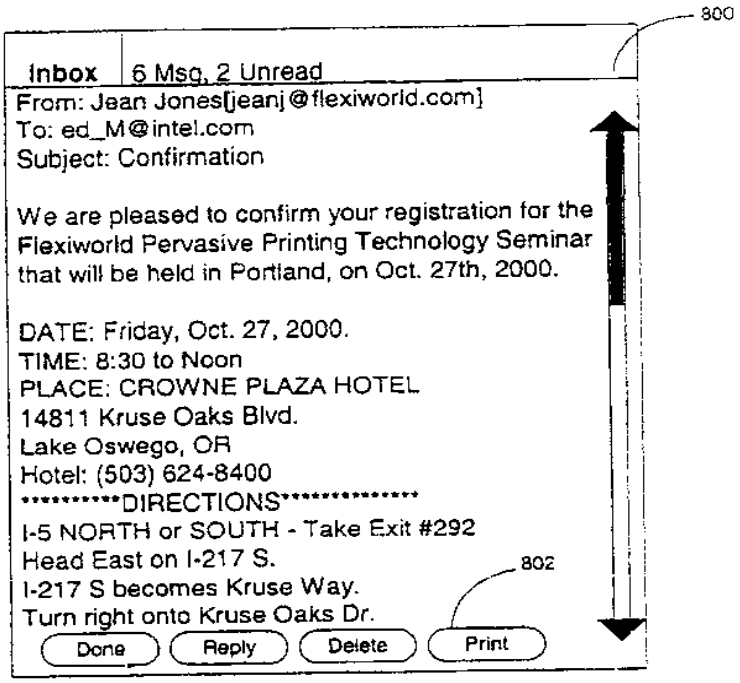

800
Inbox
6 Msg, 2 Unread
From: Jean Jones[jeanj@flexiworld.com]
To: ed_M@intel.com
Subject: Confirmation
We are pleased to confirm your registration for the Flexiworld Pervasive Printing Technology Seminar that will be held in Portland, on Oct. 27th, 2000.
DATE: Friday, Oct. 27, 2000.
TIME: 8:30 to Noon
PLACE: CROWNE PLAZA HOTEL
14811 Kruse Oaks Blvd.
Lake Oswego, OR
Hotel: (503) 624-8400
**********DIRECTIONS**********
I-5 NORTH or SOUTH - Take Exit #292
Head East on I-217 S.
I-217 S becomes Kruse Way.
Turn right onto Kruse Oaks Dr.
802
Done
Reply
Delete
Print

图8A

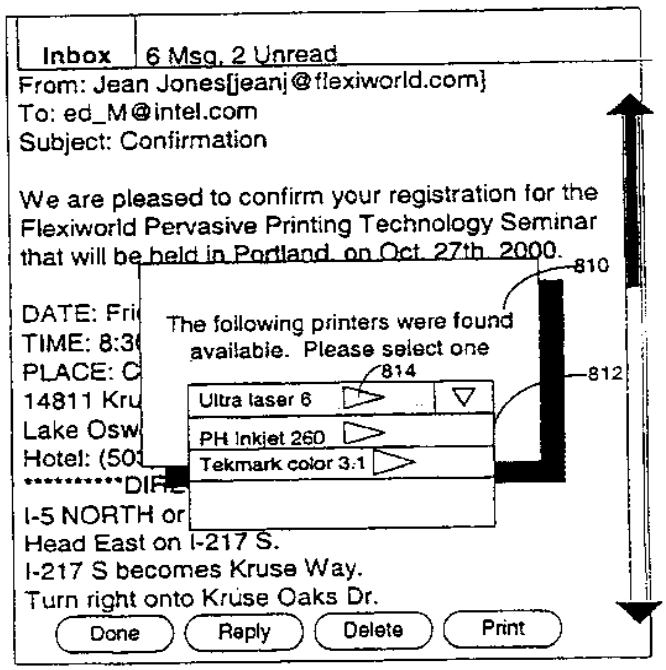

Inbox
6 Msg, 2 Unread
From: Jean Jones[jeanj@flexiworld.com]
To: ed_M@intel.com
Subject: Confirmation
We are pleased to confirm your registration for the Flexiworld Pervasive Printing Technology Seminar that will be held in Portland, on Oct. 27th, 2000.
The following printers were found available. Please select one
810
812
814
Ultra laser 6
PH Inkjet 260
Tekmark color 3.1
I-5 NORTH or
Head East on I-217 S.
I-217 S becomes Kruse Way.
Turn right onto Kruse Oaks Dr.
Done
Reply
Delete
Print

图8B

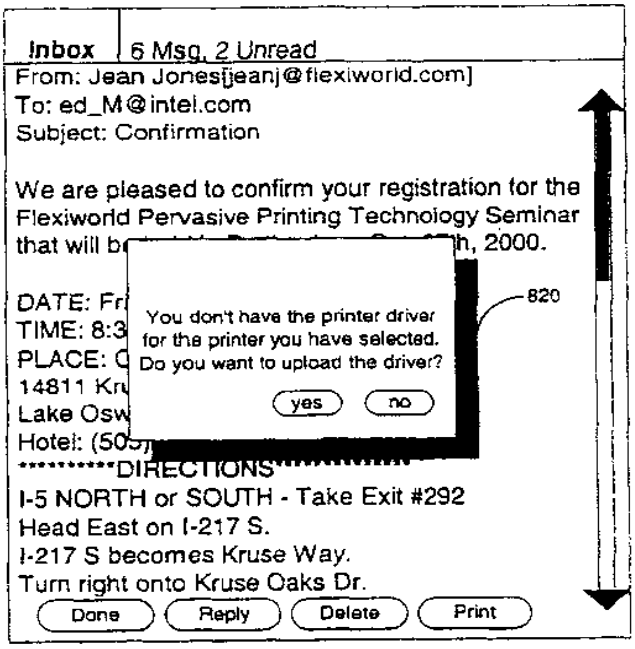

Inbox
6 Msg, 2 Unread
From: Jean Jones[jeanj@flexiworld.com]
To: ed_M@intel.com
Subject: Confirmation
We are pleased to confirm your registration for the Flexiworld Pervasive Printing Technology Seminar
that will b
h, 2000.
DATE: Fr
TIME: 8:3
PLACE: C
14811 Kru
Lake Osw
Hotel: (50
You don't have the printer driver for the printer you have selected. Do you want to upload the driver?
yes
no
820
**********DIRECTIONS**********
I-5 NORTH or SOUTH - Take Exit #292
Head East on I-217 S.
I-217 S becomes Kruse Way.
Turn right onto Kruse Oaks Dr.
Done
Reply
Delete
Print

图8C

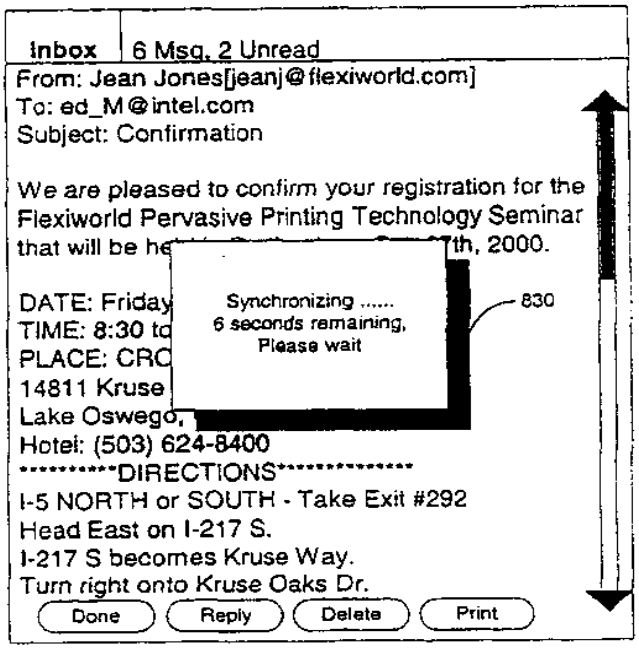

Inbox
6 Msg, 2 Unread
From: Jean Jones[jeanj@flexiworld.com]
To: ed_M@intel.com
Subject: Confirmation
We are pleased to confirm your registration for the Flexiworld Pervasive Printing Technology Seminar
that will be he
th, 2000.
DATE: Friday
TIME: 8:30 to
PLACE: CRC
14811 Kruse
Lake Oswego,
Synchronizing .....
6 seconds remaining,
Please wait
830
Hotel: (503) 624-8400
**********DIRECTIONS**********
I-5 NORTH or SOUTH - Take Exit #292
Head East on I-217 S.
I-217 S becomes Kruse Way.
Turn right onto Kruse Oaks Dr.
Done
Reply
Delete
Print

图8D

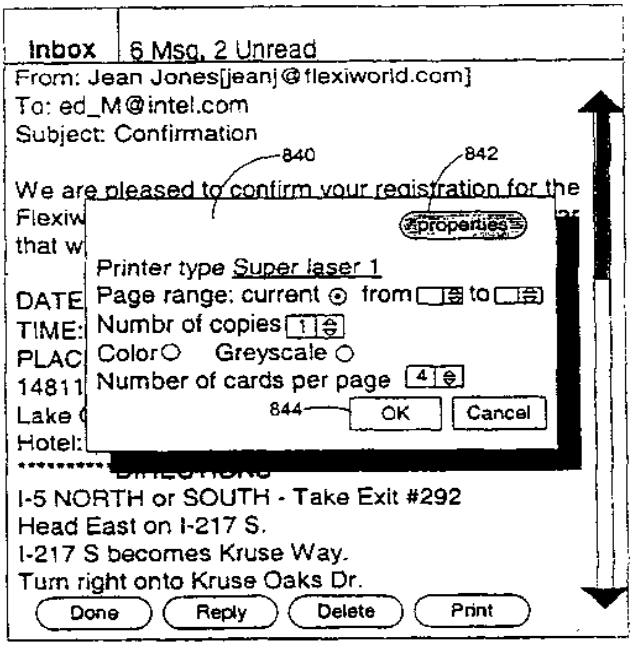


图8E

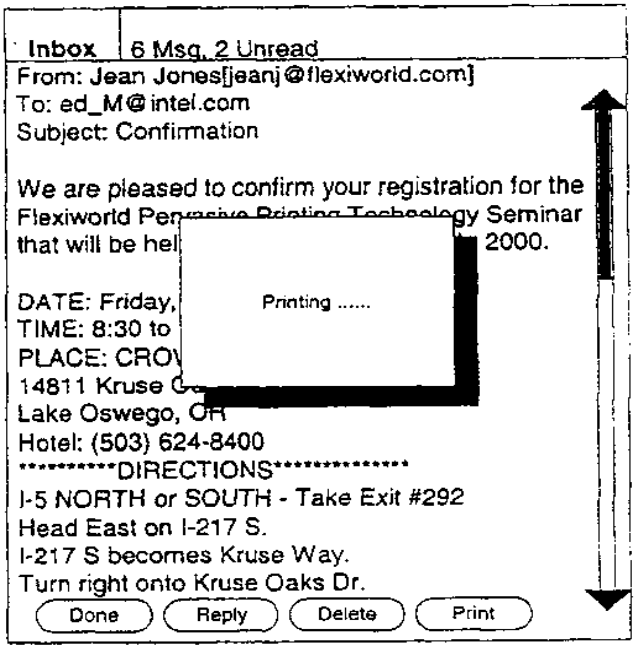


图8F

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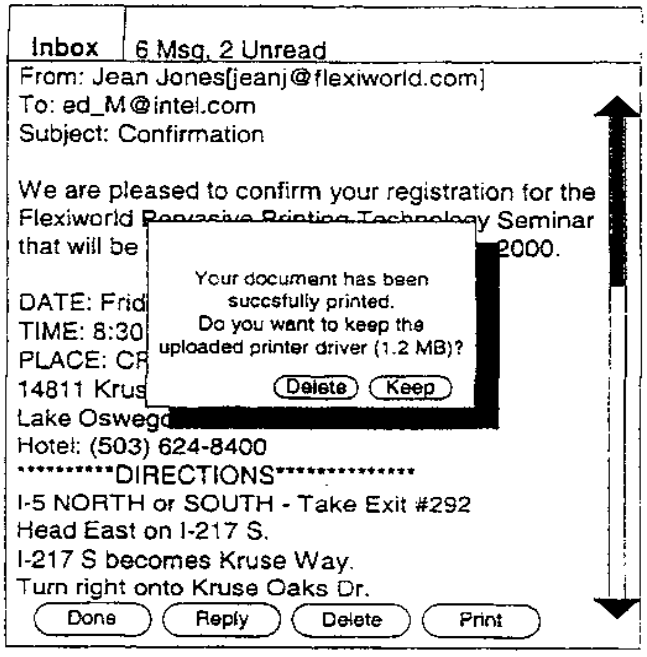


图8G

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

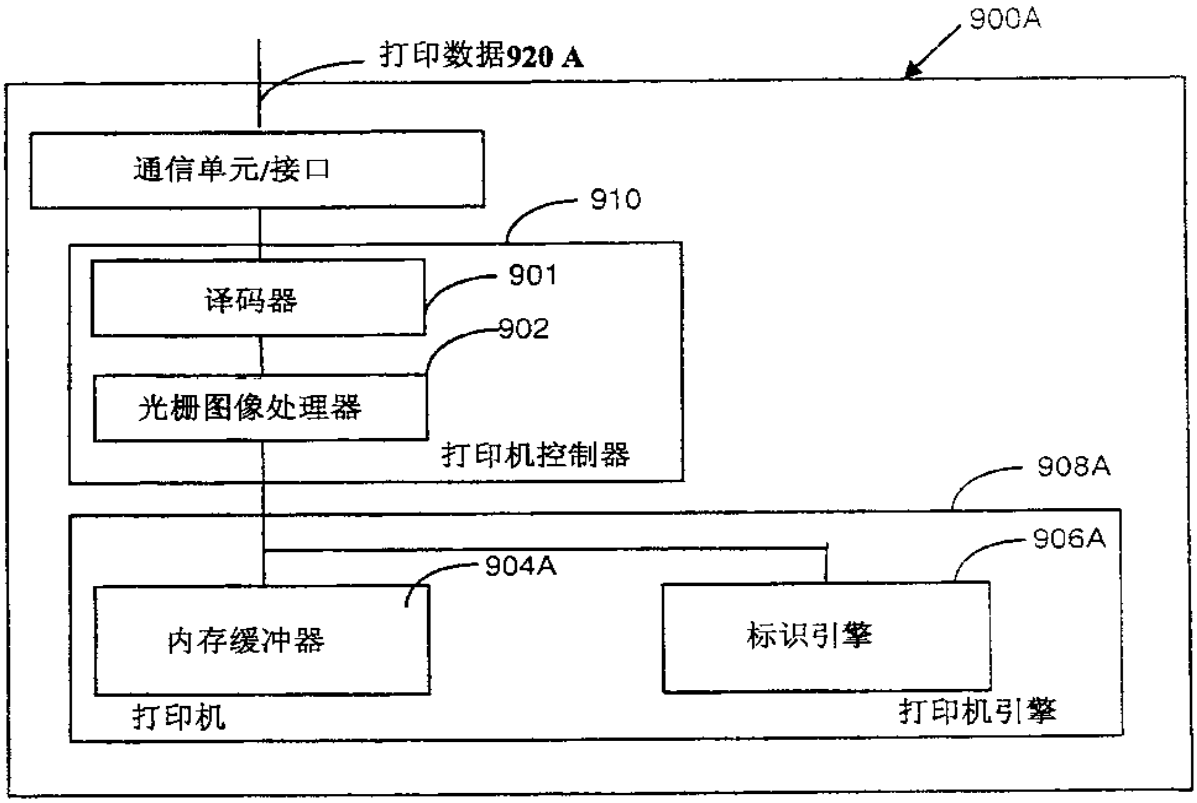


图9A

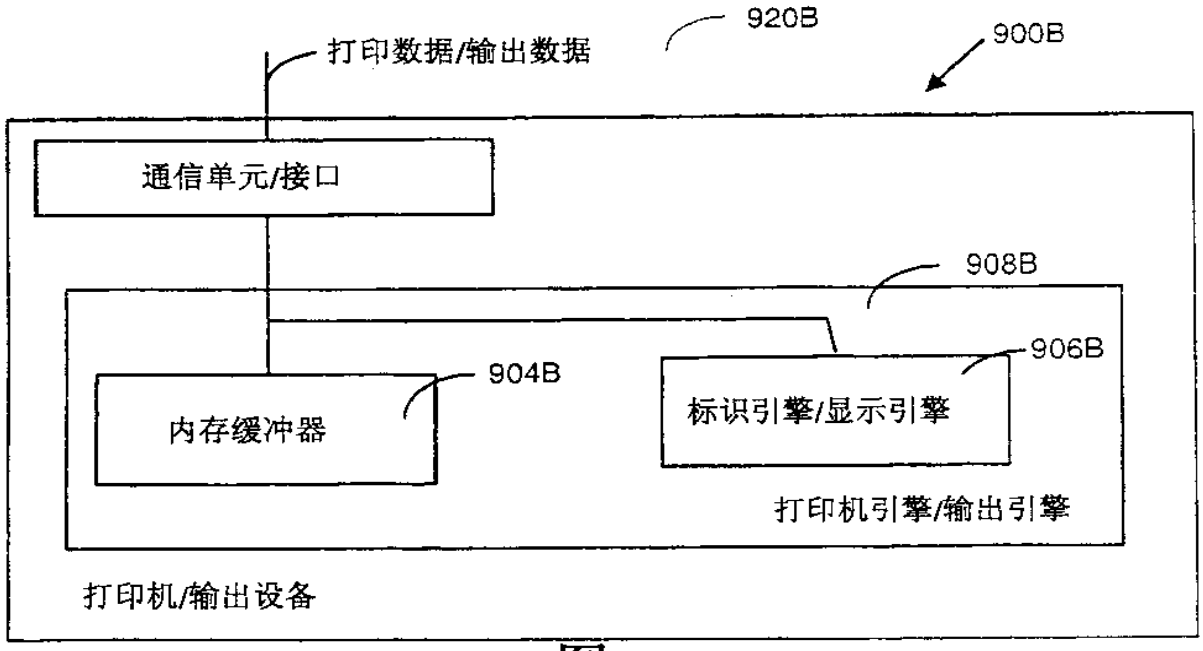


图9B

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

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(56)对比文件
US 5048057 A,1991.09.10,全文.
US 5737501 A,1998.04.07,全文.
US 5337258 A,1994.08.09,全文.
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审查员 汪宁

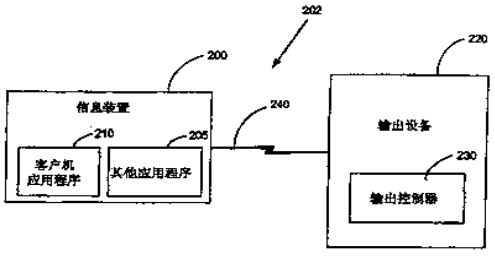
权利要求书 4 页 说明书 32 页 附图 14 页

(54)发明名称

通用数据输出系统

(57)摘要

位于局部区域上的信息装置光栅化信息装置上的数字文档以生成图象数据并由该图象数据创建中间输出数据。将中间输出数据传送到位于局域网上并包括输出具有设备特定的输出大小和分辨率的输出图象的输出引擎的输出设备。由中间输出数据恢复图象数据并将图象数据转换成与输出引擎的大小和分辨率兼容的指令。该方法进一步包括将这些指令提供给输出引擎以及响应指令,操作输出引擎,从而输出数字文档的图象。



CN 1541370 B

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1. 一种将可由信息装置访问的内容的至少一部分输出到输出设备的方法，所述信息装置是与所述输出设备不同的设备且包含用于与一个或多个输出设备进行无线通信的无线通信单元，所述方法包括：

(a) 在所述信息装置和至少两个输出设备间直接建立无线通信；

(b) 从第一可用输出设备接收指定所述第一可用输出设备的属性的信息；

(c) 由从所述可用输出设备接收的属性确定所述可用输出设备的属性是否与用于输出所述内容的至少一部分的要求匹配；并且如果匹配的话，

(d) 或者选择所述可用输出设备，使所述内容的至少一部分一致化为一个或多个输出图像，生成包含所述一个或多个输出图像的输出数据，并将包含所述一个或多个输出图像的输出数据经无线通信直接从所述信息装置传送给所选定的输出设备，或者，否则

(e) 从另一可用输出设备接收指定该另一可用输出设备的属性的信息，并且重复步骤 (c) 和 (d)。

2. 如权利要求 1 所述的方法，包括，在步骤 (b) 前，从所述信息装置传送要求接收的输出设备的消息，以传送指定与各个输出设备相关的属性的信息。

3. 如权利要求 1 所述的方法，其中与所述第一可用输出设备相关的属性包括服务质量、价格指示符、状态指示符、可用性指示符以及输出数据格式指示符的一个或多个。

4. 如权利要求 1 所述的方法，其中，与所述可用输出设备相关的属性包含名称、标识、设备类型，地址以及支持的输出设备配置文件的指示的一个或多个。

5. 如权利要求 1 所述的方法，进一步包括：在步骤 (d) 前的任一步骤中，获得无线信息装置的用户首选项，所述首选项为与在所选定的输出设备处渲染所述内容相关的参数。

6. 如权利要求 5 所述的方法，在步骤 (c) 的所述要求包括所述首选项。

7. 如权利要求 1 所述的方法，进一步包括：在步骤 (e) 之前，获得用于支付在所选定的输出设备处渲染所述内容的支付信息。

8. 如权利要求 1 所述的方法，进一步包括：在步骤 (e) 之前，获得用于实现到所选定的输出设备的无线访问的授权信息。

9. 如权利要求 8 所述的方法，进一步包括：利用所述授权信息，授权到所选定的输出设备的无线访问，并且依赖是否成功授权到所选定的输出设备的无线访问，启动从所述信息装置到所选定的输出设备的无线访问。

10. 如权利要求 1 所述的方法，其中，在步骤 (c) 或步骤 (d) 中，进一步包括：从用户接收所选定的输出设备的指示。

11. 如权利要求 1 所述的方法，其中，所述使所述内容的至少一部分一致化为一个或多个输出图像的步骤包含将至少一个输出图像编码成一个或多个图像层。

12. 如权利要求 11 所述的方法，其中，所述一个或多个图像层包括以不同分辨率编码每个图像层。

13. 如权利要求 1 所述的方法，其中所述使所述内容的至少一部分一致化为一个或多个输出图像的步骤包含以压缩操作编码至少一个输出图像。

14. 一种用于将可由信息装置访问的内容的至少一部分输出到输出设备的信息装置，所述信息装置是与所述输出设备不同的设备且包含用于与一个或多个输出设备进行无线通信的无线通信单元，所述装置包括：

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用于在所述信息装置和一个或多个输出设备间直接建立无线通信的装置；

从可用输出设备接收指定所述可用输出设备的属性的信息的装置；

由从所述可用输出设备接收的属性确定所述可用输出设备的属性是否与用于输出所述内容的至少一部分的要求匹配的装置，并且如果匹配的话，所述装置进一步包括用于选择可用输出设备的装置；

用于使所述内容的至少一部分一致化为一个或多个输出图象的装置，至少一个输出图像被以压缩操作编码；

用于生成包括所述一个或多个输出图象的输出数据的装置；以及

用于将包含所述一个或多个输出图像的输出数据经过所述信息装置之间的无线通信直接传送给所选定的输出设备用于输出的装置。

15. 一种用于将内容的至少一部分通过到输出设备的无线通信输出给输出设备的信息装置，所述内容至少部分可由所述信息装置访问，所述信息装置是与所述输出设备不同的设备，且所述信息装置包含用于与一个或多个输出设备进行无线通信的无线通信单元和与用户进行交互的接口，所述信息装置包括：

用于查找用于无线通信的输出设备的装置；

用于在所述信息装置和在所述查找中找到的一个或多个可用输出设备间直接建立无线通信信道的装置；

用于在所述无线通信信道上从至少一可用输出设备接收信息的装置，所述信息包括与所述可用输出设备相关的属性；

用于经所述信息装置的接口向所述用户提供与所述可用输出设备相关的所接收的信息的至少一部分的装置；

用于从所述用户接收所选定的输出设备的指示，并且依赖接收所选定的输出设备的至少一指示，使与内容相关的输出数据在所述无线通信信道上直接地从所述信息装置传送到所选定的输出设备用于输出的装置。

16. 一种用于将内容输出给输出设备的信息装置，所述内容至少部分可由所述信息装置访问，所述信息装置是与所述输出设备不同的设备，且所述信息装置包含用于与一个或多个输出设备进行无线通信的无线通信单元和与用户进行交互的接口，所述信息装置包括：

用于在所述无线通信单元上，经无线通信查找输出设备的装置；

用于发现在所述查找中找到的一个或多个可用输出设备的装置；

用于经过无线通信从至少一个发现的输出设备接收至少一信息的装置，所述信息包括与所发现的输出设备相关的属性；

用于部分基于经过无线通信从输出设备接收的所述属性，从所述一个或多个发现的输出设备中选择输出设备的装置；

用于获得授权信息的装置，所述授权信息用于启动从所述信息装置到所选定的输出设备的无线访问；以及

用于利用所述授权信息授权到所选定的输出设备的无线访问，并且至少依赖是否成功授权到所选定的输出设备的无线访问，启动直接从所述信息装置到所选定的输出设备的无线访问用于输出的装置。

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17. 一种用于经过无线通信将内容的至少一部分从信息装置输出给输出设备的方法，所述内容至少部分可由所述信息装置访问，所述信息装置是与所述输出设备不同的设备，且所述信息装置包含用于与一个或多个输出设备进行无线通信的无线通信单元和与用户进行交互的接口，所述方法包括：

(a) 查找用于无线通信的输出设备；

(b) 在所述信息装置和在所述查找中找到的一个或多个可用输出设备间直接建立无线通信信道；

(c) 在所述无线通信信道上从至少一可用输出设备接收信息，所述信息包括与所述可用输出设备相关的属性；

(d) 经过所述信息装置的接口向所述用户提供与所述可用输出设备相关的所接收的信息的至少一部分，并且依赖从所述用户至少接收所选定的输出设备的指示，

(e) 在所述无线通信信道上，将与所述内容相关的输出数据直接从所述信息装置传送到所选定的输出设备，或

(f) 重复步骤 (a) 至 (d)。

18. 如权利要求 17 所述的方法，其中，与所述可用输出设备相关的属性包含名称、标识、设备类型，地址以及支持的输出设备配置文件的指示的一个或多个。

19. 如权利要求 17 所述的方法，在步骤 (f) 之前，进一步执行获得用于启动到所选定的输出设备的无线访问的授权信息的步骤。

20. 如权利要求 17 所述的方法，进一步包括以下步骤：利用所述授权信息，授权到所选定的输出设备的无线访问，用于启动从所述信息装置到所选定的输出设备的无线访问。

21. 如权利要求 20 所述的方法，其中，所述授权信息包含所述信息装置的标识、用户名称、密码、ID 号、签名、物理或数字安全密码、生物特征、指纹以及声音的一个或多个。

22. 如权利要求 17 所述的方法，在步骤 (f) 之前，使所述内容的至少一部分一致化为输出数据，用于在所选定的输出设备渲染。

23. 如权利要求 22 所述的方法，其中，使所述内容的至少一部分一致化为输出数据的步骤包含使所述内容的至少一部分一致化为设备相关的输出数据，该设备相关的输出数据至少部分地与在所述无线通信信道上且从所选定的输出设备接收的属性相关。

24. 如权利要求 22 所述的方法，使所述内容的至少一部分一致化为输出数据的步骤包含使所述内容的至少一部分一致化为设备独立的输出数据，该设备独立的输出数据至少部分地与预先定义的标准格式或语言相关。

25. 如权利要求 17 所述的方法，其中，所述无线信息装置包含膝上型计算机、移动电话、智能电话、网络手机、网络设备、数字照相机以及 PDA 中的至少一个。

26. 一种用于从信息装置将内容输出给输出设备的方法，所述内容至少部分可由所述信息装置访问，所述信息装置是与所述输出设备不同的设备，且所述信息装置包含用于与一个或多个输出设备进行无线通信的无线通信单元和与用户进行交互的接口，所述方法包括：

(a) 在无线通信单元上经过无线通信查找输出设备；

(b) 发现在所述查找中找到的一个或多个可用输出设备；

(c) 经无线通信从至少一个发现的输出设备接收至少一信息，所述信息包括与所发现

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的输出设备相关的属性；

(d) 部分基于经过无线通信从输出设备接收的所述属性，从所述一个或多个发现的输出设备中选择输出设备；

(e) 获得授权信息，所述授权信息用于启动从所述信息装置到所选定的输出设备的无线访问；

(f) 利用所述授权信息授权到所选定的输出设备的无线访问，并且至少依赖是否成功授权到所选定的输出设备的无线访问，

(g) 启动直接从所述信息装置到所选定的输出设备的无线访问，或者

(h) 重复步骤 (a) 至 (g) 或 (d) 至 (g)。

27. 如权利要求 26 所述的方法，其中，所述授权信息包含所述信息装置的标识、用户名称、密码、ID 号、签名、物理或数字安全密码、生物特征、指纹以及声音的一个或多个。

28. 如权利要求 26 所述的方法，其中，获得用于启动无线访问的授权信息的步骤包含从所述用户经过所述接口接收所述授权信息。

29. 如权利要求 26 所述的方法，其中，在步骤 (f) 或步骤 (g) 中，进一步包括以下步骤：

经过无线通信向所述输出设备发送用于授权的所述授权信息的至少一部分，以及

经过所述无线通信从所述输出设备接收与是否成功授权相关的响应。

30. 如权利要求 26 所述的方法，进一步包括：在步骤 (g) 之前，获得用于支付在所选定的输出设备处渲染所述内容的支付信息。

31. 如权利要求 26 所述的方法，其中，选择输出设备的步骤包含从所述用户接收所选定的输出设备的指示。

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通用数据输出系统

[0001] 相关申请的交叉索引

[0002] 本申请要求2001年1月19日提交的临时申请No. 60/262,764的优先权，其整个内容在此合并作为参考。

技术领域

[0003] 本发明涉及向输出提供内容，特别地，涉及提供信息装置能普遍地向输出设备输出内容而不需要为每个输出设备安装专用的设备相关驱动程序或应用程序的通用输出。

背景技术

[0004] 本发明涉及通用数据输出，以及特别地，涉及提供用于信息装置和输出设备的新数据输出方法和新光栅图象处理。

[0005] 如在此所述，信息装置通常指计算设备，其包括固定计算机和移动计算设备（普遍设备）。这些信息装置的例子包括，但不限于，台式计算机、膝上型计算机、网络计算机、掌上计算机（手持计算机）、个人数字助理（PDAs）、Internet激活移动电话、智能电话、寻呼机、数字俘获设备（例如，数字照相机和摄像机）、Internet设备、e-books、信息板（pad）以及数字或web板（例如，电视、监视器和投影仪），以及音频输出设备。

[0006] 为简单和方便起见，在下文中，下述描述将输出设备称为打印机以及将输出过程称为打印。然而，应当理解到，用在描述本发明中的术语打印机和打印涉及用作特定例子的一个实施例以便简化本发明的描述。在此使用索引打印机和打印是为了应用于或延伸到输出设备的更大的范围和定义并且不应当视为限制本发明的范围和原理。

[0007] 受日益增加的带宽、处理功率、无线移动设备以及无线软件应用程序的推动，数百万的用户使用他们的普遍或移动计算设备正或将创建、下载和传送内容和信息。因此，需要允许用户方便地从他们的普遍计算设备，将内容和信息输出给任何输出设备。例如，人们需要直接和方便地从他们的普遍信息装置输出，而不依赖于与用于打印的固定计算机（台式个人计算机）同步。

[0008] 为示例说明，用他的手持计算机接收e-mail的机场的移动工作人员可希望希望走近附近的打印机或传真机来打印他的e-mail。另外，移动工作人员也希望从他的移动设备打印他的工作清单、约定簿、名片和他的航行时刻表。如另一个例子，使用他的移动设备访问电子商务站点的用户可希望打印出事务确认。如另一例子，用数字照相机照相的用户可希望轻易地将其打印到附近的打印机。在上述任何一种情况下，移动用户可希望仅仅走到打印机，并方便地打印存储在移动装置上的或从网络（例如，Internet、企业通信网）下载的文件（字处理文档、PDF、HTML等等）。

[0009] 通常，将输出设备（例如，打印机）经有线连接，诸如电缆线连接到信息装置。通过使用，例如，无线通信或红外通信，无线连接也是可能的。不管是有线还是无线连接，用户必须首先在信息装置中安装对应于特定输出设备型号和品牌的输出设备驱动程序（在输出设备是打印机的情况下，安装打印机驱动程序）。使用设备相关或特定的驱动程序，信息装

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置可将输出内容或数字文档处理为特定的输出设备的输入要求（例如，打印机输入要求）。输出设备的输入要求对应于输出设备（例如，打印机）得知的输入类型。例如，打印机的输入要求可包括打印机特定的输入格式（例如，一个或多个图象、图形或文本格式或语言）。因此，输出数据（或在输出设备是打印机的情况下的打印数据）在此是指对输入相关输出设备可接受的数据。输入要求的例子可包括，但不限于，音频格式、视频格式、文件格式、数据格式、编码、语言（例如，页面描述语言、标记语言等等）、指令、协议或特定输出设备品牌或型号能理解或使用的数据。

[0010] 输入要求可是基于属性或公开标准或两者的结合。因此，总的来说，输出设备的输入要求是设备相关。根据最佳操作的规格，不同的输出设备型号可具有由输出设备制造商（例如，打印机制造商）指定、设计或采用的它们自己的输入要求。因此，不同的输出设备通常要求使用特定的输出设备驱动程序（例如，打印机驱动程序），用于准确的输出（例如，打印）。有时，代替使用设备驱动程序（例如，打印机驱动程序），设备驱动特征可包含为应用程序软件的一部分。

[0011] 安装设备驱动程序（例如，打印机驱动程序）或应用程序可由例如，使用由打印机制造商提供的CD或软盘的人工安装来实现。或者，用户能从网络下载具体的驱动程序或应用程序。对家庭或办公用户来说，根据驱动程序的类型以及用户使用计算设备和网络的技术水平，该安装过程可花费大概从几分钟到几个小时。即使通过即插即用安装，对每个打印机或输出设备来说，仍然要求用户执行多个步骤的过程。

[0012] 该安装和配置过程对否则将他们的时间花费在做其他创新的或有趣的工作的终端用户来说增加了复杂度和工作。此外，可阻碍许多单纯的用户将新的外围设备（例如，打印机、扫描仪等等）增加到他们的家用计算机或网络上以避免安装和配置的不方便。因此，期望信息装置能输出到不至一个输出设备，而没有安装多个专用设备相关驱动程序的不便。

[0013] 另外，传统的输出或打印方法对移动设备用户比对家用或办公用户来说提出了相当高的挑战和困难。对预先安装设备相关驱动程序的需求减小了移动（普遍）计算和输出的好处和原理。例如，移动用户可希望在机场、加油站、便利商店、公用电话亭、旅馆、会议室、办公室、家里等等打印可输出e-mail、PowerPoint®演示文档、web页或其他文档。用户将在这些位置的任何一个找出与用户的基站相同品牌或型号的打印机是非常不可能的。因此，在传统的打印方法下，每次在打印前，在每个这样的远程位置，用户不得不安装和配置打印机驱动程序。通常，对正在使用的上百、或甚至上千打印机型号，以及信息装置的有限存储容量、存储空间以及处理能力，不是可行的选项。

[0014] 此外，用户可不希望由于查找驱动程序或下载它以及安装它，仅是为在机场打印出或显示出email的一页而被打扰。对促进普遍或移动计算来说，这肯定是不期望和令人气馁的过程。因此，需要更方便的打印方法来支持用户能仅仅走到输出设备（例如，打印机或显示设备）并容易输出数字文档，而不必安装或预先安装特定的输出设备驱动程序（例如，打印机驱动程序）的普遍计算范例。

[0015] 对移动用户来说，另一个挑战是许多移动信息装置具有有限的存储空间、处理容量和能力。这些限制对小和低成本的移动设备，包括例如，PDAs、移动电话、屏幕电话、寻呼机、e-bok、Internet Pads、Internet设备等等更明显。有限存储空间在安装和运行大的或

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复杂的打印机或装置驱动程序方面产生困难，更不必说对多种打印机和输出设备的多个驱动程序。慢的处理速度和有限电源产生了驱动输出设备的困难。例如，通过小移动信息装置处理或转换数字文档为输出数据非常慢以致其不适合于生产输出。集中处理也会耗尽或消耗电源或电池资源。因此，需要一种方法以便具有有限处理能力的小移动设备仍然能合理地将内容输出到各种输出设备。

[0016] 为将内容（例如，数字文档）输出或渲染（render）到输出设备上，通常要求在内容上进行光栅图象处理（raster image processing）(RIP) 操作。RIP 操作可是计算集中并且包括 (1) 光栅化 (rasterization) 操作，(2) 色空间转换，以及 (3) 半色调 (halftoning) 操作。RIP 也可包括其他操作，诸如缩放、分段、颜色匹配、颜色校正、GCR（灰色成分替换）、黑色生成、图象增强压缩 / 解压缩、编码 / 解码、加密 / 解密 GCR、其他中的图象增强。

[0017] RIP 中的光栅操作涉及将包含在内容在的对象和描述（例如，图形、文本等等）转换成适合于输出的图象形式。光栅可包括另外的操作，诸如缩放和内插操作，用于匹配特定的输出大小和分辨率。RIP 中的色空间转换包括将输入色空间描述转换成用于在输出设备渲染所需的适当的色空间（例如，RGB 至 CMYK 转换）。使用较低的亮度和色度级，数字半色调是用于渲染连续的色调图象 (tone image) 的成象技术。半色调操作诸如误差扩散可是计算集中并且当输出设备的色深 (bit depth)（例如，每个象素位）小于输入光栅图象色深时包括。

[0018] 通常，RIP 操作包含在信息，或作为输出设备或输出系统（例如，打印机控制器中）的一部分中。图 1 示例说明传统的数据输出方法 102 的流程图，其中在信息装置中实现 RIP110。不包括执行复杂的 RIP 操作的打印机控制器的输出设备，诸如，低成本、低速喷墨打印机，通常采用数据输出方法 102。在数据输出方法 102 中，信息装置在步骤 100 获得内容（例如，数字文档），用于在输出设备处渲染和输出。信息装置可包括应用程序（例如，设备驱动程序），其实现 RIP 操作 110。信息装置在步骤 120 生成输出数据并在步骤 130，将所输出的数据传送到输出设备，用于渲染。与内容有关的输出数据是以包含在输出设备中的输出引擎（例如，显示引擎、打印机引擎等等）可接受的形式（例如，以适当的输出大小和分辨率）。传统输出方法 102 中的输出数据通常是设备相关。

[0019] 图 1A 的数据输出方法 102 的一个缺点在于要不是输出需要整个光栅图象处理生成 110 的话，信息装置执行大部分操作。RIP 操作可要求集中计算。许多信息装置，诸如移动信息设备可具有不足的计算能力和 / 或存储器来以可接受的速度执行在输出过程中需要的 RIP 生成 110。

[0020] 图 1A 的传统数据输出方法 102 的另一个缺点在于所生成的输出数据是设备相关，因此，通常对其他输出设备来说非常不便携。因此，信息装置需要安装用于多个输出设备的多个应用程序或设备驱动程序，其可进一步对用在具有有限存储器、存储和处理能力的信息装置中的可行性变得复杂。

[0021] 图 1B 示例说明另一种传统的数据输出方法 104 的流程图，其中在输出设备中实现 RIP。实现过程 104 的输出设备的一个例子是高速激光打印机，其包括用于执行 RIP 操作的打印机控制以及用于渲染内容的输出引擎（例如，打印机引擎）。打印机控制器可内部安装到或外部连接到输出设备（在该例子中为打印机）上。在数据输出方法 104 中，信息装置在步骤 100 获得用于输出的内容，并在步骤 160 生成用于在步骤 170 传送给输出设备的输

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出数据或打印数据。打印数据包括与内容有关的信息并通常用页面描述语言（PDL），诸如PostScript和PCL等等编码。在步骤180中，打印机接收输出数据或打印数据（在PDL中），在步骤190中，包含在打印机中的打印机控制器解释PDL、执行RIP操作，并生成对打印机引擎来说可接受的形式（例如，以适当的输出大小、色深、色空间和分辨率的光栅图象）的打印机引擎打印数据。在步骤150中，打印机引擎用打印机引擎打印数据渲染该内容。

[0022] 将理解到，索引包括语言，诸如PDL的打印数据或输出数据应当解释为使用那种语言编码打印数据或输出数据的含义。相应地，索引生成语言，诸如PDL的数据输出过程应当解释为使用那种语言编码数据输出过程的含义。

[0023] 在图1B所示的传统数据输出方法104中有许多缺陷。这些缺陷对具有有限处理能力和存储器的移动计算设备来说尤其明显。一种这样的缺陷是包括页面描述语言(PDL)，诸如PostScript或PCL的输出数据或打印数据非常复杂。生成复杂的PDL可增加信息装置的存储器和处理要求。此外，解释、解码，然后光栅图象处理复杂的PDL能增加教育处、减小打印速度，以及增加输出设备或其打印机控制器的成本。

[0024] 另一缺点在于包括PDL的输出数据可产生非常大的文件大小，这将增加信息装置、输出设备和/或打印机控制器等等的存储器和存储要求。大的文件大小也可增加在信息装置和输出设备间的通信链接中所需的带宽。

[0025] 最后，对输出设备中的光栅文本来说，打印机控制器可需要包括多个字体。当在打印机控制器不包括或缺少特定字体或国际字符时，渲染或输出可能会变得不准确或不相容。

发明内容

[0026] 因此，本发明提供方便的通用数据方法，其中信息装置和输出设备或系统共享光栅图象处理操作。此外，新数据输出方法消除了在信息装置中安装多个设备相关专用驱动程序或应用程序以便输出到多个输出设备的需要。

[0027] 根据本发明，普遍或通用输出的电子系统和方法信息装置方便地将内容输出到实际的任何输出设备。信息装置可中央处理单元、输入/输出控制单元、储存单元、存储单元以及有线或无线通信单元或适配器。信息装置最好包括可实现为软件应用程序、助手应用程序、或设备驱动程序（在打印机的情况下为打印机驱动程序）的客户机应用程序。客户机应用程序可包括通过硬件和软件部件，例如，包括驻留在其主信息装置上的一个或多个通信芯片组管理和控制性能。

[0028] 信息装置中的客户机应用程序能与具有本发明的输出控制器的输出设备通信、管理和使数据或软件部件与其同步。

[0029] 渲染输出设备中的内容指的是在打印设备的情况下，将内容的图象打印到基片上；在显示设备的情况下，显示内容的图象；以及在语音或声音输出设备或系统中播放所述内容的音频表示。

[0030] 输出控制器可是驻留在输出设备中的电路板、卡或软件部分。另外，输出控制器可外部连接到输出设备上作为外部部件或“盒”。可尤其用嵌入处理器、软件、固件、ASIC、DSP、FPGA、芯片上系统、专用芯片组实现输出控制器。在另一实施例中，输出控制器的功能性可由运行在外部连接到输出设备的PC、工作站或服务器上的应用程序提供。

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[0031] 在如参考图 1A 所述的传统的数据输出方法 102 中，信息装置将输出数据传送给输出设备，用于渲染。输出数据对应于意欲输出的内容并且大部分光栅图象处理过 (RIPed)，因此是设备相关的，因为光栅图象处理是典型的设备相关操作。可用一种或多种压缩或编码技术编码或压缩输出数据。在本发明中，信息装置产生用于输出到输出设备的中间输出数据。中间输出数据包括对应于该内容的光栅化图象。然而，还没有执行 RIP（例如，色彩匹配和半色调）的设备相关图象处理操作。因此，中间输出数据比由参考图 1A 的输出方法生成的输出数据更设备独立和更便携。

[0032] 在本发明的一种实现中，中间输出数据包括 MRC（混合光栅内容）格式、编码和压缩技术，与传统的图象编码和压缩技术相比，其进一步提供提高的图象质量和压缩比。

[0033] 在本发明的光栅图象过程和数据输出方法的例子中，将诸如打印机驱动程序的客户机应用程序包括在信息装置中并在内容上执行部分光栅图象处理操作，诸如光栅化。信息装置生成包括对应于内容的输出图象的中间输出数据并将该中间输出数据发送给输出设备或输出系统，用于渲染。包括在输出设备或输出系统中的输出控制器应用程序或部件实现光栅图象处理操作的剩余部分，尤其诸如数字半色调、色彩校正。

[0034] 象传统的光栅图象处理方法，该发明提供信息装置和输出设备或输出系统间光栅图象处理计算负载的更平衡分布。可在输出设备或输出系统中实现诸如数字半色调和色空间变换的计算密集图象处理操作。因此，当与参考图 1A 所述的、整个光栅图象处理在信息装置中实现的传统的数据输出方法相比时，该新的光栅图象处理方法降低了信息装置的处理和存储要求。另外，在该发明中，包括在执行部分光栅图象处理操作的信息装置中的客户机应用程序或设备驱动程序与包括在执行光栅图象处理操作的信息装置中的传统输出应用程序相比，能具有更小的大小。

[0035] 在另一实现中，本发明提供具有更普遍地由多个输出设备接受的输出性能的信息装置。包括客户机应用程序的信息装置生成可包括设备独立属性的中间输出数据。输出控制器包括解释和处理该中间输出数据的部件。信息装置能将内容输出给包括输出控制器的不同输出设备或输出系统，即使当这些输出设备属于不同商标、品牌、型号并具有不同输出引擎和输入数据要求时。不象传统的输出方法，用户不需要预先在信息装置中安装用于每个输出设备的多个专用设备相关驱动程序或应用程序。

[0036] 小型客户机应用程序、信息装置中降低计算要求以及在多个输出设备渲染的更通用数据输出方法的组合使得移动设备具有更小的存储空间和处理能力来实现数据输出功能，相反，用传统的输出方法是很难实现的。

[0037] 另外，与包括页面描述语言 (PDL) 打印机控制器的传统的输出方法 104 相比，本发明能降低输出设备或输出系统的成本。在本发明中，信息装置产生中间输出数据并将其发送给输出设备或系统。在一个优选实施例中的中间输出数据包括对应于意欲输出的内容的光栅化输出图象。与过程 104 中所述的传统的方法相比，包括在输出设备或输出系统中的输出控制器解码和处理中间输出数据用于输出，而不执行复杂的解释和光栅化。相比起来，传统的数据输出方法 104 生成复杂的 PDL 并将该 PDL 从信息装置发送到包括打印机控制器（尤其例如，PostScript 控制器或 PCLS 控制器）的输出设备。与解码和处理包括光栅化输出图象的本发明的中间输出数据相比，PDL 的解释和光栅图象处理具有更高的计算要求。当与使用包括在本发明的数据输出方法中的输出控制器相比时，实现具有例如，PDL 的传统的

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打印机控制器增加了部件成本（例如，存储器、储存器、ICs、软件和处理器等等）。

[0038] 另外，与包括光栅化输出图象的中间输出数据相比，包括PDL的输出数据能产生大的文件大小。用于本发明的数据输出方法相当地将更小的输出数据从信息装置传送到输出设备。更小的输出数据大小能加速传输、更低通信带宽以及降低存储要求。最后，本发明能提供传统的方法来在具有或不与静态网络的连接的输出设备上渲染内容。在传统的网络打印中，信息装置和输出设备必须连接到静态网络。在本发明中，通过信息装置和输出设备间的局部通信和同步，安装硬件和软件来保持静态网络连接性对启动输出设备渲染内容是不必要的。

[0039] 根据本发明的几个方面，提供在附加独立权利要求中定义的主题。

[0040] 本发明的另外的目的和优点根据参考附图进行的优选实施例的详细描述，将是显而易见的。

附图说明

[0041] 图1A是根据现有技术的传统数据输出方法及其相应的光栅图象处理的流程图。

[0042] 图1B是根据现有技术，用于包括传统的打印机控制器的输出设备的第二传统数据输出方法及其相应的光栅图象处理的流程图。

[0043] 图2A和2B是示例说明能实现本发明的过程和装置的操作环境的部件的框图。

[0044] 图3A是示例说明根据本发明的信息装置实现的硬件/软件部件的示意性框图。该信息装置包括操作系统。

[0045] 图3A是示例说明根据本发明的信息装置实现的硬件/软件部件的第二示意框图；

[0046] 图4A是具有传统打印机控制器的传统打印系统或打印机的框图。

[0047] 图4B是第二传统输出系统或输出设备的框图。

[0048] 图5A是根据本发明，具有传统打印机控制器和输出控制器的打印系统或打印机的示意框图。

[0049] 图5B是根据本发明，包括输出控制器的第二输出系统或输出设备的示意性框图。

[0050] 图6A是示例说明根据本发明的输出控制器的硬件/软件部件的示意性框图。输出控制器包括操作系统。

[0051] 图6B是示例说明根据本发明的输出控制器的硬件/软件部件的第二示意性框图。输出控制器不包括操作系统。

[0052] 图6C是示例说明根据本发明的输出控制器的硬件/软件部件的第三示意性框图。输出控制器结合本发明的打印机控制器和输出器的功能性。

[0053] 图7A-7F示例说明相对于输出设备，诸如打印机的输出控制器的各种配置和实现。

[0054] 图8A是示例说明无线通信单元的硬件/软件部件的示例性实现的框图；

[0055] 图8B是示例说明无线通信单元的硬件/软件部件的第二示例性实现的框图。

[0056] 图9是本发明的通用数据输出方法及其相应的光栅成象过程的流程图。

[0057] 图10是相对于参考图2所述的部件、系统和装置的本发明的通用数据输出方法的框图。

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[0058] 图 11 是示例说明实现可选地包括在图 10 的输出过程中发现过程的一种方法的流程图。

[0059] 图 12A 和 12B 是包括在图 10 的输出过程中的示例性客户机应用程序过程的流程图。

[0060] 图 13A 和 13B 是包括在图 10 的输出过程中的示例性输出设备和输出系统过程的流程图。

具体实施方式

[0061] 以下阐述的是用在描述本发明的实现方式中的术语的定义。提供这些定义以便于理解和示例说明本发明的实现方式并且决不应当视为将本发明的范围限制到具体的例子、类和种类。

[0062] 输出设备配置文件（或对象）

[0063] 输出设备配置文件（或对象）包括软件和数据实体，其在其自身内封装描述输出设备的数据和属性以及用于操作数据和属性的指令。输出设备配置文件可驻留在不同硬件环境或平台或应用程序中，以及可以文件、消息、其他形式和技术中的软件对象或部件传送。为简化讨论，配置文件或对象也可包括。例如，可具有由一个类、类的合成，或整个应用程序组成的变化粒度的软件部分的原理。

[0064] 在此使用的术语配置文件或对象并不限制软件或数据作为其媒介。以计算机可读形式的包含信息、描述、属性、数据、指令等等的任何实体或媒介，诸如硬件、软件、基于或包括声音、文本、图形、图象或视频信号、以模拟或数字形式的电子信号等等均是配置文件和对象定义的有效形式。

[0065] 配置文件或对象也可在其一个字段或属性中包含对另一配置文件或对象的索引或指针，或对数据和/或内容的索引或指针。对配置文件或对象的索引可包括指针、标识符、名称、路径、地址或与能找到对象、配置文件、数据或内容的位置有关的任何描述的一个或多个，或组合。

[0066] 输出设备配置文件可包含可识别和描述，例如，特定输出设备诸如打印机的能力和功能性的一个或多个属性。输出设备配置文件可存储在输出设备、信息装置的存储器部件或网络节点中。网络节点包括连接到网络上的任何装置、服务器或存储单元。如下文更详细的描述，请求输出服务的信息装置可与输出设备连接。在这种局部服务谈判期间，可将部分输出设备配置文件从输出设备加载到信息装置上。通过获得输出设备配置文件（或在打印机的情况下，打印机配置文件），信息装置可了解由输出设备提供的能力、兼容性、标识和服务。

[0067] 例如，输出设备配置文件可包含下述字段和/或属性描述的一个或多个。每个下述字段是可选的，此外，每个下述字段或属性可或不可存在于特定的实现方式中（例如，可为空或 NULL）：

[0068] 输出设备的标识（例如，商标、型号、注册、IP 地址等等）

[0069] ●由输出设备提供的服务和特征设置（例如，色彩或灰度级输出、激光器或喷墨、双向、输出质量、每页的价格、服务质量等等）

[0070] ●输出设备支持的输入语言的类型、格式、输出数据和/或输入要求（例如，

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PostScript、PCL、XML、RTL 等等）

[0071] ●设备特定的或从属参数和信息（例如，通信协议、色空间、色彩管理方法和渲染意图、分辨率、半色调方法、dpi（点每英寸）、色深、页面大小、打印速度、独立颜色通道或墨水量等等）

[0072] ●用于图象处理的数据和表，诸如颜色表、半色调表、比例因子、编码 / 解码参数和方法、压缩和解压缩参数和方法等等。

[0073] ●包含有关输出设备及其服务的参数和信息的另一配置文件（例如，色彩配置文件、半色调配置文件、通信配置文件、光栅配置文件、服务质量等等）。

[0074] ●有关由输出设备提供的多个服务的支付信息。

[0075] ●输出设备支持的信息或安全要求以及认证类型。

[0076] ●输出设备配置文件的日期和类型、其改进和更新的历史

[0077] ●包含算术或指令或数据的软件部分，其可加载以便在信息装置内运行。例如，图形用户界面（GUI）软件部分可加载到信息装置上。软件部分可通过本发明的客户机应用程序包含到或装入信息装置中以便得获用户首选项（例如，打印质量、页面布局、复制量、每页的名片数等等）。在另一例子中，软件部分可包括用于其它中的压缩 / 解压缩、编码 / 解码、色彩匹配或校正、分段、缩放、半色调、加密 / 解密的方法、指令或可执行程序。

[0078] ●对一个或多个输出设备参数的指针或索引，包括上述输出设备配置文件或对象字段或属性描述的一个或多个。例如，有时，可将输出设备参数的快到期或原始版本存储在网络节点（连接到网络上的任何设备、服务器或存储单元）中，或可由客户机应用程序获得的信息装置内。任何输出设备配置文件可包括对这些输出设备参数的指针或多个指针。

[0079] 内容（或数据内容、数字内容、输出内容）

[0080] 内容（或数据内容、数字内容、输出内容）是用于输出，可包括其他内容类型中的文本、图形、图象、表格、视频、音频的数据。内容可包括数据本身或对那个数据的索引。内容可以任何格式、语言、编码或组合，并且可是以部分或全部专有的格式、语言或编码。数字文档是可包括描述数字文档本身和 / 或对数字文档的索引的属性和字段的内容的例子。数字文档的例子可是文件类型：HTML、VHTML、PostScript、PCL、XML、PDF、MS Word、PowerPoint、JPEG、MPEG、GIF、PNG、WML、VWML、CHTML、HDML、ASCII、2 字节国际编码字符等等的任何一个或组合。在本发明的描述中，可与术语数据内容、输出内容或数字内容互换使用内容。

[0081] 中间输出数据

[0082] 输出数据（或在打印机的情况下为打印数据）是从信息装置发送到输出设备的电子数据。输出数据与用于输出并以各种格式和语言（例如，POSTSCRIPT、PCL、XML）编码的内容有关，其可包括压缩或加密数据。一些输出设备制造商可也将专用或非专用语言、格式、编码、压缩、加密等等的组合包括在输出数据（或打印数据）中。

[0083] 中间输出数据是本发明的输出数据，并且其包括由信息装置生成的输出文件或数据、或客户机应用程序或包括信息中的设备驱动程序的更宽定义。中间输出数据可包括文本、向量图形、图象、视频、音频、符号、表格或组合，以及除此之外，可用一种或多种页面描述语言、标记语言、图形格式、成象格式、元文件编码。除此之处，中间输出数据也可包含指令（例如，输出首选项）和描述（例如，数据布局）。可压缩、加密或标记部分或所有中间输出数据。

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[0084] 在本发明的优选实施例中，中间输出数据包含光栅图象数据。例如，能在信息装置中光栅化包含在内容中不是以图象形式的向量图形和文本信息或对象或将其一致成为图象数据并包括在中间输出数据中。RIP的设备相关图象处理操作诸如，数字半色调和色空间转换能在输出设备或输出系统实现。

[0085] 中间输出数据可是设备相关或设备独立。在一种实现中，如果所使用的光栅参数，诸如分辨率、比例因子、色深、输出大小和/或色空间是设备相关，光栅化输出图象是设备相关。在本发明的另一种实现中，如果所使用的光栅参数是设备独立的，那么光栅化图象可是设备独立的。当那些参数包括基于标准或规格的一组预定或预先定义的光栅参数，光栅参数可变为设备独立。通过预先定义或设备独立的光栅参数，本发明的客户机应用程序能光栅化至少一部分内容并生成包含在中间输出数据中的设备独立图象。通过这样做，中间输出数据可变为设备独立，因此，成为用已经预先构造成接受中间输出数据的输出设备通用可接受的。

[0086] 在信息装置将光栅化或将文本和图形信息转换成图象数据的一个优点在于输出设备或打印机控制器不再需要执行复杂的光栅操作而且它们不必包括多种字体。因此，采用在此描述的中间输出数据和数据输出方法能潜在地降低输出控制器、打印机控制器和/或输出设备的成本和复杂性。

[0087] 图象数据编码的一种形式称为混合光栅内容或MRC。通常，存储在MRC中的图象包括不至一个图象或位图层。在MRC中，基于分段标准，尤其诸如背景和前景、亮度和色度，在不同层中分段图象。例如，MR包括具有背景层、前景层和切换或选择器层的三层。这三层是同延的并且可包括不同分辨率、编码和压缩。前景和背景层根据尤其基于分段标准、色彩型号的部分或通道、图象编码表示（HLS、RGB、CMYK、YCC、LAB等等）分段图象的各个部分的方式，每个包含附加层。对每个点来说，切换层可指定前景或背景层是否有效。MRC中的每个层可具有不同色深、分辨率、色空间，其允许例如，与背景层独立的压缩前景层。先前使用图象数据的MRC形式来最小化存储要求。另外，已经提出了用彩色图象传真传送中的MRC格式。

[0088] 在本发明的一个实施例中，中间输出数据包括采用MRC格式、编码和/或相关压缩方法的一个或多个光栅化输出图象。在该实现中，输出图象中的不同层可具有不同的分辨率并且可包括不同压缩技术。可用不同的压缩或编码技术分段和压缩原始内容（例如，数字文档）中的不同信息，诸如色度和亮度和/或前景和背景信息。也可将原始内容中的分段元素或对象信息存储在不同图象层中并具有不同分辨率。因此，与其他传统图象编码和压缩技术相比，通过MRC，有机会降低输出数据文件大小、保留更多的图象信息、增加压缩比并提高图象质量。下面将更详细地描述本发明中的光栅化的实现、光栅图象处理以及包括MRC编码的中间输出数据。

[0089] 光栅化

[0090] 光栅化是将数字文档中的图形和文本转换成图象数据的操作。对包括在数字文档中的图象数据来说，光栅化可包括缩放和内插。光栅化操作具有包括，尤其是色深和分辨率的光栅化操作的特征。指定的光栅化操作可具有好几个光栅化参数，包括输出大小、色空间，色彩通道等等。在光栅化操作中使用的一个或多个光栅化参数值可按缺省指定，可将一个或多个光栅化参数值提供给信息装置作为光栅化向量的分量。在指定的应用程序中，光

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栅化向量可指定仅一个光栅化参数的值，在光栅化操作中使用的其他光栅化参数采用默认值。在另一种应用中，光栅化向量可指定不至一个，但小于全部的光栅化参数值，在光栅化操作中使用的至少一个其他光栅化参数值采用默认值。并且在另一应用中，光栅化向量可指定用在光栅化操作中的所有光栅化参数值。

[0091] 图 2A 和 2B 是示例说明能实现本发明的过程和装置的操作环境的部件的框图。图 2A 表示包括信息装置 200 和输出设备 220 的电子系统。输出设备 200 包括输出控制器 230。图 2B 示例包括信息装置 200 和输出系统 250 的电子系统的第二种实现方式。输出系统 250 包括输出设备 220 和可外部连接到，或者与输出系统 250 中的输出设备 220 关联的输出控制器 230。

[0092] 信息装置 200 是具有处理能力的计算设备。在一个实施例中，信息装置 200 可是移动计算设备，诸如掌上型计算机、手持设备、膝上型计算机、个人数字助理 (PDA)、智能电话、屏幕电话、e-book、Internet 终端、通信终端、Internet 设备、寻呼机、数字照相机等等。信息装置 200 也可包括静态计算设备，诸如台式计算机、工作站、服务器等等是可能的。

[0093] 图 3A 和 3B 是示例说明包括在本发明的信息装置 200 中的硬件 / 软件部件的例子的框图。

[0094] 信息装置 200 可包含部件，诸如处理单元 380、存储单元 370、可选存储单元 360 和输入 / 输出控制单元（例如，通信管理器 330）。信息装置 200 可包括接口（未示出），用于与用户交互作用。可用软件或硬件或组合来实现接口。这种接口的例子包括，但不限于鼠标、键盘、触触或非触敏屏、按钮、软键、记录笔、扬声器、麦克风等等的一个或多个。

[0095] 信息装置 200 通常包含与其他电子设备，诸如网络节点（未示出）、输出设备 220 和输出系统 230(250？）连接的一个或多个网络通信单元 350。网络通信单元可用硬件（例如，硅芯片集、天线）、软件（例如，协议堆栈、应用程序）或组合来实现。

[0096] 在本发明的一个实施例中，信息装置 200 和输出设备 220 或输出系统 250 间的通信接口 240 是无线通信接口，诸如短程无线接口，包括根据蓝牙或 IEEE802.11 标准实现的那些接口。也可用无线通信的其他标准和 / 或装置实现通信接口，尤其包括无线电、红外、蜂窝、超声波、水听器，用于访问一个或多个网络节点和 / 或设备。也可包括有线连接，尤其诸如串行或并行接口、USB 接口和火线 (IEEE1394) 接口。到局域网，尤其诸如 Ethernet 或令牌环形网的连接也可在本发明中实现，用于信息装置 200 和输出设备 220 间的局部通信。可用来实现信息装置 200 和输出设备 220 间的无线接口的通信单元 350 的硬件 / 软件部分的例子将在下面参考图 8A 和 8B 更详细地描述。

[0097] 为简化起见，图 3 示例说明信息装置 200 包括一个通信单元 350 的一种实现方式。然而，应注意到，信息装置 200 可包含不至一个通信单元 350 以便支持具有不同设备和 / 或网络节点的各种接口、协议和 / 或通信标准。例如，信息装置 200 可通过蓝牙标准接口或通过 IEEE802.11 标准接口与一个输出设备 220 通信同时通过并行电缆接口，与另一个输出设备 220 通信。信息装置 200 也可连接到有线或无线网络（例如，Internet 或企业通信网）以便发送、接收和 / 或下载信息。

[0098] 信息装置 200 可是具有由制造商预先配置的功能性的专用设备（例如，email 终端、web 终端、数字照相机、e-book、web 终端、Internet 设备等等）。另外，信息装置 200 可允许用户安装另外的硬件部分和 / 或应用软件 205 以便扩展其功能性。

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[0099] 信息装置200可包含多个应用程序205以便实现其特征设置和功能性。例如，可实现文档浏览或编辑应用程序来帮助用户浏览以及可能部分或整个编辑用某种格式或语言（例如，页面描述语言、标记语言等等）编写的数字文档。数字文档可本地存储在信息装置2000中或网络节点（例如，内容服务器）中。文档浏览应用程序的例子是Internet浏览器，诸如Internet Explorer、Netscape Navigator或WAP浏览器。这些浏览器可检索和显示用标记语言，尤其诸如HTML、WML、XML、CHTML、HDML所写的内容（例如，数字内容）。信息装置200中的软件应用程序的其他例子可包括文档编辑软件，诸如MicrosoftWord™，其允许用户浏览和/或编辑具有各种文件扩展名（例如，doc、rtf、html、xml等等）的数字文档，不管是本地存储在信息装置200中还是网络节点中。同样，软件应用程序205的其他例子包括图象采集和编辑软件。

[0100] 如在前参考图1所述，在向具有有限存储器和处理能力的信息装置200提供输出能力方面存在许多困难。为解决这些难题，信息装置200包括客户机应用程序210，帮助提供本发明的通用数据输出能力。客户机应用程序210可包括能由信息装置200的处理单元380执行的软件和数据。客户机应用程序210可实现为独立的软件应用程序或作为另一软件应用程序的一部分或特征，或以设备驱动程序的形式，其可由信息装置200中的其他应用程序软件205调用、共享和使用。客户机应用程序210也可包括调用其他应用程序（例如，文档浏览应用程序、编辑应用程序、数据和/或图象采集应用程序、通信管理器、输出管理器等等）205的部分以便提供某些特征设置，如下面所述。图3示例说明客户机应用程序210是与其他应用程序205分开的应用程序的结构，诸如在客户机应用程序是设备驱动程序的情况下；然而，应当注意，客户机应用程序210可是在图3中未示出的其他应用程序的组合或一部分。客户机应用程序210可在信息装置200中不同地实现，以及可在不同的操作系统或平台上运行。客户机应用程序210也可在没有操作系统的环境中运行。例如，图3A示例说明包括操作系统240A的信息装置200A的实现方式，而图3B示例说明信息装置200B不包括操作系统的实现方式。

[0101] 客户机应用程序210包括光栅化部件310，以便根据一个或多个光栅化参数，使内容一致为一个或多个光栅输出图象、中间输出数据生成器部件320，生成和/或编码包括一个或多个输出图象的中间输出数据；以及通信管理器330，管理与输出设备220或系统250或输出控制器230的通信和交互作用。通信管理能实现为客户机应用程序210的一部分（如图产3所示）或实现为单独的应用程序（未示出）。客户机应用程序中的部分可用软件、硬件或组合来实现。例如，客户机应用程序210可包括或利用下述的一个或多个：

[0102] ●获得用于输出的内容的部件或操作（例如，数字文档）。客户机应用程序210可从其他应用程序205（例如，文档浏览应用程序、内容创建和编辑应用程序等等）获得数字文档，或客户机应用程序210可为用户提供其自己的能力来浏览、编辑和/或选择数字文档。

[0103] ●光栅化内容的部件或操作，根据一组光栅化参数，诸如比例因子、输出大小、色深、色空间和分辨率，将除对象或元素外的文本、图形和图象包括到一个或多个光栅图象中。可用各种方式，例如，从输出设备220下载的、或本地存储在信息装置200中的，或由用户手工输入的输出设备配置文件获得光栅化参数。另外，光栅化参数可是基于作为一组缺省、或硬编码在客户机210中的存储在信息装置200中的预缩放准或规格，或在与输出设备

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220、输出控制器 230 和 / 或用户通信后由客户机应用程序 210 计算的。

[0104] ●生成包括对应于该内容（例如，数字文档）的至少一个光栅化输出图象的中间输出数据的部件或操作。该过程可进一步包括尤其是压缩、编码、加密和颜色校正的一个或组合。该中间输出数据可包括尤其例如，图象、指令、文档和 / 或格式描述、色彩配置文件。

[0105] ●通过有线或无线通信链路 240，将中间输出数据传送给输出设备 220 或系统 250 的部件或操作。

[0106] 客户机应用程序 210 也可选地包括或利用下述部件或操作的一个或多个：

[0107] ●与至少一个或多个输出设备 220 通信以便加载输出设备配置文件的部件或操作。

[0108] ●直接或间接（诸如通过操作系统或部件或对象模型、消息、文件传送等等）与驻留在相同的信息装置 200 中的其他应用程序 205 以便获得所需，或与本发明的普遍输出过程相关的对象、数据、和 / 或内容（例如，获得用于打印的数字文档）的部件或操作。

[0109] ●直接或间接管理和利用由驻留在其主信息装置 200 中的硬件部件（例如，通信单元 350）提供的功能性的部件或操作。

[0110] ●在主信息装置中提供图形用户界面以便与用户交互作用的部件或操作。

[0111] ●获得用户首选项的部件或操作。例如，用户可通过 GUI 直接输入他或她的首选项。也可采用一组默认值。可预置或根据与输出设备 220 或输出控制器 230 通信和谈判的结果，通过信息装置 200 获得默认值。

[0112] 参考图 12，在客户机应用过程中进一步详细地描述本发明的客户机应用程序 210 的上述功能性和过程。

[0113] 输出设备 220 是能输出数字内容的电子系统，而与输出介质是基片（例如，纸）、显示、投影还是声音独立。输出设备 220 的典型的例子是打印机，其将包含文本、图形、图象或任何组合的数字文档输出到基片上。输出设备 220 也可是能显示静止图象或视频的显示设备，诸如但不限于，电视、监视器和投影仪。输出设备 220 也可是能输出声音的设备。任何能以音频（例如音乐）或数据（例如，文本或文档）格式播放或读取数字内容的设备也是可能的输出设备 220。

[0114] 在此频繁地将打印机称为输出设备的例子以便简化讨论，或作为具体实施中的主输出设备 220。然而，应当认识到，本发明也可应用于其他输出设备 220，尤其诸如传真机、数字复印机、显示屏、监视器、电视、投影仪、声音输出设备。

[0115] 用输出设备 220 渲染内容是指将内容输出到特定的输出介质（例如，纸、显示屏等等）上。例如，用打印机渲染内容在基片上生成图象，用显示设备渲染内容在屏幕上生成图象，以及用音频输出设备渲染内容生成声音。

[0116] 传统的打印系统一般包括光栅图象处理器以及打印机引擎。打印机引擎除其他部件外，包括存储缓冲器、标记引擎。光栅图象处理器将内容转换适合于打印的图象形式。存储缓冲器保存准备打印的光栅化图象；以及标记引擎将着色剂传送给基片（例如，纸）。

[0117] 光栅图象处理器也可位于输出设备（例如，包括在打印机控制器 410 中）或外部实现（在信息装置 200、外部控制器、服务器等等中）。光栅图象处理器可实现为硬件、软件或组合（未示出）。例如，可在信息装置 200 中的软件应用程序或设备驱动程序内实现光栅图象处理器。光栅图象处理操作的例子包括图象和图形解释、缩放、分段、色空间变换、图象

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增强、色校正、半色调、压缩等等。

[0118] 图 4A 示例说明包括打印机控制器 410 和打印机引擎 420A 的一个传统打印机系统或打印机 400A 的框图。打印机控制器 410 包括解释器 402 和光栅图象处理器 406，以及打印机引擎 420 包括存储缓冲器 424A 和标记引擎 426A。

[0119] 标记引擎可使用多种不同技术的任何一种来将光栅图象传送给纸或其他介质，或换句话说，将着色剂传送给基片。可使用的不同标记或打印技术包括击打式打印或非击打式打印。击打式打印的例子包括点阵、电传打印机、菊花轮等等。非击打式打印技术可包括喷墨、激光、静电、热、染料升华等等。

[0120] 打印机的标记引擎 426 和存储缓冲器 424 形成其打印机引擎 420，其也可包括另外的电路和部件，诸如固件、硬件或芯片或芯片组，用于解码和信号转换等等。到打印机引擎 420 的输入通常是由光栅图象处理器 406 生成的最终光栅化打印机引擎打印数据。这种输入通常是设备相关，以及打印机或打印机引擎特定的。打印机引擎 420 可采用该设备相关输入并生成或渲染输出页（例如，在基片上用墨水）。

[0121] 当光栅图象处理器位于输出设备 220 内时，其通常包括在打印机控制器 410 中（如图 4A 所示）。打印机控制器 410 可解释、光栅化、以及将以页面描述语言（例如，PostScript，PCL）、标记语言（例如，XML、HTML）或其他特定的文档格式或语言（例如，PDF、EMF）的形式的输入打印数据转换成打印机引擎 420A 能理解的最终格式、语言或指令的打印机引擎打印数据。

[0122] 发送给具有打印机控制器 410 的打印机的打印数据通常是以要求进一步解释、处理或转换的形式（例如，附录）。打印机控制器 410 接收打印数据、解释、处理并将打印数据转换成能由打印机引擎 420A 理解的形式。与打印数据的类型独立，通常，用户在他或她的信息装置 200 中需要设备特定的驱动程序以便输出能由特定的打印机或输出设备 220 接受的适当的语言、格式或文件。

[0123] 图 4B 示例说明另外的传统输出设备 400B。输出设备 400B 可是打印设备、显示设备、投影设备、或声音设备。在输出设备是打印设备或打印机的情况下，参考图 4B 的打印机不包括打印机控制器 410。例如，打印机 400B 可是低成本打印机，诸如台式喷墨打印机。在该例子中的 RIP 操作可以包含在信息装置 200 中的软件应用程序或以设备驱动程序来实现。信息装置 200 通过光栅化和转换数字文档为能由输出引擎（或在打印机的情况下的打印机引擎）420B 理解的输出数据（例如，转换成具有每个象素一个或多个位的压缩 CMKY 数据）。

[0124] 与类型或技巧水平独立，不同输出设备 220 通常需要信息装置 200 中的不同的打印机驱动程序或输出管理应用程序以便提供输出能力。具有有限存储器和处理能力的一些移动设备可具有存储多个设备驱动程序或执行计算集中的 RIP 操作的困难。每次需要打印到新打印机上，安装新设备相关或特定的打印机驱动程序是不可行的。为克服这些困难，本发明对输出设备 220 或输出系统 250 提供了几种改进，如下面的详细描述。

[0125] 在本发明中，输出设备 220 可包括输出控制器 230 以便帮助管理与信息装置 200 的通信和谈判过程以及处理输出数据。输出控制器 230 可包括用于至少一个输出设备 220 的专用的硬件或软件或两者的组合。输出控制器 230 可是内部安装，或外部连接到一个或多个输出设备 220 上。输出控制器 230 有时称为打印服务器或输出服务器。

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[0126] 图 5A 和 5B 示例说明本发明的输出控制器 230 的两个示例性内部实现方式。图 5A 示例说明在参考图 4A 的传统打印机内实现输出控制器 230，其包括传统的打印机控制器 410(5A)。输出控制器 230(5A) 包括解释器 510A 部件，用于解码本发明的中间输出数据，以及转换器部件 530A，用于将一个或多个解码的输出图象转换成适合于输入到打印机控制器 410(5A) 的打印机控制器打印数据。可选图象处理部件 520A 包括在输出控制器 230(5A) 中。

[0127] 图 5B 示例说明包括在参考图 4B、不包括打印机控制器的传统输出设备 220 中的输出控制器 230 的实现方式。输出控制器 230(5B) 包括解释器 510B 部件，用于解码本发明的中间输出数据；图象处理器 520B 部件，用于执行一个或多个图象处理操作，诸如色空间转换、色彩匹配和数字半色调；以及可选编码器 530B 部件，如果图象处理的结果还不是适合于输出引擎 420B 的所需形式，将所处理过的输出图象一致化为适合于输出给输出引擎 420B 的输出引擎输出数据。

[0128] 在一种实现中，输出设备 220 可包括通信单元 550 或适配器以便与信息装置 220 连接。输出设备 20 有时可包括不至一个通信单元 550 以便支持不同设备的不同接口、协议或通信标准。例如，输出设备 220 可通过蓝牙接口与第一信息装置 200 通信，同时通过并行接口与第二信息装置 200 通信。无线通信单元的硬件部件的例子将在下面参考图 8A 和 8B 更详细地描述。

[0129] 在一个实施例中，输出控制器 230 不包括通信单元，而宁可利用或管理驻留在相关输出设备 220，诸如图 5 中所示中的通信单元。在另一个实施例中，输出控制器 230 可包括或提供通信单元给输出设备 220，如图 6 所示。例如，具有无线通信单元的输出控制器 230 可内部安装或外部连接到传统打印机以便为其提供先前缺乏的无线通信能力。

[0130] 图 6 包括示例说明在三种不同实现中输出控制器 230 的硬件 / 软件部件的三个功能框图。输出控制器 230 的每个部件可包括软件、硬件或组合。例如，输出控制器 230 可包括使用专用集成电路 (ASIC)、数字信号处理器 (DSP)、现场可编程门阵列 (FPGA)、固件、芯片上系统以及各种通信芯片组中的一个或多个或组合。输出控制器 230 还包含具有软件部分的嵌入处理器 670A 或嵌入应用程序软件以便实现其特征设置和功能性。

[0131] 输出控制器 230 可包含嵌入操作系统 680。通过操作系统，可由操作系统管理的应用程序软件提供输出控制器 230 的一些或所有功能性和特征设置。可将另外的应用程序软件安装或升级到更新的版本以便例如，提供另外的功能性或故障补丁。图 6A 和 6C 示例说明具有操作系统 680 的实现的例子，而图 6B 示例说明没有操作系统 680 或可选嵌入处理器 670 的例子。

[0132] 输出控制器 230 通常包括存储单元 640、或可与例如，打印机控制器 410 共享存储器单元。存储器单元和存储单元，尤其诸如 ROM、RAM、闪速存储器和盘驱动器可提供永久或易失存储。存储器单元或存储单元可存储实现输出控制器 230 的功能性的输出设备配置文件、对象、编码、指令或数据（统称为软件部分）。在数据输出操作期间或之前，可将部分软件部分（例如，输出设备配置文件）加载到信息装置 200 上。

[0133] 输出控制器 230 可包括处理器部件 670A 和 670C、存储器部件 650、可选存储部件 640、以及可选操作系统部件 680。图 6 表示如果存在的话，存储器 650、储存器 640、处理器 670 和操作系统 680 部件能共享或由输出控制器 230 中的其他操作部分，诸如解释器 610 和

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图象处理器 650 的一种体系结构或实现方式。图 6 表示包括在输出控制器 230 中的两个通信单元 660A 和 660B，然而，本发明的输出控制器 230 可包括多个通信单元 660。输出控制器不包含任何通信单元而与可利用输出设备的通信单元也可能的。

[0134] 输出控制器 230 可外部地连接到输出设备 220 或内部集成到输出设备 220 中。图 5A 和 5B 示例说明在输出设备 220 内的输出控制器 230 的实现。然而，输出控制器 230 也可实现为有线或无线地连接到输出设备 220 的外部盒或站。实现为到输出设备 220 的外部盒或站的输出控制器 230 可包含其自己的用户接口。这种实现的一个例子是连接到输出系统 250 中的输出设备 220 的打印服务器。另一种结构和实现是如果输出设备 220 为打印机，与现有的打印机控制器 410 集成或组合输出控制器 230 的功能性（称为“组合控制器），如参考图 7C 至 7F 所示。组合控制器也可内部集成或外部连接到输出设备 220，并包括打印机控制器 410 以及本发明的输出控制器 230 的功能性（例如，输入解释和/或光栅图象处理）。这种配置的一个优点在于输出控制器 230 和打印机控制器 410 的功能性或部件可共享的资源，诸如处理、存储器单元等等。图 6C 示例说明打印机控制器 410、解释器 610C 和转换器 630C 共享使用由操作系统 680C 管理的处理器 670C、存储器 650C 和储存器 640C 的组合控制器实现或输出控制器 230 的例子。参考图 7，更进一步示例说明相对于输出设备 220 或输出系统 250，输出控制器 230 的各种示例性实现和结构。

[0135] 输出控制器 230 的其他可能的实现方式包括例如，传统的个人计算机 (PC)、工作站、以及输出服务顺或打印机。在这些情况下，输出控制器 230 的功能性可使用安装在计算机（例如，PC、服务器或工作站）中的应用程序软件来实现，同时该计算机有线或无线连接到输出设备 220。使用 PC、服务器、工作站或其他计算机来实现具有应用程序软件的输出控制器 230 的特征设置正好是输出控制器 230 的另一可能实施例并且绝不脱离本发明的精神、范围和过程。

[0136] 应当注意输出控制器 230 和打印机控制器 410 间的差别。打印机控制器 410 和输出控制器 230 均是控制器并且是用于至少一个输出设备 220 的专用硬件和/或软件。输出控制器 230 是指具有本发明的特征设置、能力和功能性的控制器。打印机控制器 410 可包含尤其诸如解释输入页面描述语言、光栅图象处理以及查询的功能。输出控制器 230 可包括除本发明的特征设置、功能性、能力和过程外的打印机控制器 410 的部分或全部特征。

[0137] 用于提供通用数据输出的输出控制器 230 的功能性和部件可包括或利用：

[0138] ●从多个信息装置 200 接收输出数据的部件和操作；输出数据可包括包含至少一个与意欲输出的数据内容有关的光栅化图象的中间输出数据。

[0139] ●解释和/或解码中间输出数据的部件和操作。

[0140] ●处理中间输出数据的部件和操作。这些部件和操作可包括图象处理功能，尤其诸如缩放、分段、色彩校正、色彩管理、GCR、图象增强、解压缩、解密、和/或半色调。

[0141] ●生成输出引擎输出数据的部件和操作，输出引擎输出数据以用于输入到输出引擎可接受的输出数据格式。

[0142] ●将输出引擎输出数据发送给输出引擎的部件和操作。

[0143] 当与包括打印机控制器 410 的输出设备 220 关联时，本发明的输出控制器可进一步包括或利用：

[0144] ●将中间输出数据转换成打印机控制器打印数据（例如，PDL，诸如 PostScript 和

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PCL）的部件和操作，打印机控制器打印数据以打印机控制器可接受的格式。

[0145] ●将打印机控制器打印数据发送给一个或多个打印机控制器的部件和操作。

[0146] 除上述部件和功能性外，输出控制器 230 可进一步包括下述的一个或多个：

[0147] ●通过有线或无线接口，与一个或多个信息装置 200 通信的部件和操作。

[0148] ●通信和/或管理包括在输出控制器 230 或输出设备 220 中的通信单元的部件和操作。

[0149] ●将至少部分输出设备配置文件（在打印机的情况下为打印机配置文件）存储在存储部件中的部件和操作。

[0150] ●通过将至少部分输出设备配置文件传送给请求服务的信息装置，响应来自信息装置 200 的服务请求的部件和操作。输出控制器 230 可在一个或多个会话中传送输出设备配置文件或对象。

[0151] ●将由主输出设备 220 提供的服务广播或通告给请求该服务的一个或多个信息装置 200 的部件和操作。

[0152] ●通过例如，根据所请求或渲染给客户机（信息装置 200）的服务，计算和处理支付来实现支付处理和管理功能的部件和操作。

[0153] ●提供用户接口，诸如显示屏、触摸按钮、软键等等的部件和操作。

[0154] ●实现作业管理功能，尤其诸如查询和假脱机的部件和操作。

[0155] ●实现安全或验证过程的部件和操作。例如，输出控制器 230 可在其存储部件（或共享存储部件）中存储访问控制列表，其指定什么设备或用户可从其主（或连接的）输出设备 220 获得服务。因此，授权信息装置 200 可在符合控制列表后，获得访问。

[0156] 当输出控制器 230 实现为固件、或嵌入应用程序时，输出控制器 230 的功能性的配置和管理可通过例如，使用主计算机中的控制器管理软件来任意实现。主计算机可是台式个人计算机（PC）、工作站或服务器。主计算机可局部或通过网络连接到输出设备 220 或控制器 230。可通过有线或无线通信来实现主计算机和输出控制器 230 间的通信。在主计算机中的管理应用程序软件能管理输出控制器 230 的设置、配置和特征设置。此外，主计算机的配置应用程序可下载和/或安装应用程序软件、软件部分和/或数据到输出控制器 230，用于升级、更新和/或修改输出控制器 230 的特征和能力。

[0157] 在一种实现中的输出设备 220 包括或连接到如上所述的输出控制器 230。由输出控制器 230 提供的功能性和特征自动包括在输出设备 220 的功能性中。然而，输出设备 220 可实现或包括至少部分提供输出控制器 230 的特征和功能性的其他控制器和/或应用程序。

[0158] 因此，输出设备 220 可包括下述功能性的一些或全部：

[0159] ●从多个信息装置 200 接收多个服务请求或查询（例如，服务请求、数据查询、对象或部分查询等等）并且通过返回可包含数据、软件、指令和/或对象的部分来适当地响应它们所部件和操作。

[0160] ●从多个信息装置 200 接收输出数据的部件和操作，输出数据可包括包含与意欲输出的内容有关的一个或多个光栅化图象的中间输出数据。

[0161] ●解释和/或解码中间输出数据的部件和操作。

[0162] ●处理和/或中间输出数据为适合于在与输出设备有关的输出引擎渲染的形式

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（例如，输出引擎打印数据）的部件和操作。

[0163] ●将与内容有关的表示或图象渲染到输出介质（例如，基片或显示屏）上的部件和操作。

[0164] 输出设备 220 可进一步包括下述功能性的任何一个或多个：

[0165] ●用于建立和管理与请求服务的信息装置 200 的通信链路的部件和操作。通信链路可包括有线或无线通信的部件和操作。

[0166] ●用于将至少一部分输出设备配置文件（例如，打印机配置文件）存储在存储元件中的部件和操作。

[0167] ●将至少一部分输出设备配置文件（例如，在打印机的情况下的打印机配置文件）提供给请求服务的一个或多个信息装置 200 的部件和操作。输出设备 220 可在一个或多个会话中传送输出设备配置文件。

[0168] ●将所提供的或可用的服务通告或广播给一个或多个信息装置 200 的部件和操作。

[0169] ●通过例如，根据由客户机所请求的或渲染给客户机（信息装置 200）的服务，计算和处理支付来实现支付处理和管理功能的部件和操作。

[0170] ●实现作业管理功能性。尤其诸如查询和假脱机的部件和操作。

[0171] ●提供用户接口，诸如显示屏触摸按钮、软键、开关等等的部件和操作。

[0172] ●实现安全性或验证过程的部件和操作。例如，输出设备 220 可在其存储部件（或共享存储部件）内存储访问控制列表，其指定什么设备或用户可从其获得服务。因此，授权信息装置 200 在符合控制列表后获得访问。

[0173] 图 7A-7F 示例说明相对于输出设备 230(220？）的输出控制器 230 的各种另外的配置和实现方式。有时将打印机用作示例性的输出设备 230 以便论证各种配置。然而，应当注意，本发明的输出设备 230(220？）并不限于打印机。

[0174] 如参考图 4 所述，打印机可以或可不包含打印机控制器 410。包括打印机控制器 410 的打印机 400A 通常比不包括打印机控制器 410 的打印机 400B 具有更高的速度以及更昂贵。

[0175] 图 7A 表示输出控制器 230 可外部级联到一个或多个打印机（仅示出一个）。信息装置 200 与输出控制器 230A 连接，然后，输出控制器 230A 与输出设备 220，诸如打印机 220 连接。输出控制器 230A 与打印机 220A 间的通信链路可是有线链路或无线链路，如前所述。图 6A 和 6B 示例说明输出控制器的功能部件设计的两个例子，能实现如图 7A 所示的配置。在该实现方式中的图象处理器 620 是可选的。

[0176] 图 7B 表示将输出控制器 230B 安装为打印机 220B 内部的一个或多个电路板或卡的另一种实现方式。输出控制器 230B 可与打印机控制器 410 和打印机 220B 的其他部件共存。这种实现的一个例子是将输出控制器 230 顺序地与打印机控制器 310 连接。图 5A 表示为实现的一个例子。

[0177] 图 7C 表示输出控制器 230 和打印机控制器 410 的功能性组合为单个控制器（称为“组合控制器”）230C 的另一种实现。在该实施例中，当与实现如图 7B 所示的两个单独的控制器相比，可降低材料的成本。例如，组合控制器 230C 可共享相同的处理器、存储器、和储存器来运行两种类型的控制器的应用程序和功能性，因此，当与提供两个单独的控制器

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相比时，可具有较低的部件成本。图 6C 示例说明组合控制器功能部件实现的例子。

[0178] 一些打印机不包括光栅图象处理器或打印机控制器 410，如图 4B 所示。这种类型的打印机的例子是更低成本的台式喷墨打印机。到喷墨打印机的输入可由每个象素输入一个或多个位的压缩 CMYK 数据（专用或公开）组成。为输出给不包括打印机控制器的打印机，通常在信息装置 200 中要求设备特定的软件应用程序或打印机驱动程序以便执行光栅图象处理操作。因此，输出控制器 230 能实现成包括不具有打印机控制器的打印机的各种输出设备 220 和 / 或输出系统 250，用于执行光栅图象处理操作。

[0179] 图 7D 和图 7E 示例说明在输出设备 220 或系统 250 中的输出控制器 230 的两种实现。输出设备 230 或系统 250 可包括显示设备、投影设备、音频输出设备或打印设备。在当输出设备 220D 或 220E 是打印机时的情况下，其不包括打印机控制器。图 7D 示例说明安装为输出设备 220D 的外部部件或“盒”的输出控制器 230D 的实现。例如，输出控制器 230 可实现为打印服务器中的应用程序，或独立的盒或站。在这种配置中，可在输出控制器 230D 中实现一些或全部光栅图象处理操作。输出控制器 230D 从信息装置 220 接收中间输出数据并生成包括在输出设备 220D 中的输出引擎可接受的输出引擎输出数据。输出控制器 230D 可将输出数据经有线或无线通信链路或连接发送给输出设备 220D。图 6A 和 6B 示例说明能实现用于图 7D 和 7E 的配置的输出控制器的功能部件设计的两个例子。

[0180] 图 7E 表示输出控制器 230E 的第五实现，其中输出控制器 230E 包含在输出设备 220E 中作为一个或多个电路板或卡，并可包含在嵌入处理器上运行的软件和应用程序。相对于输出设备 220D（图 7D），输出设备 220E 不包括打印机控制器 410。因此，输出控制器 230E 实现包括部分或全部光栅成象处理操作的本发明的功能性和能力。

[0181] 图 7F 表示第六种实现，将打印机控制器 310 和输出控制器的功能性集成为单独外部组合控制器部件或“盒”230F 的外部组合控制器 230F。两个控制器功能可共享公用处理器以及公用存储空间以便运行两种类型的控制器的应用程序。在该配置下，信息装置 200 或组合控制器 230F 能执行或共享至少一部分光栅图象处理功能性。图 6C 表示组合控制器 230F 的功能部件的例子。

[0182] 如 7 图 F 所示的组合控制器 230F 的另一实现是使用运行包括输出控制器 230 和打印机控制器 410 的功能性的一个或多个应用程序的外部计算设备（PC、工作站或服务器）。

[0183] 上述是输出控制器 230 的不同实现和结构的例子。其他实现方式也是可能的。例如，可在外部盒或站内实现部分输出控制器 230 的功能性而剩余的功能性可驻留在输出设备 220 内作为单独的板或与打印机控制器 410 集成。如另一个例子，输出控制器 230 的功能性可实现为连接到相同输出设备 220 的多个外部盒或站。如另一个例子，相同的输出控制器 230 可连接到多个输出设备 220。

[0184] 图 8A 和 8B 是示例说明无线通信单元的硬件 / 软件部件的两种可能结构的框图。这些无线通信单元可在信息装置 200、输出控制器 230 和输出设备 220 中实现或包括在其中。参考图 8A，可实现无线适配器 230 以便通过无线链路启动设备（例如，信息装置 200 和输出设备 220）中的数据 / 语音传输。使用与天线 816 耦合的 RF 收发机 814 来接收和传送无线射频信号。RF 收发机 814 还将无线电信号转换成电信号以及将电信号转换成无线电信号。RF 收发机 814 通过接口 812 连接到 RF 链路控制器 810。接口 812 可执行诸如模数转换、数模转换、调制、解调、压缩、解压缩、编码、解码、以及其他数据或格式转换功能的功能。

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[0185] RF 链路控制器 810 实现使得主机（例如，信息装置 200、输出控制器 230、输出设备 220 等等）在无线电链路上通信的实时低层（例如，物理层）协议处理。由链路控制器 810 执行的功能可包括，但不限于错误检测/校正、功率控制、数据包处理、数据加密/解密和其他数据处理功能。

[0186] 可利用各种无线电链路。特别关注在 2.4Ghz 未许可的频带中操作的一组竞争技术。该组目前包括蓝牙、家用射频 (Home RF) 以及基于 IEEE802.11 标准的实现。这些技术的每一种具有不同的协议设置并且它们均提供用于无线局域网 (LANs) 的解决方案。这些技术中的干扰会限制同时采纳这些协议。期望出现新局域网技术以及汇合现有的技术。不然，可在本发明中实现所有这些现有的和未来的无线技术，而没有限制，因此，决不脱离本发明的范围。

[0187] 在当前可用的无线技术中，蓝牙很有利，因为它要求相对低的功耗和蓝牙使能的设备在 piconet 中操作，其中在点对多点系统中连接几个设备。参考图 8B，可实现一个或多个红外 (IR) 适配器 820 以便通过红外传输，在设备中启动数据传输。根据红外数据协会 (IrDA) 标准和规格，容易实现 IR 适配器 820。通常，使用 IrDA 标准来提供用于通常使用用于连接的电缆的设备的无线连接技术。IrDA 标准是点对点（对蓝牙中的点对多点）、窄角 (narrow angle)、特定的数据传输标准。

[0188] 根据数据传送的所需速率，改变红外适配器 820 的结构。图 8B 示例说明红外适配器 820 的一个实施例。收发机 826 接收/发射 IR 信号并将 IR 信号转换成电信号/将电信号转换成 IR 信号。UART（通用异步接收/发射机）822 执行串行化/去串行化的功能，将串行数据流转换成数据字节/将数据字节转换成串行数据流。UART822 通过编码器/解码器 (ENDEC) 824 连接到 IR 收发机 826。该结构通常适合于以相对低的速率传送数据。需要其他部件（例如，包成帧器、锁相环）用于更高数据传输率。

[0189] 图 8A 和 8B 示例说明无线通信单元的示例性硬件结构。可将这些硬件部件包括在设备（例如，信息装置 200、输出控制器 230、输出设备 220 等等）中以便支持各种无线通信标准。然后，有线链路，诸如并行接口、USA、固件接口、Ethernet 和令牌环网络也可在本发明中，通过使用适当的适配器和结构来实现。

[0190] 图 9 是能实现本发明的通用输出方法的示例性光栅成象过程 (RIP) 902 的逻辑流程图。可由在信息装置 200 中运行的应用程序获得和/或生成内容（例如，数字文档）900。例如，文档浏览应用程序可允许用户下载和/或打开本地存储或在网络节点中的数字文档 900。如另一例子，文档创建或编辑应用程序可允许用户在他/她的信息装置 200 中创建和编辑数字文档。

[0191] 信息装置中的客户机应用程序 210 可以由驻留在信息装置 200 中的其他应用程序调用的设备驱动程序的形式以便提供输出服务。另外，本发明的客户机应用程序可是包括除其他功能性，诸如内容采集、预览、浏览和/或编辑等等以外的数据输出和管理部分的应用程序。例如，信息装置 200 中的客户机应用程序 210 本身包括除在此描述的输出管理功能外的允许用户下载、浏览和/或编辑数字文档 900 的部分和功能。

[0192] 光栅图象处理方法 902 允许信息装置 200 诸如移动设备普遍和方便地将内容（例如，数字文档）输出给包括输出控制器 230 的输出设备 220 或系统 250。信息装置 200 中的客户机应用程序 210 可执行部分光栅图象处理操作（例如，光栅化操作）。光栅图象处

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理的其他操作，诸如半色调可由输出设备 220 或由输出控制器 230 完成。在传统的数据输出方法中，光栅图象处理可完全在信息装置（例如，参考图 1A 不包括打印机控制器的打印机）或输出设备（例如，参考图 1B 包括打印机控制器的打印机）中实现。本发明提供在信息装置 200 和输出设备 220 或系统 250 间共享光栅图象过程操作的更平衡的方法。例如，在发送给输出引擎或打印机引擎，用于步骤 960 中的最终输出前，由从客户机应用程序 210 至输出控制器 230 的不同部分或整个输出系统的一部分来处理内容 600（例如，所处理的光栅图象）。因为光栅图象处理操作不是完全在信息装置 200 中袜，对信息装置 200 有很少的处理需求。因此，本 RIP 过程可允许具有极少的存储器和处理能力的另外的移动设备以便具有数据输出能力。

[0193] 在步骤 910，光栅化操作中，根据一个或多个光栅化参数，诸如输出大小、色深、色空间、分辨率、色彩通道的数量等等，可使包括文本、图形和图象对象的内容（例如，数字文档）一致或光栅化为图形形式。在光栅化操作期间，根据指定的光栅化参数设置，将内容中的文本和向量图形信号光栅化或转换成图形或位图信息。可调整和／或内插内容或数字文档中的图象信息以便适合特定的输出大小、分辨率和色深等等。光栅化参数通常是设备相关，因此，可根据输出设备 220 及其输出引擎的不同需求和属性改变。有许多方法来获得设备相关光栅化参数，如下面参考图 12A 更详细地描述。在一个例子中，设备相关光栅化参数可从存储在信息装置 200、输出设备 220 或输出控制器 230 中的输出设备配置文件获得。

[0194] 在另一种实现中，可按标准或规格预定光栅化参数。在该实现中，在步骤 910 中，光栅化内容 900 以便适合或匹配其预先定义的或标准的光栅化参数。因此，光栅化输出图象变为设备独立。设备独立的一个优点是用这些标准或规格的知识实现或创建的控制器、设备和／或输出设备可接受光栅化输出图象。具有预定或标准属性的光栅化图象通常更便携。例如，基于预缩放准和／或规格，可预先编程客户机应用程序 210 和输出设备 220 或其输出控制器 230 以便接收、和／或输出光栅图象。

[0195] 有时，用于光栅化参数的预缩放准或规格需要改变或更新。用于提供容易更新或升级的一种可能的实现是将信息和相关的光栅化参数存储在文件或配置文件中代替将这些参数硬编码到程序、部件或应用程序中。客户机应用程序 210、输出控制器 230 和／或输出设备 220 能读取文件或配置文件以便获得与光栅化参数有关的信息。为升级或更新标准的规格或缺省要求，仅替换或编辑文件或配置文件代替更换软件应用程序或部件，诸如客户机应用程序 210。

[0196] 在步骤 920 中，将以图象形式的光栅化图象编码到中间输出数据中。描述输出内容的中间输出数据可包括图象信息、指令、描述和数据（例如，色彩配置文件）。光栅化输出图象可进一步要求在存储为中间输出数据间，处理尤其包括压缩、编码、加密、平滑、图象增强、分段、色彩校正的一个或多个。中间输出数据中的输出图象可以任何图象格式和用任何压缩技术诸如 JPEG、BMP、TIFF、JBIG 等等编码。在一个实施例中，使用混合光栅内容（MRC）格式及其相关的编码和／或压缩方法来生成输出图象。优先于其他图象格式和技术使用 MRC 的好处可尤其包括例如，更好的压缩比、更好的数据信息保留、更小的文件大小和／或相对更好的图象质量。

[0197] 在步骤 930 中，为进一步处理和最终输出，将中间输出数据传送到输出设备 220 或输出系统 250。通过信息装置 200 和输出设备 200 间的无线或有线通信链路可实现以及能

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通过一个或多个会话来实现中间输出数据的传输。

[0198] 在步骤940中，输出设备220或输出系统250接收所传送的中间输出数据。输出设备220或输出系统250可包括输出控制器230以便协助与信息装置200通信和/或处理中间输出数据。输出控制器230相对于如图7A-7F所示的输出设备220，可具有各种配置和实现方式。除其他操作外，解释过程940可包括解析、解码、解压缩、解密、图象空间转换。如果所接收的中间输出数据要求这些处理的话。从中间输出数据解码或检索输出图象并可暂时存储在包括在输出设备/输出系统(220/250)或输出控制器230中的缓冲器或存储器中，用于进一步处理。

[0199] 如果中间输出数据包括具有MRC格式或编码技术的部分，其可包含用来增强图象质量的另外的分段信息(例如，前景和背景)。例如，尤其在缩放、色彩校正、色彩匹配、图象增强、图形保真和/或数字半色调中的不同技术或算法可应用于图象信息的不同段或层上以便改进输出质量或最大化图象信息的保留或恢复。稍后，可将多层组合或映射到单层中。这些图象处理和转换部件和/或操作可包括在本发明的输出控制器230中。

[0200] 在步骤950中，来自中间输出数据的解码或检索输出图象需要进一步处理或转换。这可尤其包括缩放、分段、内插、色彩校正、GCR、黑色生成、色彩匹配、色空间变换、图形保真、图象增强、图象平滑和/或数字半色调操作中的一个或多个。

[0201] 在输出设备220不包括打印机控制器的实施例中，输出控制器230或包括输出控制器的输出设备220在执行输出图象上的RIP操作的剩余部分(例如，色空间转换或半色调)后，可在步骤950中，进一步将输出数据转换成对输入到用于渲染的打印机引擎可接受的形式。

[0202] 在输出设备220或输出系统250包括传统的打印机控制器的另外的实施例中，输出控制器可简单地解码和/或将中间输出数据(在该例子中的打印数据)转换成打印机控制器可接受的格式或语言。例如，打印机控制器可要求输入页面描述语言(例如，PostScript、PCL、PDF等等)、标记语言(HTML、XML等等)或其他图形或文档格式。在这种情况下，输出控制器230可解释、解压缩和将中间打印数据转换成具有与打印机控制器输入要求有关的最佳输出分辨率、色深、色空间和输出大小的输出图象。然后，将输出图象编码或嵌入到打印机控制器打印数据(例如，页面描述语言)并将其发送给打印机控制器。打印机控制器打印数据是用于输入到打印机控制器可接受或兼容的打印数据。在打印机控制器接收打印机控制器打印数据后，打印机控制器可进一步在输出图象上执行诸如解析、光栅化、缩放、色彩校正、图象增强、半色调等等的操作并生成适合于输入到打印机引擎的适当的打印机引擎输入数据。

[0203] 在步骤960中，将由输出控制器230或打印机控制器在步骤950中生成的输出引擎输出数据或打印机引擎打印数据发送给输出设备的输出引擎或打印机引擎，用于最终输出。

[0204] 图10示例说明本发明的通用数据输出过程的流程图，包括参考图9示例说明的光栅图象处理。通用数据输出过程允许信息装置200将内容或数字文档普遍地输出给输出设备。数据输出过程可包括或利用：

[0205] ●用户接口部件和操作，其中用户初始化输出过程并提供用于输出的选定输出内容(例如，数字文档)的标识。

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[0206] ●处理指示用于输出的内容，并生成中间输出数据的客户机应用程序或操作。中间输出数据可包括与该内容有关的至少部分光栅输出图象描述的客户机应用程序或操作。

[0207] ●将中间输出数据传送给一个或多个选定输出设备 200 的信息装置部件或操作。

[0208] ●解释中间输出数据并可进一步处理或转换输出数据为用于渲染该内容的输出引擎更可接受的形式的输出设备部件（例如，输出控制器）或操作。

[0209] 参考图 10，在步骤 1000 中，用户可初始化通用输出方法或过程 1002。通常，用户通过调用在他／她的信息装置 200 中的客户机应用程序 210，初始化输出过程。可将客户机应用程序 210 运行为独立的应用程序或由其他应用程序 205（诸如由文档浏览、创建或编辑应用程序）运行或作为驻留在相同的信息装置 200 中的另一应用程序 205 的一部分或部件或特征。当由其他应用程序 205 运行，诸如，在当客户机应用程序是设备驱动程序或助手应用程序时的情况，客户机应用程序 210 可从其他应用程序 205 获得信息，诸如内容（例如，数字文档）。这可例如，由一个消息或其组合，或通过操作系统或特定对象或部件模型等等便于实现。

[0210] 在输出过程 1002 中，用户可需要选择一个或多个输出设备 220，用于输出服务。可实现任选的发现过程步骤 1020 来帮助用户选择输出设备 220。在发现过程步骤 1020 期间，用户信息装置 200 可 (1) 查找可用输出设备 220；(2) 为用户提供可用输出设备 220 的清单；以及 (3) 为用户提供选择一个或多个输出设备 220 来承担输出作业的装置。下面将参考图 11 来更详细地描述发现过程 1020 的例子。

[0211] 可选发现过程 1020 有时是不必要的。例如，用户可忽略发现过程 1020，如果他或她已经知道指向输出的输出装置（例如，打印机）220 的话。在这种情况下，用户可通过有线连接或直接指向在其附近的那个输出装置 220，诸如在红外连接的情况下，简单地将信息装置 200 连接到那个输出装置 220。如另一个例子，用户可预先选择或设置频繁地用作最佳缺省的输出设备 220。因此，如果发现缺省输出设备 220 或打印机可用的话，可部分或完全忽略发现过程 1020。

[0212] 在阶段 1030 中，客户机应用程序可与输出设备 220、用户和／或驻留在的信息装置 200 中的其他应用程序交互作用以便 (1) 获得必要的输出设备配置文件和／或用户首选项，(2) 执行功能或部分光栅图象处理操作，诸如光栅化、缩放和色彩校正，和／或 (3) 至少部分将光栅化内容（例如，数字文档）转换或编码成中间输出数据。中间输出数据的处理和生成可部分反映所获得的输出设备配置文件和／或用户首选项的关系，如果有的话。然后，通过有线或无线局部通信链路 240，将由客户机应用程序 210 生成的中间输出数据传送到包括或与选定的输出设备 220 或输出系统 250 有关的输出控制器 230。参考图 12 更详细地描述示例性客户机应用程序过程。

[0213] 在步骤 1040 中，本发明的输出控制器 230 接收中间输出数据。在所选定的输出设备 230 不包括打印机控制器的情况下，本发明的输出控制器 230 可进一步执行功能，尤其诸如地解析、解释、解压缩、解码、色彩校正、图象增强、GCR、黑色生成和半色调。另外，输出控制器 230 可进一步将中间输出数据转换或一致为适合于输出引擎（例如，在打印机的情况下为打印机引擎）的形式或格式。因此，从输出控制器生成的输出引擎输出数据通常是设备相关且通过包括在选定的输出设备 220 或输出系统 250 中的输出引擎（或在打印机的情况下为打印机引擎）可接受，用于最终输出。

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[0214] 在所选定的输出设备 220 是打印机的情况下，以及当打印机包括或连接到打印机控制器时，输出控制器 230 可生成与打印机控制器连接所需的适当的语言或输入格式（称为打印机控制器打印数据）。打印机控制器可例如，要求特定的输入，诸如页面描述语言(PDL)、标记语言，或特定的图象或图形格式。在这些情况下，在步骤 1040 中的输出控制器 230 可解释和解码中间输出数据，然后将中间输出数据转换成所需的打印机控制器打印数据（例如，PDL，诸如 PostScript 或 PCL）。然后，将由输出控制器生成的打印机控制器打印数据发送到打印机控制器，用于进一步处理。打印机控制器可执行除其他操作外的解释和光栅图象处理操作。在处理后，打印机控制器生成适合于在打印机引擎渲染的打印机引擎打印数据。

[0215] 在任何一种情况下，输出控制器 230 或打印机控制器生成适合于发送给包括在输出设备中的输出引擎或打印机引擎或与其连接的用于渲染的输出引擎输出数据。输出数据可暂时缓存在输出设备 220 的部件中。参考图 13，更详细地描述输出设备过程 1040 的实现。

[0216] 当用户请求输出服务时，包括在通用普遍输出过程 1002 中的步骤可自动进行。另外，在每个和每一步骤中可向用户提供进行、取消或输入信息的选项。例如，用户通过例如，指出取消信号或命令或通过中止客户机应用程序 210，或通过关闭信息装置 200 等等，在任何时间取消输出服务。

[0217] 图 11 是发现过程 720 的例子的流程图，其可是可选步骤以便帮助用户定位用于输出作业的一个或多个输出设备 220。然而，可部分或全部忽略发现过程 1020。发现过程 1020 的实现可要求驻留在信息装置 200 和输出设备 220 中的兼容硬件和软件部件。信息装置 200 可在该过程中利用客户机应用程序 210 或其他应用程序 205。发现过程 1020 可包括：

[0218] ●信息装置 200 与可用输出设备 220 通信以便获得与输出设备 220 有关的信息和属性和/或其服务，诸如输出设备性能、特征设置、服务可用性、服务质量、条件。

[0219] ●信息装置 200 将用户信息提供到每个可用和/或兼容输出设备 220 上。

[0220] ●用户选择或客户机应用程序 210（自动或不自动）选择一个或多个输出设备 220，用于来自可用或兼容输出设备 220 的输出服务。

[0221] 在发现过程 1020 期间可使用各种协议和/或标准。无线通信协议是最佳的。另一方面，也可实现有线通信。应用协议或标准的例子可包括，但不限于，尤其蓝牙、HAVi、Jini、Salutation、Service LocationProtocol、以及 Universal Plug-and-Play。可在发现过程 1020 中实现标准和专用协议或组合。然而，这些不同协议、标准或组合将不脱离本发明的精神和范围。

[0222] 在一个实施例中，驻留在信息装置 200 中的应用程序（为讨论简单起见，在此称为“通信管理器”，未示出）帮助与输出设备 220 通信并管理服务请求和发现过程 1020。通信管理器可是客户机应用程序 210 的一部分或特征。另外或组合，通信管理器也可是单独的应用程序。当通信管理器是单独的应用程序时，客户机应用程序 210 可具有通信、管理或访问通信管理器的功能性的能力。

[0223] 当用户通过信息装置 200 请求输出服务时，发现过程 1020 可由用户手动地或由通信管理器自动启动。

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[0224] 在可选步骤 1100 中，用户可指定查找或匹配标准。例如，用户可查找提供免费服务的彩色打印机和／或打印机。用户可手动地每次为发现过程 1020 指定那个标准。另外或组合，用户可设置能应用到多个发现过程 1020 的缺省首选项。然而，有时，不要求查找标准；信息装置 200 可简单地查找能提供输出服务的所有可用输出设备 220。

[0225] 在步骤 1101 中，信息装置 200 查找可用输出设备 220。查找过程可由例如，信息装置 200（例如，通过通信管理器的帮助）多播或广播或通告其服务请求或等待可用输出设备 220 响应来实现。另外，信息装置 200 可从一个或多个输出设备 220“收听”服务广播，然后识别所需要或可接受的一个或多个输出设备 220。同时，相同网络（例如，LAN）的多个输出设备向控制点登记（未示出）它们的服务是可能的。控制点是维持有关相同网络内的所有服务设备上的记录的计算系统（例如，服务器）。信息装置 200 可连接控制点并查找可查询所需服务。

[0226] 在步骤 1102 中，如果未找到可用输出设备 220，通信管理器或客户机应用程序 210 可向用户提供备用方案 1104。这种备用方案可包括例如，放弃发现过程 1020、再次尝试发现过程 1020，或当找到可用输出设备 220 时告知。例如，发现过程 1020 可不检测在当前有线／无线网络中的任何可用输出设备 220。然后，将特定的查找标准（如果有的话）保存或寄存在通信管理器中。当用户进入具有可用输出设备 220 的新网络时，或当将新兼容输出设备 220 增加到当前网络上时，或当输出设备 220 变为对任何理由可用时，通信管理器可将这种可用性告知用户。

[0227] 在步骤 1106 中，如果发现可用输出设备 220，通信管理器可从每个所发现的输出设备 220 获得一些基本的信息，或部分或全部输出设备配置文件。这些信息的例子包括，但不限于，设备标识、服务费用、预约、服务特征、设备性能、操作指令等等。最好通过信息装置 200 的用户接口（例如，显示屏、扬声器等等），将这些信息提供给用户。

[0228] 在步骤 1108 中，基于所提供的信息，如果有的话，用户可选择一个或多个输出设备 220，以便承担输出作业。如果不满意任何一个可用输出设备 220，用户可拒绝该服务。在这种情况下，可向用户提供备选方案，诸如，通过对查找标准所做的一些改变，再次尝试步骤 1110。用户可选择在任何时间中止服务请求。在步骤 1112，通过选定或确定的一个或多个输出设备 220，可“锁定”信息装置 200 和选定的输出设备 220 间的通信链路。可删去未选定的其他输出设备 220。然后输出过程 1020 可进行到图 10 的步骤 1030 的客户机应用程序过程。

[0229] 图 12A 是参考图 10 的步骤 1030 的示例性客户机应用程序过程的流程图。用于通用输出的客户机应用程序过程 1202 可包括或利用：

[0230] ●获得所需输出的内容（例如，数字文档）的客户机应用程序 210。

[0231] ●获得输出服务参数的客户机应用程序（例如，光栅化参数、输出作业参数）。实现的一个例子是从包括设备从属参数的输出设备配置文件（例如，打印机配置文件）获得输出设备参数。可将这种配置文件存储在输出控制器 230、输出设备 220 或信息装置 200。

[0232] ●通过 (1) 用户输入（自动或手动）或选择或 (2) 基于预定首选项或预定缺省，或 (3) 上述的组合，可选地获得用户首选项的客户机应用程序 210。

[0233] ●根据从上述步骤诸如，通过输出设备配置文件、用户选择、预定用户首选项、预定缺省或标准等等获得的一个或多个光栅参数，光栅化意欲输出的至少部分内容的客户机

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应用程序 210。

[0234] ●生成包含至少部分与意欲输出的内容有关的光栅化图象的中间输出数据的客户机应用程序 210。

[0235] ●将中间输出数据传送给输出设备 220 或输出控制器 230 的客户机应用程序，用于进一步处理和/或最终输出。

[0236] 客户机应用程序 210 可以任何方法获得内容（例如，数字文档）900 或对该内容的指针或索引。在优选实施例中，客户机应用程序 210 是以设备驱动程序或独立应用程序的形式，以及可由客户机应用程序 210，从在相同信息装置 200 中的其他应用程序 205 获得内容或其索引。为示例说明例子，用户可通过在他/她的信息装置 200 中使用文档浏览、预览和/或编辑应用程序 205，首先浏览或下载或创建数字文档，然后通过将客户机应用程序 210 运行为设备驱动程序或助手应用程序来请求输出服务。客户机应用程序 210 与文档浏览或编辑应用程序通信以便获得数字文档或该数字文档的索引。如另一个例子，客户机应用程序 210 是独立的应用程序，以及其运行另一应用程序来帮助定位和获得数字文档，用于输出。在这种情况下，用户可首先运行客户机应用程序 210，然后调用驻留在相同信息装置 200 中的另一应用程序 205（例如，文档编辑和/或浏览应用程序）来预览或下载数字文档。然后，客户机应用程序 210 与文档浏览或编辑应用程序通信以便获得用于输出的数字文档。

[0237] 在另一实施例中，客户机应用程序 210 本身提供包括用于用户选择用于输出的内容（例如，数字文档）的能力的多个功能性或特征设置。例如，本发明的客户机应用程序 210 可提供用户能直接输入或选择用户希望输出的数字文档的索引或路径的 GUI。

[0238] 为在内容（例如，数字文档）900 上执行光栅化操作，在步骤 1210 中的客户机应用程序 210 需要获得输出设备 220 的设备从属参数，诸如光栅化参数。设备从属参数可包括在输出设备配置文件中。客户机应用程序 210 可以任何方式获得输出设备配置文件或光栅化参数。例如，可通过下述的一个或组合来获得输出设备配置文件或光栅化参数：

[0239] ●客户机应用程序与输出设备 220 通信以便加载与一个或多个光栅化参数有关的输出设备配置文件或信息。

[0240] ●客户机应用程序 210 从网络节点（例如，服务器）获得输出设备配置文件。

[0241] ●用户选择存储在用户信息装置 200 中的输出设备配置文件。

[0242] ●客户机应用程序 210 自动检索或使用尤其缺省配置文件、预定标准值或默认值。

[0243] ●客户机应用程序 210 通过至少部分基于其从输出设备 220、用户、缺省值和网络节点的一个或组合获得的信息，计算，可包括近似获得输出设备参数。

[0244] 注意到步骤 1210 是可选的步骤是很重要的。在一些实例中，在现有可选发现过程（图 10 中的步骤 1020）期间，通过客户应用程序 210，已经获得部分或全部输出设备配置文件或相关的设备相关信息。在这种情况下，可部分或全部忽略步骤 1210。

[0245] 在一种实现中，客户机应用程序 210 与一个或多个输出设备 220 通信以便加载存储在一个或多个输出设备 220 或它们的相关的一个或多个输出控制器 230 的存储器或存储部件中的输出设备配置文件。在一些实例中，所加载的输出设备配置文件可包含对设备参数的部分或全部索引或指针，而不是设备参数本身。可将实际输出设备参数存储在网络节

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点或信息装置 200 中，使用索引或指针，可由客户机应用程序 210 或通过其他应用程序 205 检索它们。应当注意，多个信息装置 200 可请求从相同的输出设备 220 同时或至少在重叠周期期间获得输出设备配置文件。输出设备 220 或其相关的输出控制器 230 可具有同时或用另外的方法管理多个通信链路和提供输出设备配置文件给多个信息装置 200 的部件或系统。另外，输出设备 220 可提供部件或系统来从不同信息装置查询请求并根据方案，诸如先来先服务、服务质量等等，用顺序的方式为他们提供服务。可通过例如，输出控制器 230 作为可选特征设置，实现具有或不具有查询或假脱机功能的多用户通信和服务管理能力。

[0246] 在另一实现中，可将一个或多个输出设备配置文件本地存储在信息装置 200 中。客户机应用程序 210 可提供用户能从预先存储的配置文件选择配置文件的 GUI。例如，GUI 可向用户提供输出设备名称的清单（例如，品牌和型号），每个对应于本地存储的输出设备配置文件。当用户选择输出设备 220 时，然后，客户机应用程序 210 可检索对应于由用户选定的名称的输出设备配置文件。

[0247] 在某些情况下，在以前所述的发现或通信过程期间，客户机应用程序 210 用以前描述的各种方法已经获得输出设备 ID、名称或索引或其他信息。在这种情况下，客户机应用程序 210 基于没有用户干预获得的输出设备 ID、名称或索引，可自动地启动或检索存储在信息装置 200 中的输出设备配置文件。

[0248] 在另一实现中，客户机应用程序 210 可使用本地存储在用户信息装置 200 中的一组预定默认值。这些默认值可存储在一个或多个文件或表中。客户机应用程序 210 可访问文件或表来获得这些默认值。客户机应用程序 210 也可基于在上述步骤（例如，在可选发现过程中，基于所获得的部分或不完全的打印机配置文件信息等等）期间获得的信息，创建或计算某些默认值。用户可有或可没有机会来修改或重写一些或所有默认值。

[0249] 最后，如果，为任何原因，没有设备相关信息可用，客户机应用程序 210 可使用标准输出和光栅化参数或预定缺省参数。上述示例说明实现方式的许多例子和变化，在实现中的这些和其他可能的变化不脱离本发明的范围。

[0250] 在步骤 1220 中，客户机应用程序 210 可选地获得用户首选项。在一个示例性实现中，客户机应用程序 210 可用 GUI（图形用户界面）获得用户首选项。为简化起见，可向用户呈现标准 GUI 表格，而与包含在输出过程中的输出设备 220 的品牌和型号无关。通过该界面，用户可指定一些设备独立输出参数，诸如页面范围、每页名片的数量、复制数量等等。另外或组合，客户机应用程序 210 也可将输出设备相关特征和首选项包括到呈现给用户的 GUI 中。可由包含在通过在以前步骤中描述的部件和过程获得的输出设备配置文件中的信息，部分或全部支持 GUI 的设备相关部分。为示例说明，设备相关特征和性能可尤其包括打印质量、色彩或灰度级、双向或单端、输出页大小。

[0251] 最好，用户首选项的一些或全部部件、属性或字段具有默认值。部件或全部默认值可硬编码到客户机应用程序 210 的软件程序或硬件部件中。另外，客户机应用程序 210 也可访问文件以便获得默认值，或其可基于在上述步骤或部件期间（例如，从输出设备配置文件）获得的信息，计算某些默认值。用户可有或可没有预先配置、或修改或重写一些或全部默认值的能力。客户机应用程序 210 可通过或没有用户干预或知识，获得和使用一些或所有默认值。

[0252] 在步骤 1230 中，本发明的客户机应用程序 210 执行光栅化操作以便根据在上述步

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骤获得的光栅化参数，将可包括向量图形、文本和图象的对象和信息的内容（例如，数字文档）一致为一个或多个输出图象。在光栅化过程期间，根据指定的光栅化参数设置，将内容中的文本和向量图形对象或信息光栅化或转换成图象或位图形式。在该内容中的图象信息可要求缩放和内插操作以便一致光栅化参数。光栅化过程可进一步包括操作诸如，缩放、内插、分段等等以便适合或一致一个或多个输出图象为指定的光栅化参数设置，诸如目标输出大小、分辨率、色深、色空间和图象格式等等。

[0253] 在步骤1240中，客户机应用程序210生成包括光栅化的一个或多个输出图象的中间输出数据。本发明的中间输出数据可包含图象信息、指令、描述以及数据，尤其诸如色彩配置文件。创建和生成中间输出数据可进一步包括生成尤其诸如压缩、编码、加密、平滑、分段、缩放和/或色彩校正。可用不同的格式和/或压缩方法（例如，JPEG、BMP、TIFF、JBIG等等或组合）不同地编码和/或实现包含在中间输出数据中的图象。一个优选实现方式是用混合光栅内容（MRC）描述生成或编码中间输出数据中的输出图象。在本发明的数据输出过程中使用MRC提供机会来通过应用不同的压缩技术以便分段内容中的元素来提高压缩比。另外，MRC提供机会来在输出图象的编码过程期间维持更原始的内容信息，因此，部分地改进输出质量。

[0254] 在步骤1250中，客户机应用程序210通过局部通信链路240，将中间输出数据传送给输出设备220。通信链路可用有线或无线技术实现，以及传输可包括一个或多个会话。

[0255] 应当意识到图12A示例说明在本发明的数据输出方法1002中的客户机应用程序1030的一个例子。具有更多或更少步骤的其他实现也可可能的，以及在图12中未出的几个另外的可选过程也可包括在客户机应用程序过程1030中。然而，使用这些不同的变化，不会导致脱离本发明的范围。例如，当选定输出设备220将服务提供给受限用户组时，可包括可选验证步骤。当客户机应用程序210通过与输出设备或输出控制器通信，获得输出设备配置文件时，可将验证过程增加到步骤1210中。如另一个例子，当客户机应用程序将中间输出数据传送给一个或多个输出设备220或输出控制器230时，也可在步骤1250中实现验证过程。可通过例如，将信息装置200的标记与存储在输出设备220或输出控制器230中的标识的认可控制列表进行比较，实现简单的验证。也可使用其他更复杂的验证和加密方案。可单独地或组合地将信息，尤其诸如用户名称、密码、ID号、签名、安全密钥（物理或数字）、生物特征、指纹、声音用作验证手段。可由用户手动提供或由选定的输出设备220或输出控制器230自动选择这些标识和/或验证信息。通过成功验证，用户有权访问由输出设备220提供的所有或部分服务。客户机应用程序210获得的输出设备配置文件可根据所请求或确定的服务类型或质量改变。如果验证失败，拒绝用户部分或全部访问服务是可能的。在这种情况下，可向用户提供备选方案，诸如选择另一输出设备220或另外的服务。

[0256] 另一可选过程是参考图12，在输出服务前后，诸如步骤1210或1250，要求用户提供支付或储蓄或契约。支付或储蓄的例子可尤其包括现金、信用卡、银行卡、借记卡、智能卡、电子货币。输出控制器220(230？)可将支付计算或交易处理提供为本发明的可选特征设置。

[0257] 图12B示例说明另一示例性的客户机应用程序输出过程1030，通过该过程，信息装置200可将内容普遍和通用地输出给与本发明的输出控制器230有关或具有本发明的输出控制器230的一个或多个输出设备220。

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[0258] 除忽略获得输出设备配置文件的步骤1210外，图12B中所示的过程与图12A所描述的过程类似。在该实施例中，客户机应用程序210利用一组硬编码、包括光栅化参数的标准或预定输出设备参数，通过光栅化参数，客户机应用程序210能执行光栅化操作和其他所需的图象处理功能。可向用户提供改变这些参数或输入另外的参数的选项。光栅化参数包括输出大小、输出分辨率、色深、色空间、色彩通道、比例因子等等。这些预定参数通常遵循规格或标准。相同的规格和标准也可定义或至少部分描述中间输出数据。可将预定标准参数存储在信息装置200、输出控制器230和/或输出设备220中的文件或配置文件中，用于更新或升级。

[0259] 在客户机输出过程1204中，由于预定光栅化参数，客户机应用程序210可不需要从选定的输出设备230更新打印机配置文件。因此，当与在图12A所示的过程1202相比时，在该过程1204中，在信息装置200和输出设备220间的无双向通信是必要的。客户机应用程序210基于标准和/或预定参数，执行光栅化操作1225，并生成具有那些光栅化参数的预定或标准属性的光栅化输出图象。将包括至少一个光栅化输出图象的最终中间输出数据在步骤1250中从信息装置200传送到输出设备220，或传送到其相关的输出控制器230，用于渲染或输出。与在如图12A所示的过程1202中生成的中间输出数据相比，在过程1202中生成的中间输出数据通常是较低设备相关。可预先编程包括或与输出设备220相关的输出控制器230以便解释包括对应于这些标准或预定参数的性质或属性的光栅输出图象。

[0260] 可将标准或预定光栅化参数硬编码或编程到客户机应用程序210和/或输出控制器230中。然而，代替硬编码这些参数，便于更新或修改的一种技术是将这些标准参数存储在缺省文件或配置文件中。可由信息装置200中的应用程序（例如，客户机应用程序210）和/或由输出设备2220或输出控制器230中的应用程序或部件检索和利用包含在文件或配置文件中的标准或预定参数。用这种方法，可通过替换或修改文件或配置文件，代替修改或更新信息装置200、输出设备220和/或输出控制器230中的程序、应用程序或部件，很容易实现对那些预定或标准参数的任何必要的更新、升级或所需修改。

[0261] 向信息装置200提供通用输出性能的客户机应用程序过程1204可包括或利用：

[0262] ●获得意欲输出的内容（例如数字文档）的客户机应用程序210。

[0263] ●客户机应用程序210通过(1)用户输入（自动或手动）或选择或(2)基于预置首选项或预定默认值，或(3)上述的组合，可选地获得用户首选项（在步骤1220中）。

[0264] ●根据预定或标准光栅化参数，光栅化内容（在步骤1230或1225中）的客户机应用程序210。

[0265] ●生成用于在输出设备220渲染或输出的中间输出数据（在步骤1240中）的客户机应用程序210，中间输出数据至少部分包含与意欲输出的内容有关的光栅化图象。

[0266] ●将中间输出数据传送给输出设备220(在步骤1250中)，用于进一步处理和最终输出的客户机应用程序210。

[0267] 与图12A所示的过程1202相比，图12B所示的客户机输出过程1204的一个优点在于所生成的中间输出数据通常是低设备相关。设备独立属性允许中间输出数据对具有输出控制器或与输出控制器有关的大多数输出设备来说更便携和更易接受。两个数据输出过程(1202和1204)允许通用输出；允许用户在信息装置200中安装单个客户机应用程序210或部件以便向不至一个输出设备220提供输出能力。

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[0268] 图 13A 示例说明本发明的输出设备 1302 及其相关的光栅成象方法的一个例子。在该输出设备过程 1302 中，输出设备 220 能从信息装置 200 接收中间输出数据。输出设备过程 1302 及其操作可包括或利用：

[0269] ●接收中间输出数据的输出设备 / 系统或输出控制器（在步骤 1300 中）。中间输出数据至少部分包括光栅输出图象，其描述用于在输出设备 220 或系统 250 渲染的至少部分内容。

[0270] ●解释（在步骤 1310 中）中间输出数据的输出设备 / 系统或输出控制器。在一个优先实施例中，中间输出数据包括利用一个或多个 MRC 格式或部分的输出图象。

[0271] ●在光栅图象上执行图象处理操作（在步骤 1320 中）的输出设备 / 系统或输出控制器。图象处理操作可尤其包括，但不限于图象解压缩、缩放、半色调、色彩匹配。

[0272] ●转换和 / 或生成（在步骤 1330 中）以适合于输入到包括在输出设备 220 中的输出引擎（例如，在打印机的情况下的打印机引擎）的格式或描述的输出引擎输出数据的输出设备 / 系统或输出控制器。

[0273] ●在步骤 1370 中渲染或生成最终输出（例如，输出引擎输出数据）的输出设备 220 中的输出引擎。

[0274] 输出设备 220 或输出系统 250 可内部或外部地包括输出控制器 230 以便帮助输出过程 1302 的管理和操作。如图 7 所示，有许多可能的与输出设备 220 有关的输出控制器 230 的配置和实现。在下文中，将输出控制器 230 看作连接到其上的输出设备的内部部分。此后，可由与其有关的输出控制器部分或全部实现下述输出设备的操作。

[0275] 在步骤 1300 中，由客户机应用程序 210 启动输出设备过程 1302，将中间输出数据传送到输出设备 220 或输出系统 250。在步骤 1310 中，输出设备 220 读取和解释包含与打算输出的内容有关的至少一个光栅输出图象的中间输出数据。在读取和解释过程 1310 期间，输出设备 220 可包括解析中间输出数据并执行尤其诸如解压缩、解码、以及解密操作的部件。可不同地编码输出图象以及其可包括一个或多个压缩方法。

[0276] 在图象编码方法包括 MRC 格式的情况下，那么，在一个示例实现中，在步骤 1310 的解码和映射输出图象期间，可将包括 MRC 的图象中的较低分辨率层和信息映射、缩放或内插到较高分辨率输出图象上以便产生更好的图象质量。因此，在步骤 1310，在中间输出数据包括 MRC 部分的情况下，可解压缩、处理、映射和组合 MRC 图象的每层到单个组合的输出图象层。步骤 1310 也可尤其包括缩放、色空间变换、和 / 或内插。除使用具有不同层的不同缩放和内插比的映射方法的可能性外，使用 MRC 的另一优点在于在步骤 1320 中，可利用包含在 MRC 中的分段信息来将不同的图象处理和增强技术应用于 MRC 图象的不同层的数据上。

[0277] 在步骤 1320，输出设备 220 可进一步在解码输出图象上执行图象处理操作。这些图象处理操作可尤其包括，例如，色彩校正、色彩匹配、图象分段、图象增强、图形矢真、图象平滑、数字水印、缩放、内插和半色调。图象处理操作 1320 可与步骤 1310 结合或同时操作。例如，当解码和 / 或解压缩图象的每行、象素或部分时，应用图象处理操作 1320。在另一实现中，图象处理 1320 可在已经解码或解压缩整个输出图象或大部分图象后发生。

[0278] 如果中间输出数据包括 MRC 部分，那么在步骤 1310 中，有另外的机会来提高图象质量。用 MRC 编码的图象包含传统的单层图象格式通常不具有的分段信息。例如，前景可

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在一层中，以及背景在另一层中。如另一个例子，色度信息可在一层中以及亮度可在另一层中。可使用 MRC 中的该分段信息来将不同或选择性的图象处理方法和算法应用于不同层或段以便提高图象质量或保留或恢复图象信息。不同图象处理技术或算法可包括色彩匹配、色彩校正、黑色生成、半色调、缩放、内插、图形矢真、平滑、数字水印等等。例如，可将色度色彩匹配应用到前景信息以及将感性色彩匹配应用到背景信息，反之亦然。如另一个例子，可将错误扩散半色调应用到前景上以及将随机半色调应用到背景上，反之亦然。如另一个例子，可将双三次插值应用到层上以及将双线性或最小距离内插应用到不同层上。

[0279] 在步骤 1330 中，输出设备 220 或输出控制器 230 可将处理过的图象（例如，半色调）转换成输出设备 220 的输出引擎可接受的。该转换步骤是可选的，由特定输出设备引擎（例如，在打印机的情况下为打印机引擎）的类型、格式和输入要求而定。不同输出引擎可具有不同的输入光栅图象输入要求。例如，不同输出引擎可要求不同输入图象格式，每个象素的位或字节数、压缩或非压缩格式、或不同色空间（例如，诸如，RGB、CMY、CMYK 或 HI-FI 色彩，诸如绿、橙、紫、红等等的组合。每次在行、列、多行、多列、程序块、段或组合中编码输入的光栅，用于将光栅数据发送给输出引擎。在一些情况下，如果步骤 1320 的结果已经是输入设备引擎可接受的形式，可忽略步骤 1330。换句话说，然而，可要求进一步转换和 / 或处理以便满足特定的输出设备引擎的特定输入要求。

[0280] 注意从步骤 1310 至步骤 1330 的上述处理可要求一个或多个存储缓冲器以便暂时存储处理过的结果是很重要的。存储缓冲器可存储或保存在上述任何一个步骤中的输出图象的行、列、部分、或程序块。在其他可能的组合中，可以交替的方式，或以交织或交叉的方式顺序地执行将信息存储到存储缓冲器中以及从存储缓冲器检索信息。可用输出控制器 230 部分或全部实现步骤 1310 至步骤 1330 操作。

[0281] 在步骤 1370 中，包括在输出设备 220 或输出系统 250 中的输出设备引擎接收在步骤 1330 或步骤 1320 中生成的输出引擎输出数据。输出引擎输出数据是以满足输出引擎的输入要求和属性的，诸如色空间、色彩通道、色深、输出大小、分辨率等等。然后，输出引擎采用该输出引擎输出数据并通过其标记引擎或显示引擎输出或渲染该数据内容。

[0282] 包括输出设备过程 1302 的数据输出方法 1002 的一个优点在于相对于参考图 1 的传统过程，它对信息装置 200 具有更少的处理要求，因此，更使得信息装置 200 具有相对更低的处理能力和存储空间以便具有输出能力。

[0283] 例如，一些图象处理功能，诸如半色调（例如，错误扩散）可要求相当大的处理和计算能力。在包括输出设备过程 1302 的数据输出过程 1002 中，通过包括在输出设备 220 或输出系统 250，而不是信息装置 200 中的输出设备部件（例如，输出控制器 230）来在步骤 1320 中执行半色调，因此，代替信息装置 200 的计算要求。数据输出 1302 的另一好处在于中间输出数据比按参考图 1A 的传统输出方法 102 所生成的输出数据具有更小的设备相关。设备独立提供机会允许信息装置 200 中的单个驱动程序或应用程序，将中间输出数据输出给包括输出控制器 230 的多个输出设备 220。

[0284] 一些输出设备 220 可包含打印机控制器 410。这种类型的输出设备或打印机的例子尤其是 PostScript 打印机或 PCL 打印机。图 13B 示例说明具有包括打印机控制器 410 的打印机的输出设备过程 1304 的例子。如图 1 所述，具有打印机控制器的打印机要求输入，诸如页面描述语言（例如，PostScript、PCL 等等）、标记语言（HTML、XML 等等）、特定的图

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象格式、特定的图形格式，或组合，由打印机控制器的类型而定。

[0285] 有许多用于将数据输出能力和过程提供给包括打印机控制器的打印机或打印系统的打印系统配置。在一个例子中，输出设备 220 中的现有的打印机控制器可包括由输出控制器提供的特征设置以便形成“组合控制器”，如前面参考图 7C 和 7F 所述。在另一例子中，本发明的输出控制器 230 可顺序地或级联到现有的打印机控制器。输出控制器 230 可内部安装（参考图 7B）或外部连接到（参考图 7F）输出设备 220。对包括打印机控制器的输出设备 220 来说，输出控制器 230 可在步骤 1310 中简单地解码中间输出数据，然后，在步骤 1350 中将其转换成用于输入到打印机控制器可接受的形式。

[0286] 用于包括打印机控制器 410 的输出设备过程 1304 和操作可包括或利用：

[0287] ●接收中间打印数据或输出数据（参考步骤 1300）的输出设备 220 或系统 250 中的输出控制器 230 或部件，中间打印数据至少包括至少部分与用于在输出设备 220 渲染的内容有关的光栅图象。

[0288] ●解释中间输出数据（参考步骤 1310）的输出设备 220 或系统 250 中的输出控制器 230 或部件，在一个优选实施例中，中间输出数据包括利用一个或多个 MRC 格式或部件的输出图象。

[0289] ●将中间输出数据转换成打印机控制器打印数据（参考步骤 1350）的输出设备 220 或系统 250 中的输出控制器 230 或部件，打印机控制器打印数据包括对打印机控制器的输入要求来说可接受或兼容的格式或语言（例如，PDL、PDF、HTML、XML 等等）。

[0290] ●接收打印机控制器打印数据的输出设备 220 或系统 250 中的输出控制器 230 或部件，打印机控制器可解析、解释和进一步处理（例如，光栅化、缩放、图象增强、色彩校正、色彩匹配、半色调等等）并将打印机控制器打印数据转换成打印机引擎打印数据（参考步骤 1360），打印机引擎打印数据由对输入到输出设备 220 或输出系统 250 中的打印机引擎来说可接受的格式或描述组成。

[0291] ●通过输入打印机引擎打印数据，渲染或生成最终输出（参考步骤 1370）的输出设备 220 或系统 250 中的打印机引擎或部件。

[0292] 在输出设备过程 1304 中，步骤 1300（接收中间输出数据）和步骤 1310（解释中间输出数据）均与在前面部分中参考图 13A 所述的输出设备过程 1302 中的步骤 1300 和步骤 1310 相同。

[0293] 在步骤 1350 中，输出控制器 230 将中间打印数据转换成以输入到打印机控制器来说兼容或可接受的形式的打印机控制器打印数据。例如，打印机控制器可要求输入特定的页面描述语言（PDL），诸如 PostScript。然后，输出控制器 230 创建 PostScript 文件并将在步骤 1310 中生成或检索的输出图象嵌入 PostScript 文件中。输出控制器 230 还能创建和将来自步骤 1310 的输出图象嵌入其他打印机控制器打印数据格式、指令或语言。

[0294] 在步骤 1360 中，打印机控制器接收在步骤 1350 中生成的、包括打印机控制器可接受的输入语言或格式的打印机控制器打印数据。打印机控制器可解析、解释并解码输入打印机控制器打印数据。打印机控制器可进一步在输出图象上执行光栅图象处理操作，尤其诸如光栅化、色彩校正、黑色生成、GCR、图形矢真、缩放、图象增强，以及半色调。然后，打印机控制器可生成适合于输入到打印机引擎的打印机引擎打印数据。根据特定的打印机引擎的要求，可改变打印机引擎打印数据的类型和／或格式。

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[0295] 注意，从步骤 1310 到步骤 1360 的上述过程可要求一个或多个存储缓冲器来暂时存储处理过的结果是很重要的。存储缓冲器能在任何一个上述步骤中存储或保留输出图象的行、列、部分、或程序块。在其他可能的组合中，可顺序地、交替地、以交织或交叉的方式将令牌存储到存储缓冲器和从存储缓冲器检索信息。能输出控制器 230 实现步骤 1310 至步骤 1360 的过程和操作。

[0296] 在步骤 1370 中，包括在输出设备 220 或输出系统 250 中的打印机引擎基于在步骤 1360 中生成的打印机引擎打印数据，生成或渲染最终输出。例如，打印机引擎打印数据可以 CMY、CMYK 以及 RGB 等等的形式下，以及这可以每个象素一个或多个位的格式，满足打印机引擎的大小和分辨率要求。包括输出设备 220 的打印机引擎可采用该打印数据并通过其标记引擎生成或渲染输出页。

[0297] 已经参考所示的实施例，描述和示例说明了本发明的原理，将意识到在排列和细节方面可修改所示例的实施例而不脱离这些原理。鉴于可应用本发明的原理的许多可能的实施例，应认识到详细的实施例仅是示例目的，而不应当视为限制本发明的范围。相反，我要求本发明的所有这些实施例均落入由下述权利要求书及其等效的范围内。

[0298] 除非上下文指出，否则，权利要求中对元件的实例的数目的引用，不管其引用一个实例还是不至一个实例，至少要求元件的所述实例数，但不是为了使权利要求的范围排除具有比所述的元件的多的实例的结构或方法。特别地，但不限于，权利要求中对一个或多个输出市长图系统、图象或一个图象，光栅化参数或一个光栅化参数的引用不是为了使权利要求的范围排除具有、包括、采用或提供两个或以上输出设备或系统、图象或光栅化参数的结构或方法。

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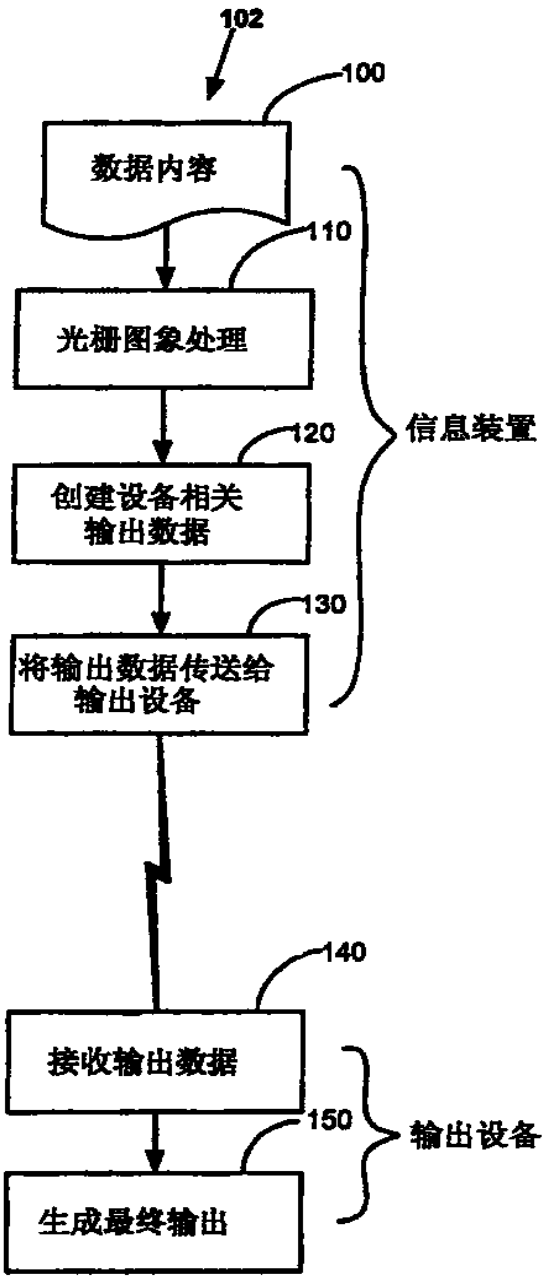


图 1A

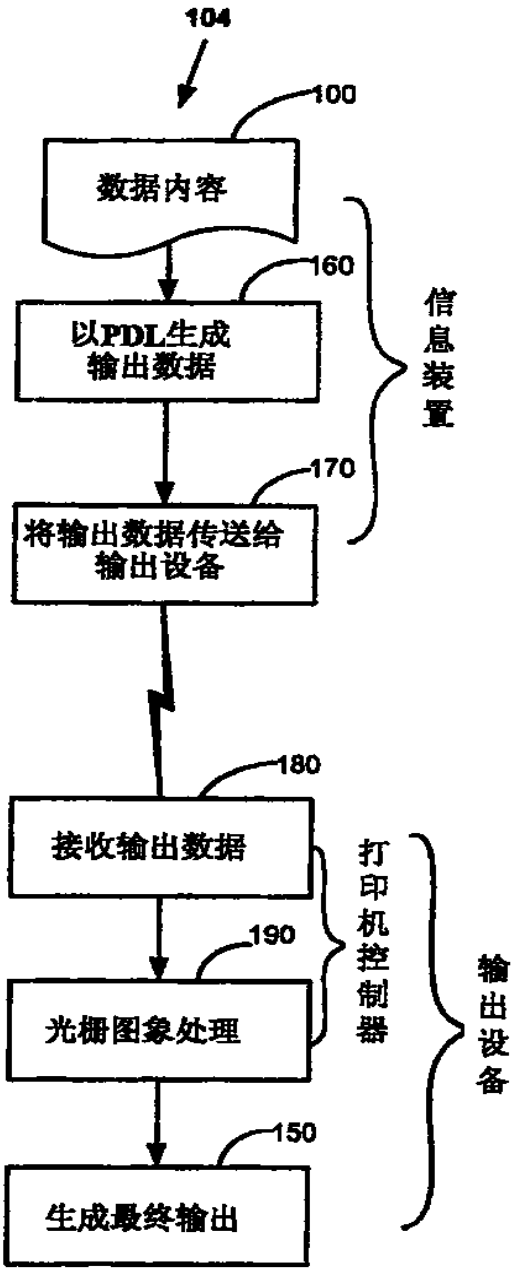


图 1B

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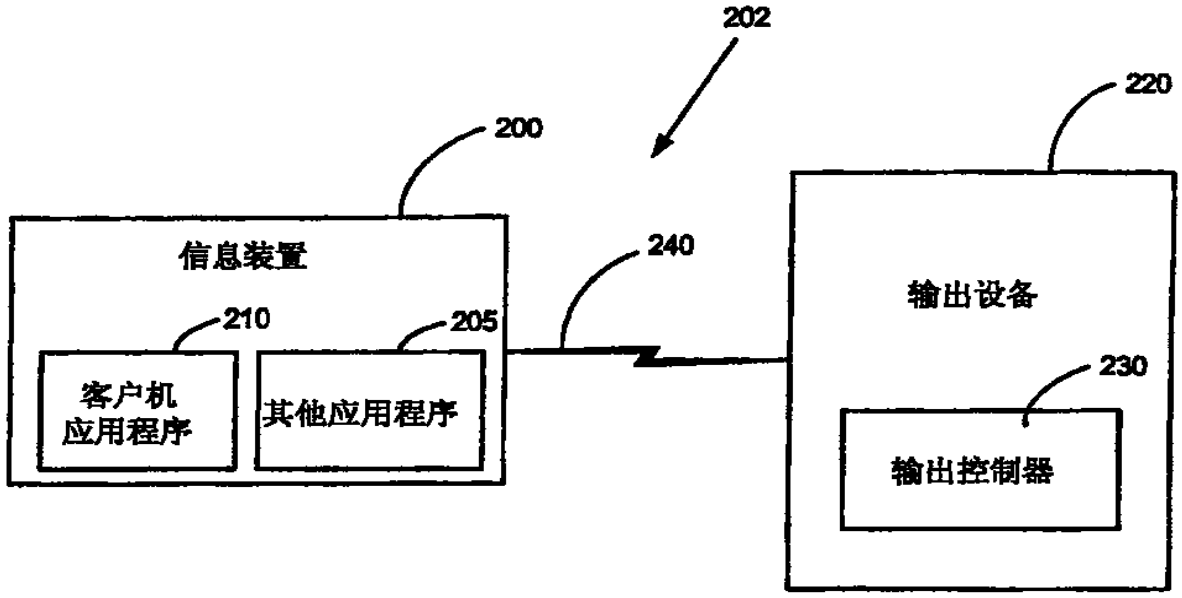


图 2A

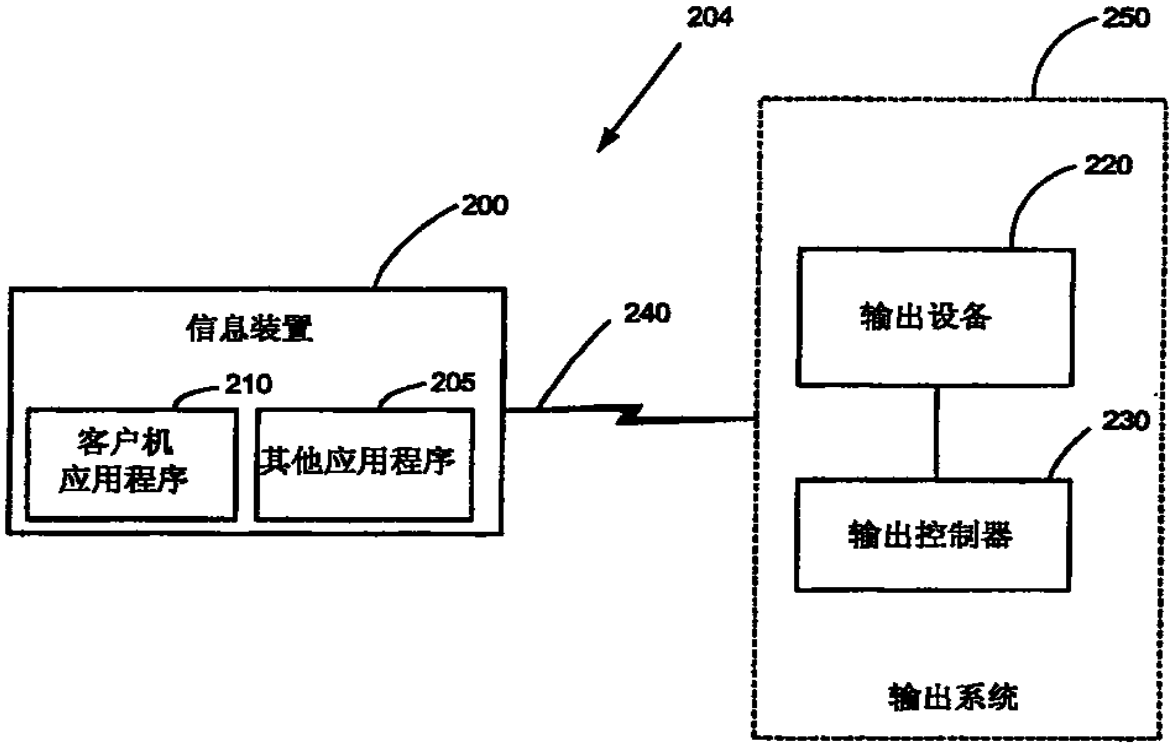


图 2B

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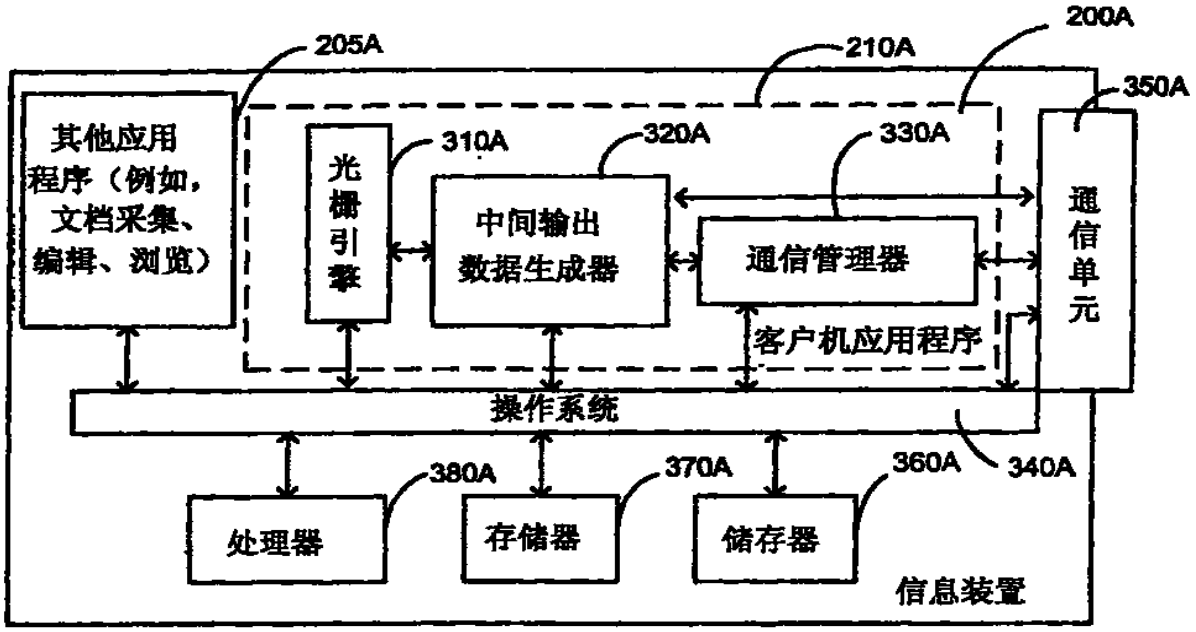


图 3A

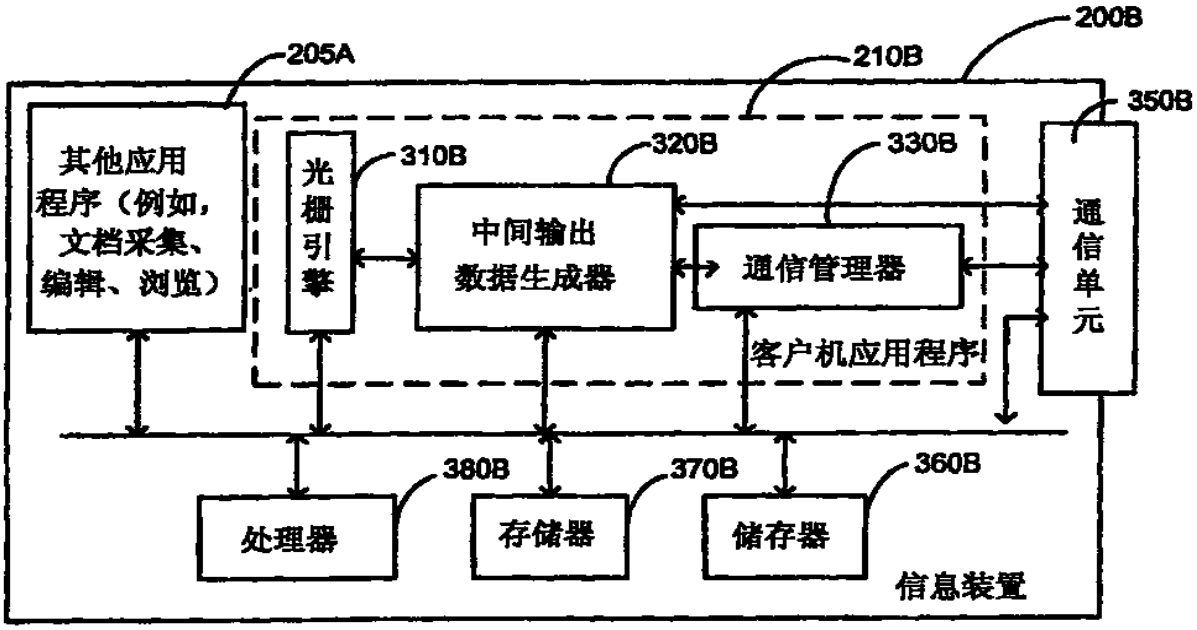


图 3B

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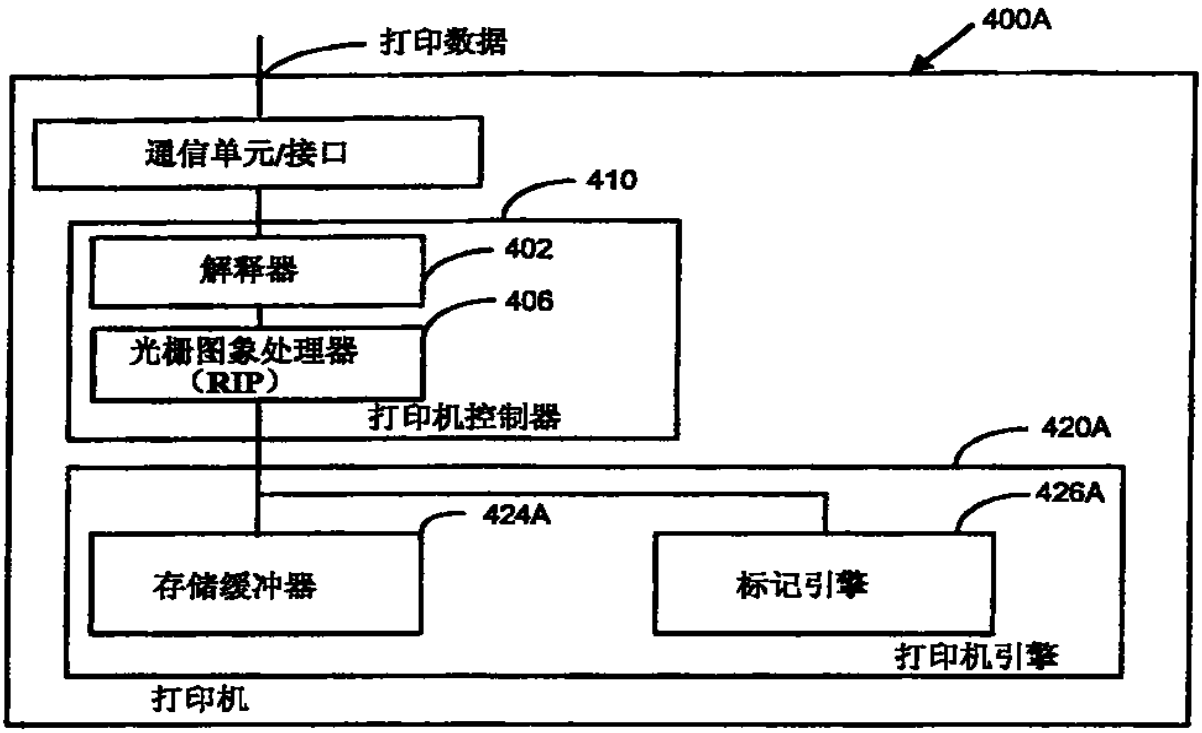


图 4A

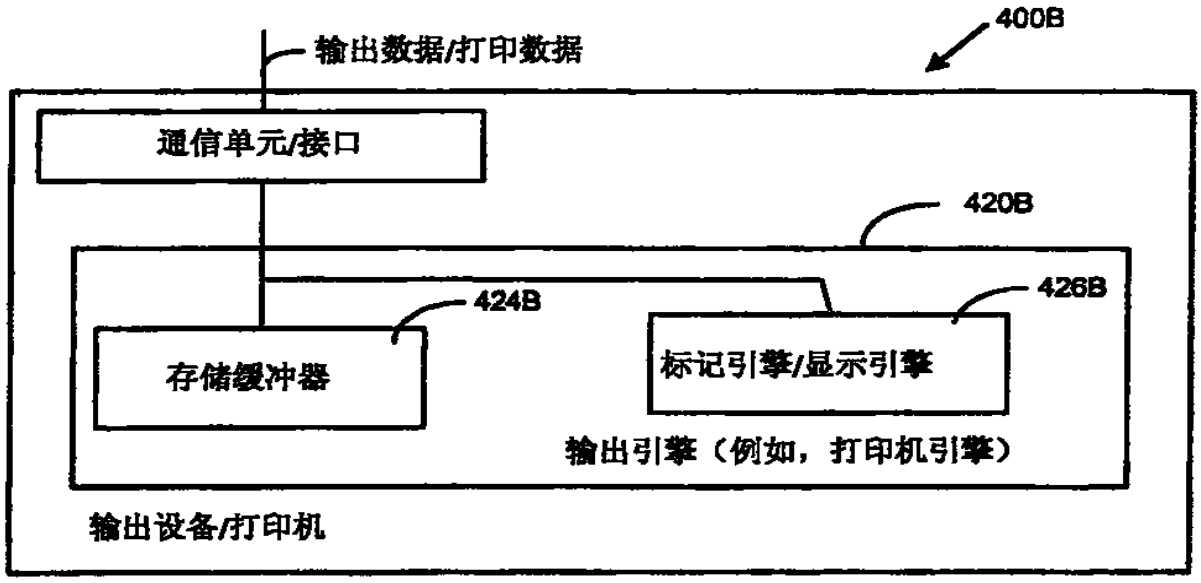


图 4B

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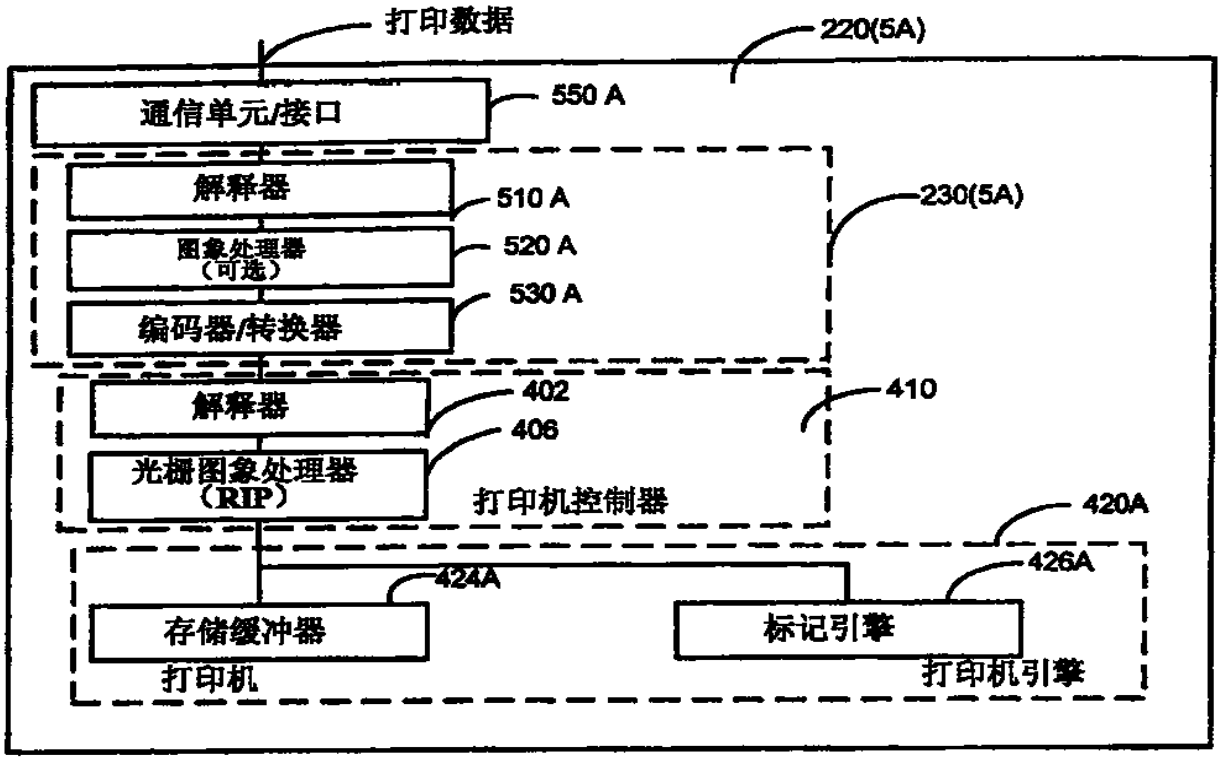


图 5A

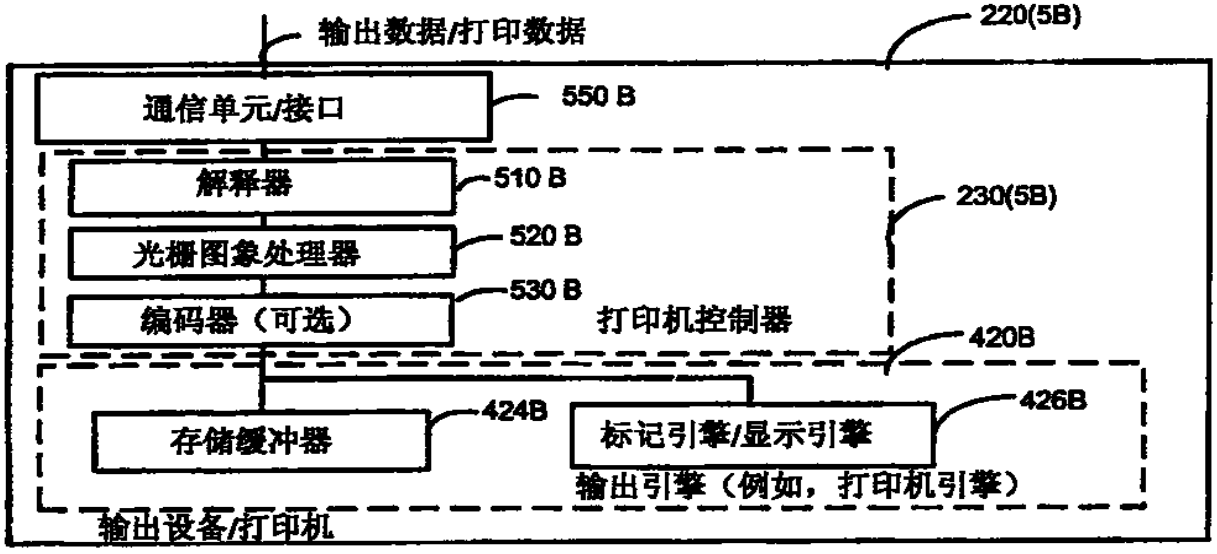


图 5B

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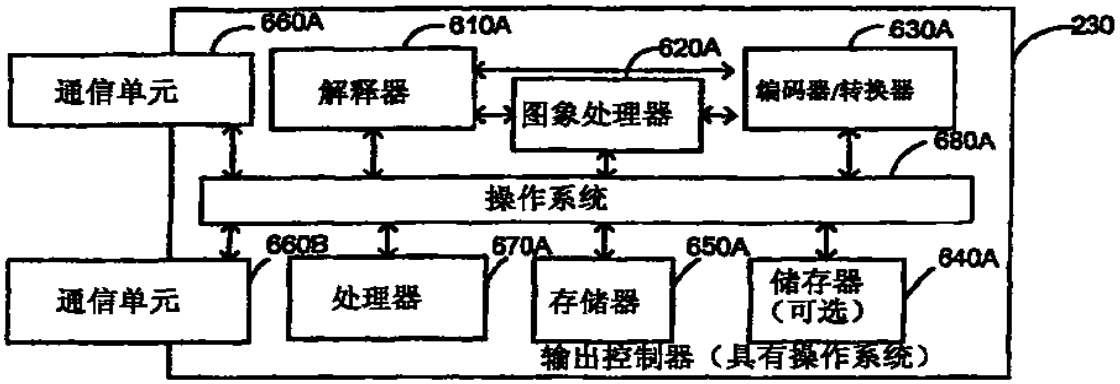


图 6A

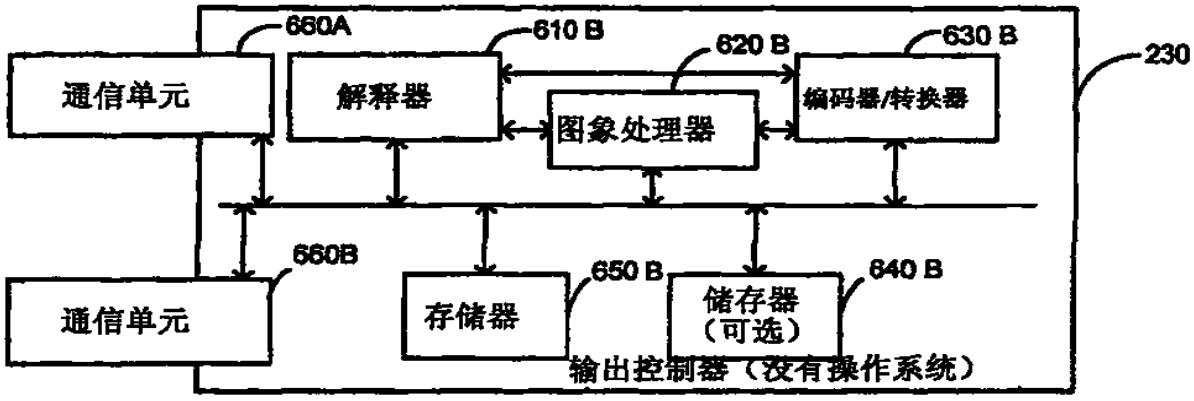


图 6B

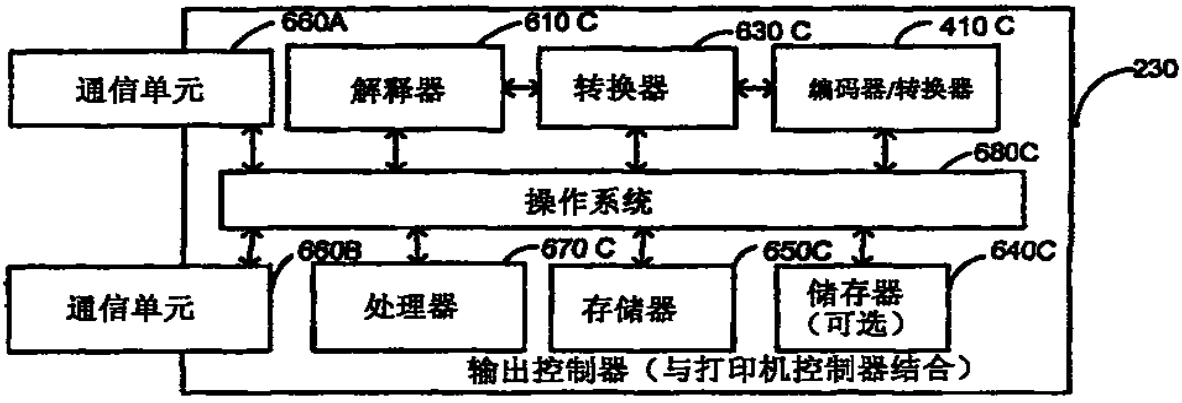


图 6C

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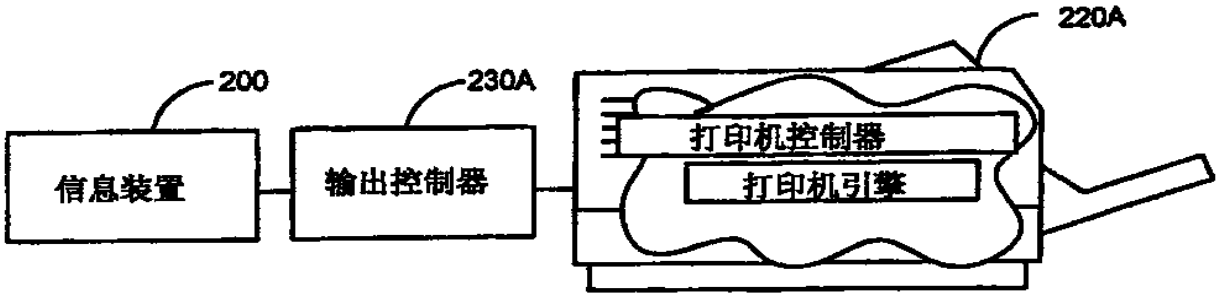


图 7A

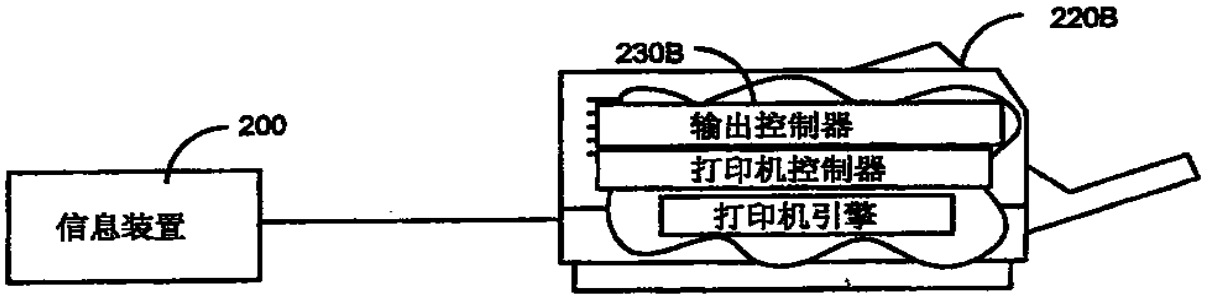


图 7B

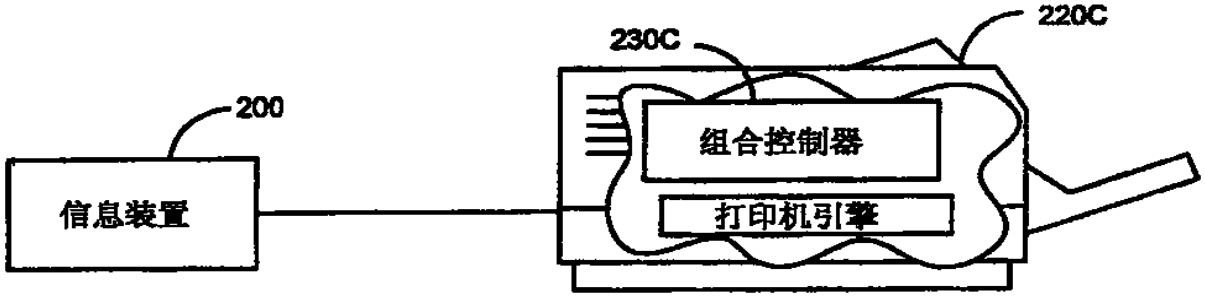


图 7C

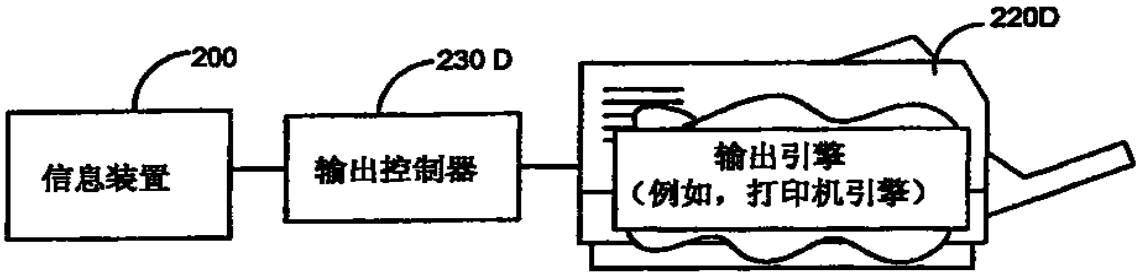


图 7D

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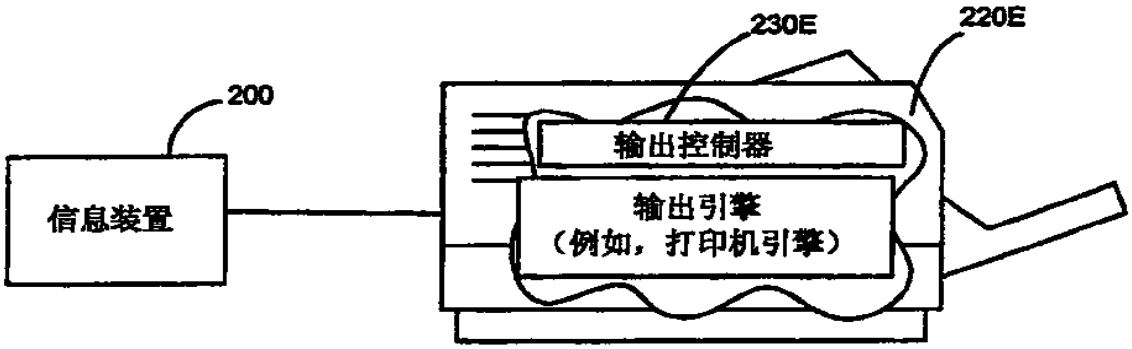


图 7E

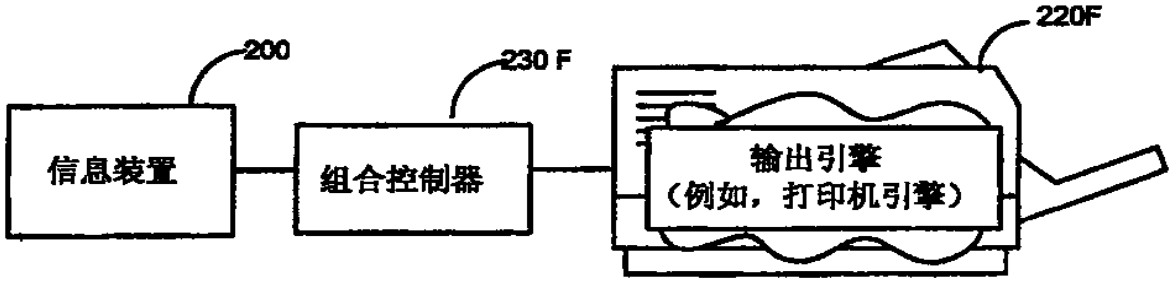


图 7F

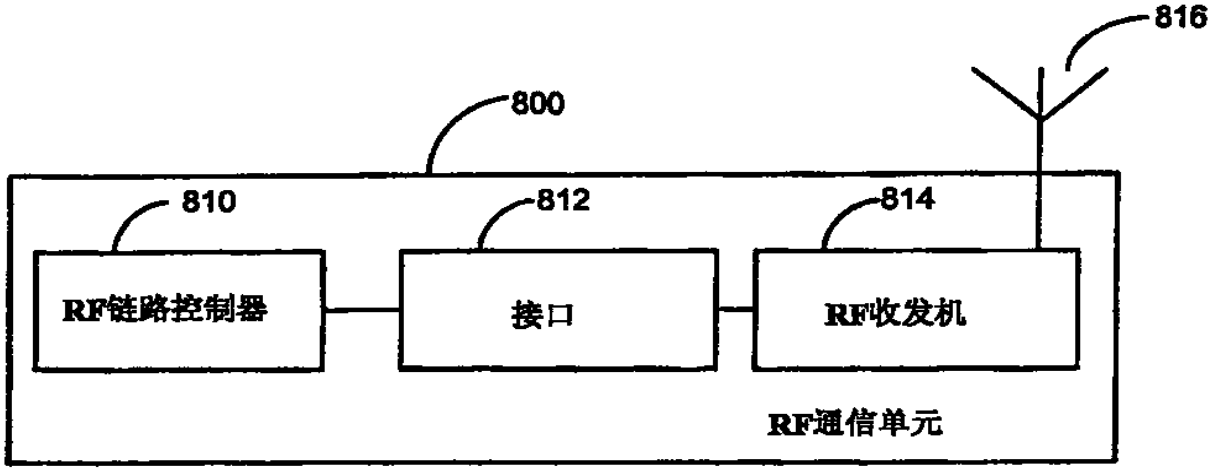


图 8A

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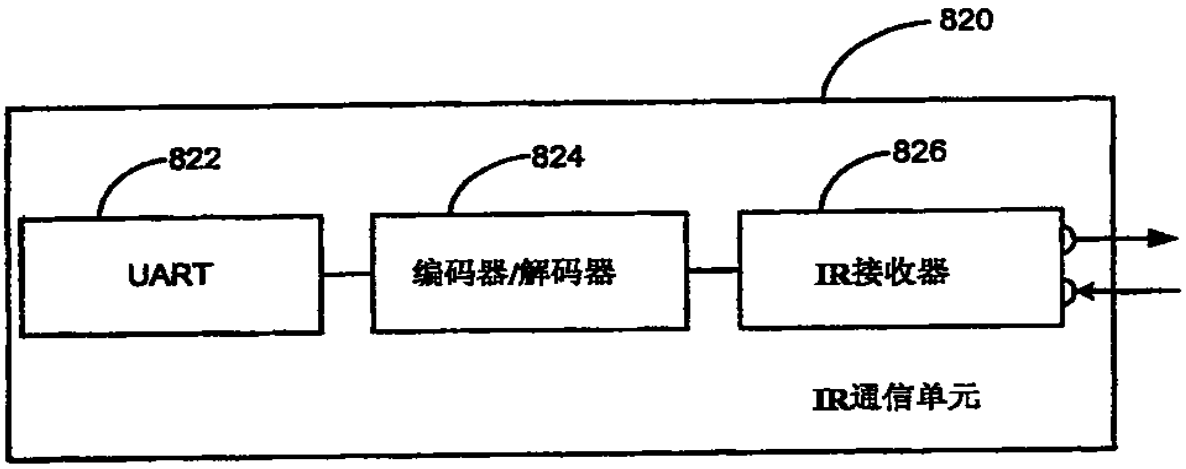


图 8B

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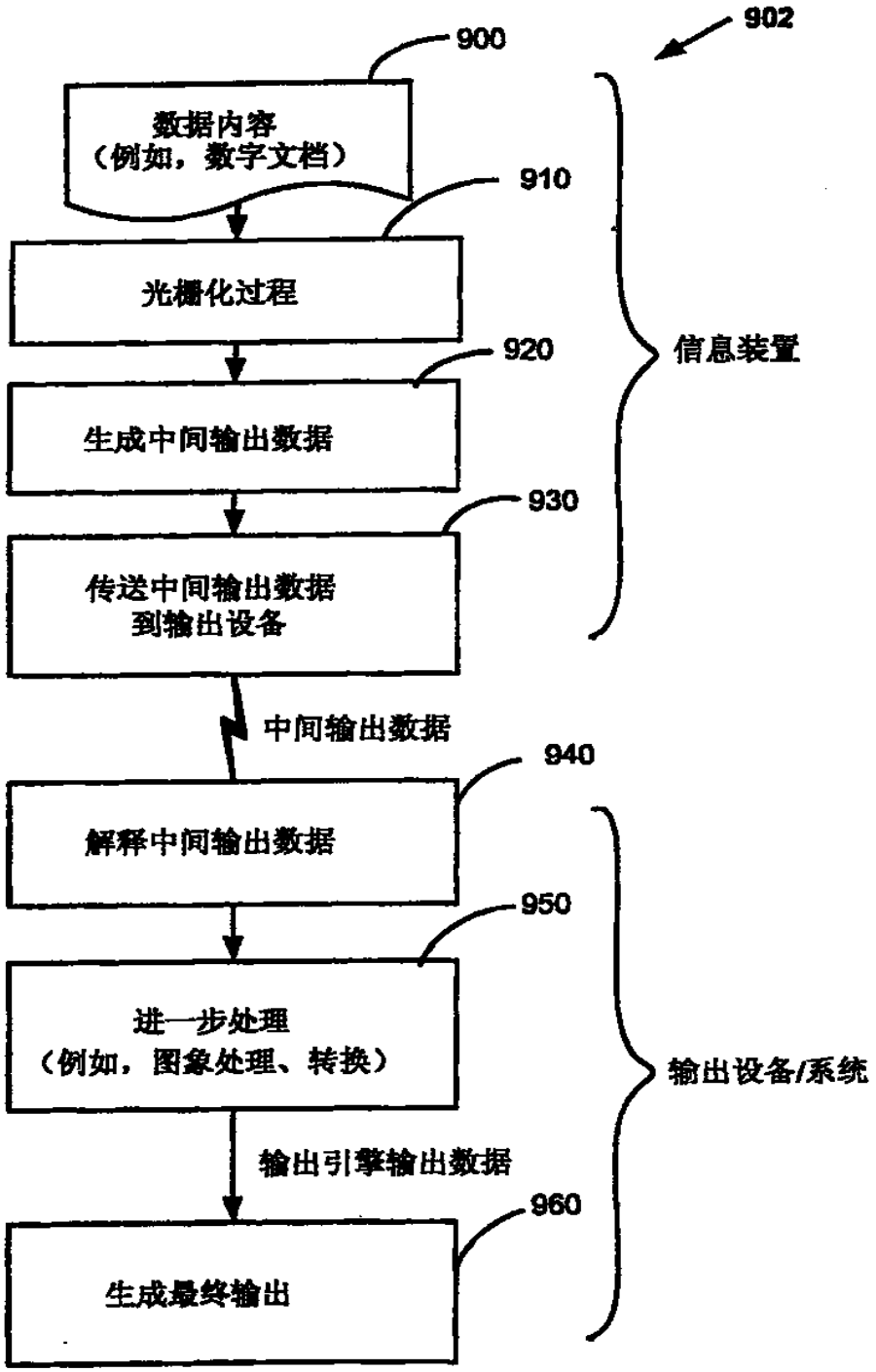


图 9

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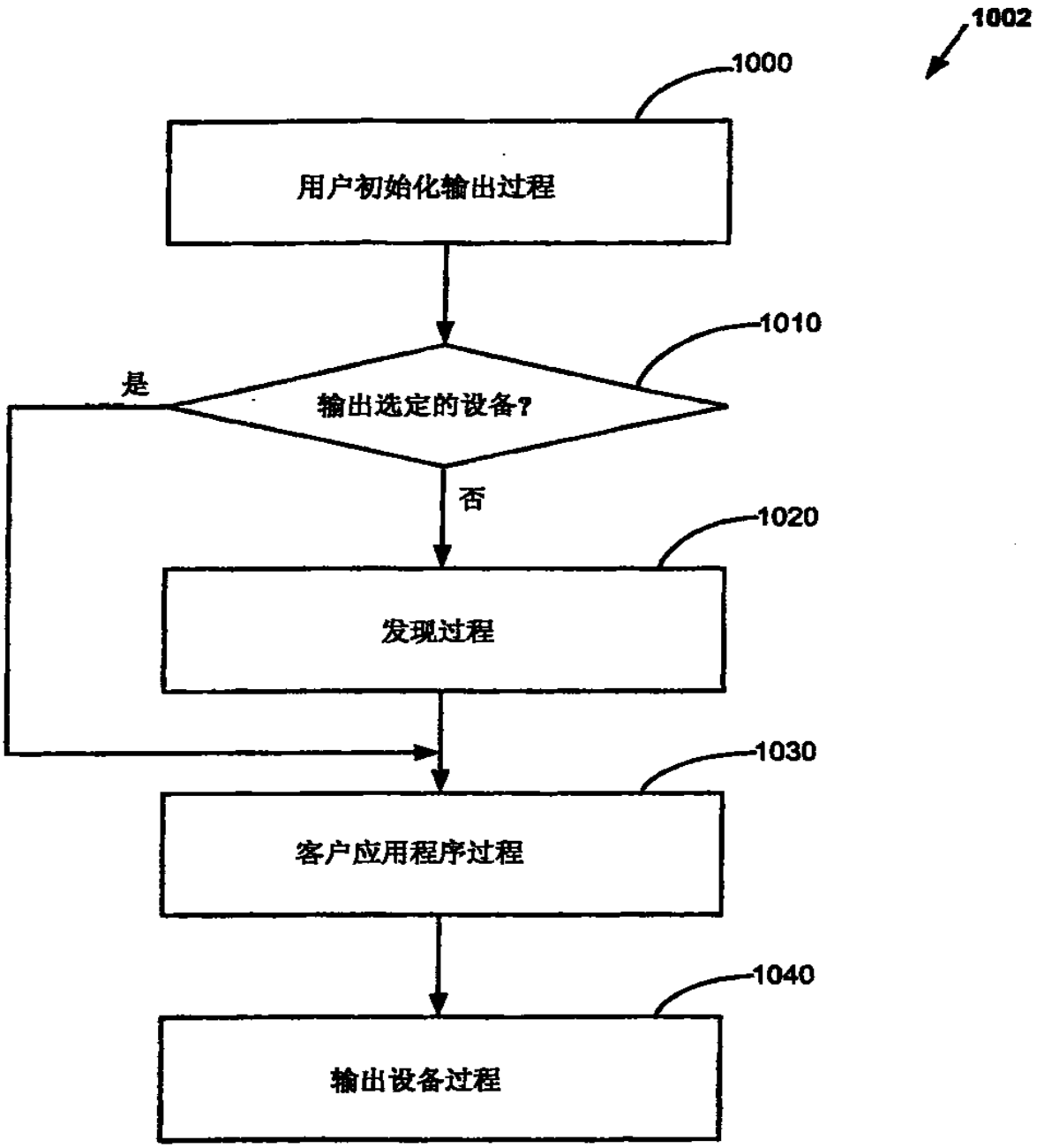

1002
1000
用户初始化输出过程
1010
是
输出选定的设备?
否
1020
发现过程
1030
客户应用程序过程
1040
输出设备过程

图 10

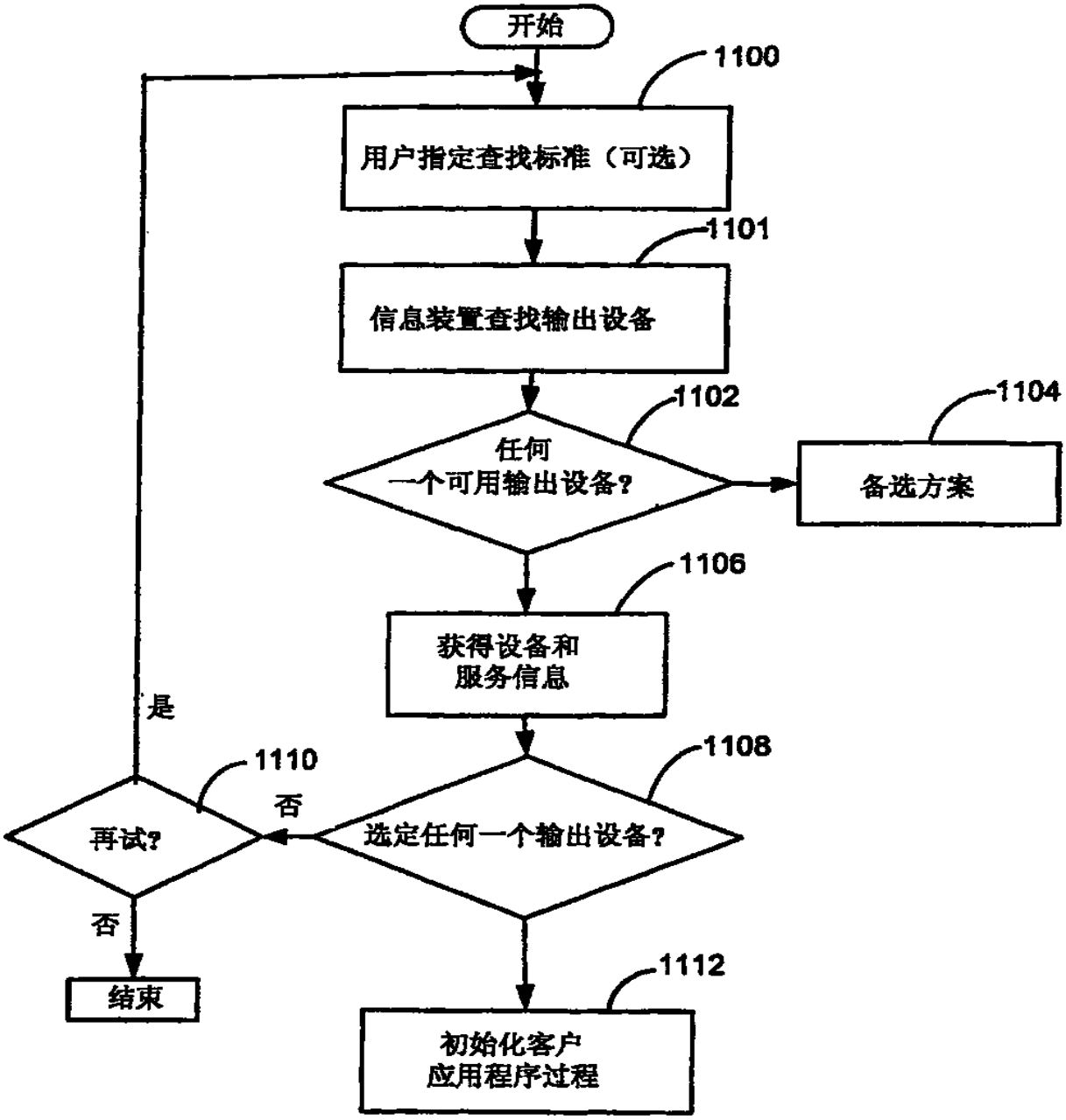


图 11

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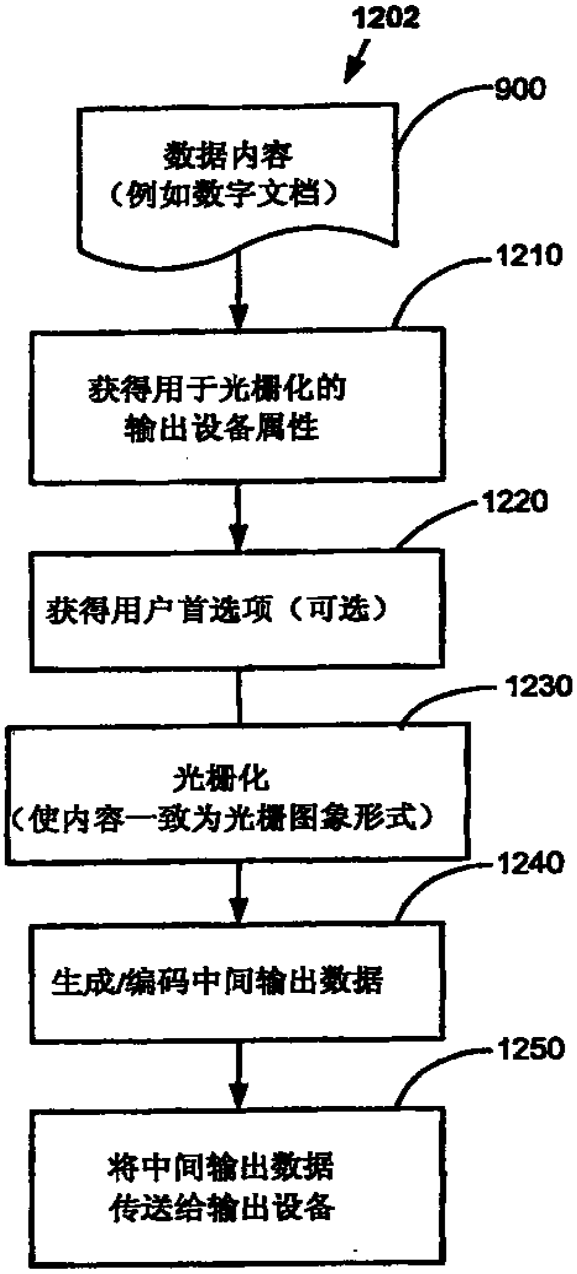


图 12A

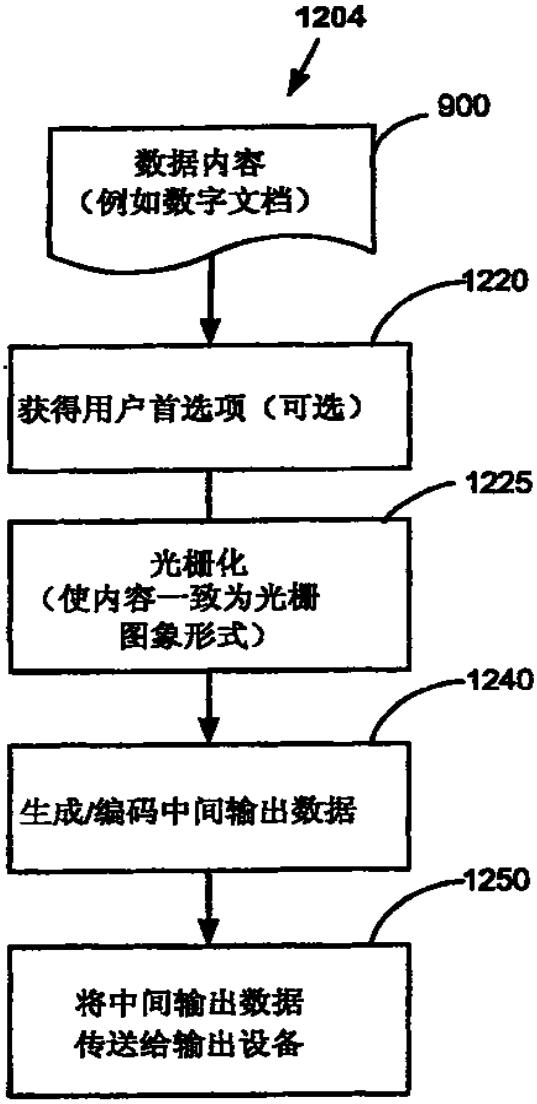


图 12B

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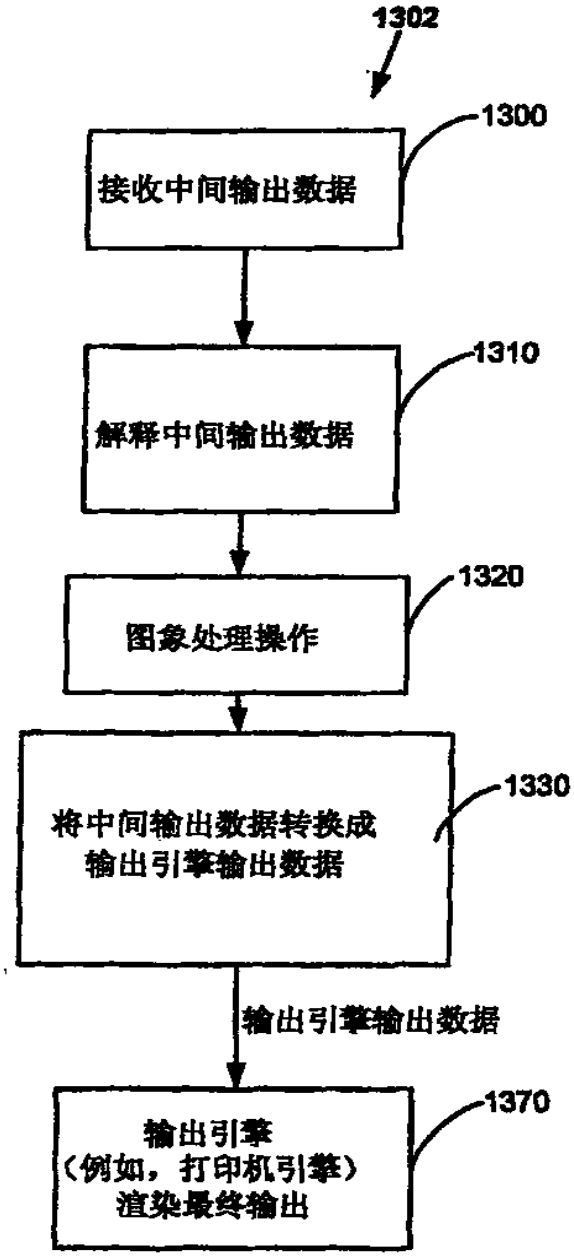


图 13A

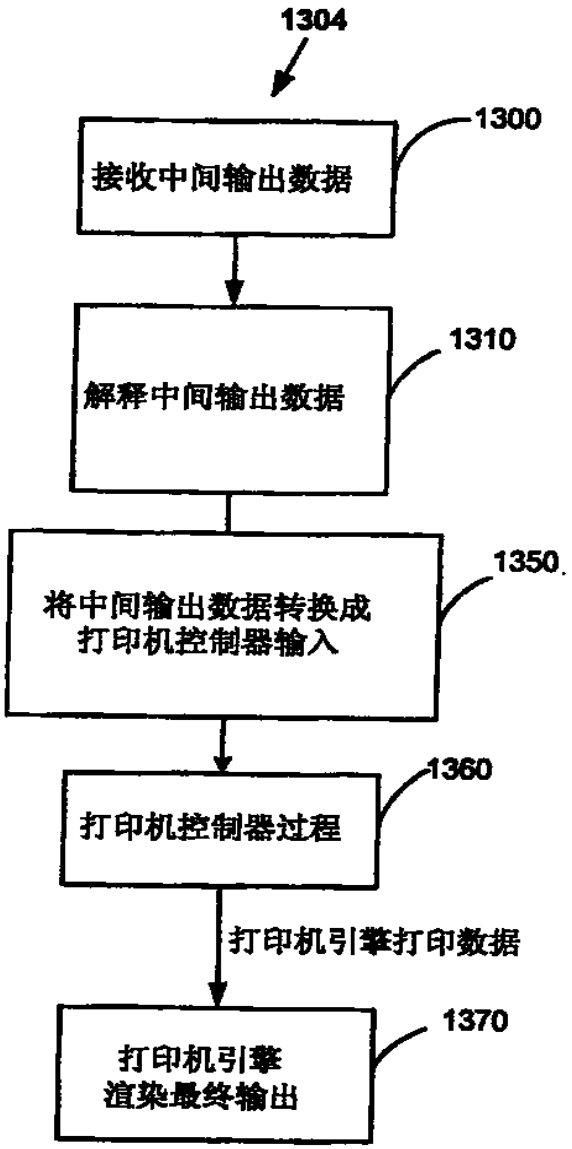


图 13B

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(72) Inventors; and

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(81) Designated States *(national)*: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

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Published:
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WO 02/084928 A2

(54) Title: SYSTEM FOR UNIVERSAL DATA OUTPUT

(57) Abstract: An information apparatus that is on a local area rasterizes a digital document on the information apparatus to generate image data and creates an intermediate output data from the image data. The intermediate output data is transmitted to an output device that is on the local area network and includes an output engine that outputs images with a device-specific output size and resolution. The image data is recovered from the intermediate output data and is converted to instructions compatible with the output engine, based at least in part on the device-specific output size and resolution of the output engine. The method further includes providing the instructions to the output engine and operating the output engine in response to the instructions and thereby outputting an image of the digital document.

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SYSTEM FOR UNIVERSAL DATA OUTPUT

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims benefit of Provisional Application No. 60/262,764 filed January 19, 2001, the entire disclosure of which is hereby incorporated by reference herein for all purposes.

TECHNICAL FIELD OF THE INVENTION

[0002] Present invention relates to providing content to an output device and, in particular, to providing universal output in which an information apparatus can pervasively output content to an output device without the need to install a dedicated device dependent driver or applications for each output device.

BACKGROUND OF THE INVENTION

[0003] The present invention relates to universal data output and, in particular, to providing a new data output method and a new raster image process for information apparatuses and output devices.

[0004] As described herein, information apparatuses refer generally to computing devices, which include both stationary computers and mobile computing devices (pervasive devices). Examples of such information apparatuses include, without limitation, desktop computers, laptop computers, networked computers, palmtop computers (hand-held computers), personal digital assistants (PDAs), Internet enabled mobile phones, smart phones, pagers, digital capturing devices (e.g., digital cameras and video cameras), Internet appliances, e-books, information pads, and digital or web pads. Output devices may include, without limitation, fax machines, printers, copiers, image and/or video display devices (e.g., televisions, monitors and projectors), and audio output devices.

[0005] For simplicity and convenience, hereafter, the following descriptions may refer to an output device as a printer and an output process as printing. However, it should be understood that the term printer and printing used in the discussion of present invention refer to one embodiment used as a specific example to simplify the description of the invention. The references to printer and printing used here are intended to be applied or extended to the larger scope and definition of output devices and

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should not be construed as restricting the scope and practice of present invention.

[0006] Fueled by an ever-increasing bandwidth, processing power, wireless mobile devices, and wireless software applications, millions of users are or will be creating, downloading, and transmitting content and information using their pervasive or mobile computing devices. As a result, there is a need to allow users to conveniently output content and information from their pervasive computing devices to any output device. As an example, people need to directly and conveniently output from their pervasive information apparatus, without depending on synchronizing with a stationary computer (e.g., desktop personal computer) for printing.

[0007] To illustrate, a mobile worker at an airport receiving e-mail in his hand-held computer may want to walk up to a nearby printer or fax machine to have his e-mail printed. In addition, the mobile worker may also want to print a copy of his to-do list, appointment book, business card, and his flight schedule from his mobile device. As another example, a user visiting an e-commerce site using his mobile device may want to print out transaction confirmation. In still another example, a user who takes a picture with a digital camera may want to easily print it out to a nearby printer. In any of the above cases, the mobile user may want to simply walk up to a printer and conveniently print a file (word processing document, PDF, HTML etc) that is stored on the mobile device or downloaded from a network (e.g., Internet, corporate network).

[0008] Conventionally, an output device (e.g., a printer) is connected to an information apparatus via a wired connection such as a cable line. A wireless connection is also possible by using, for example, radio communication or infrared communication. Regardless of wired or wireless connection, a user must first install in the information apparatus an output device driver (e.g., printer driver in the case the output device is a printer) corresponding to a particular output device model and make. Using a device-dependent or specific driver, the information apparatus may process output content or digital document into a specific output device's input requirements (e.g., printer input requirements). The output device's input requirements correspond to the type of input that the output device (e.g., a printer) understands. For example, a printer's input requirement may include printer specific input format (e.g., one or more of an image,

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graphics or text format or language). Therefore, an output data (or print data in the case the output device is a printer) herein refers to data that is acceptable for input to an associated output device. Examples of input requirements may include, without limitation, audio format, video format, file format, data format, encoding, language (e.g., page description language, markup language etc), instructions, protocols or data that can be understood or used by a particular output device make and model.

[0009] Input requirements may be based on proprietary or published standards or a combination of the two. An output device's input requirements are, therefore, in general, device dependent. Different output device models may have their own input requirements specified, designed or adopted by the output device manufacturer (e.g., the printer manufacturer) according to a specification for optimal operation. Consequently, different output devices usually require use of specific output device drivers (e.g., printer drivers) for accurate output (e.g., printing). Sometimes, instead of using a device driver (e.g., printer driver), the device driving feature may be included as part of an application software.

[0010] Installation of a device driver (e.g., printer driver) or application may be accomplished by, for example, manual installation using a CD or floppy disk supplied by the printer manufacturer. Or alternatively, a user may be able to download a particular driver or application from a network. For a home or office user, this installation process may take anywhere from several minutes to several hours depending on the type of driver and user's sophistication level with computing devices and networks. Even with plug-and-play driver installation, the user is still required to execute a multi-step process for each printer or output device.

[0011] This installation and configuration process adds a degree of complexity and work to end-users who may otherwise spend their time doing other productive or enjoyable work. Moreover, many unsophisticated users may be discouraged from adding new peripherals (e.g., printers, scanners, etc.) to their home computers or networks to avoid the inconvenience of installation and configuration. It is therefore desirable that an information apparatus can output to more than one output device without the inconvenience of installing multiple dedicated device dependent drivers.

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[0012] In addition, conventional output or printing methods may pose significantly higher challenges and difficulties for mobile device users than for home and office users. The requirement for pre-installation of a device-dependent driver diminishes the benefit and concept of mobile (pervasive) computing and output. For example, a mobile user may want to print or output e-mail, PowerPoint® presentation documents, web pages, or other documents at an airport, gas station, convenience store, kiosk, hotel, conference room, office, home, etc. It is highly unlikely that the user would find at any of these locations a printer of the same make and model as is at the user's base station. As a consequence, under the conventional printing method, the user would have to install and configure a printer driver each time at each such remote location before printing. It is usually not a viable option given the hundreds, or even thousands of printer models in use, and the limited storage, memory space, and processing power of the information apparatus.

[0013] Moreover, the user may not want to be bothered with looking for a driver or downloading it and installing it just to print out or display one page of email at the airport. This is certainly an undesirable and discouraging process to promote pervasive or mobile computing. Therefore, a more convenient printing method is needed in support of the pervasive computing paradigm where a user can simply walk up to an output device (e.g., printer or display device) and easily output a digital document without having to install or pre-install a particular output device driver (e.g., printer driver).

[0014] Another challenge for mobile users is that many mobile information apparatuses have limited memory space, processing capacity and power. These limitations are more apparent for small and low-cost mobile devices including, for example, PDAs, mobile phones, screen phones, pagers, e-books, Internet Pads, Internet appliances etc. Limited memory space poses difficulties in installing and running large or complex printer or device drivers, not to mention multiple drivers for a variety of printers and output devices. Slow processing speed and limited power supply create difficulties driving an output device. For example, processing or converting a digital document into output data by a small mobile information apparatus may be so slow that it is not suitable for productive output. Intensive processing may also drain or consume power or battery resources. Therefore, a method is needed so that a small mobile device, with limited processing

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capabilities, can still reasonably output content to various output devices.

[0015] To output or render content (e.g. digital document) to an output device, a raster image processing (RIP) operation on the content is usually required. RIP operation can be computationally intensive and may include (1) a rasterization operation, (2) a color space conversion, and (3) a halftoning operation. RIP may also include other operations such as scaling, segmentation, color matching, color correction, GCR (Grey component replacement), Black generation, image enhancement compression/decompression, encoding/decoding, encryption/decryption GCR, image enhancement among others.

[0016] Rasterization operation in RIP involves converting objects and descriptions (e.g. graphics, text etc) included in the content into an image form suitable for output. Rasterization may include additional operations such as scaling and interpolation operations for matching a specific output size and resolution. Color space conversion in RIP includes converting an input color space description into a suitable color space required for rendering at an output device (e.g. RGB to CMYK conversion). Digital halftoning is an imaging technique for rendering continuous tone images using fewer luminance and chrominance levels. Halftoning operations such as error diffusion can be computationally intensive and are included when the output device's bit depth (e.g. bits per pixel) is smaller than the input raster image bit depth.

[0017] Conventionally, RIP operations are included either in an information apparatus, or as part of an output device or output system (e.g. in a printer controller). Fig. 1A illustrates a flow diagram of a conventional data output method 102 in which RIP 110 is implemented in the information apparatus. Output devices that do not include a printer controller to perform complex RIP operations, such as a lower-cost, lower speed inkjet printer, normally employ data output method 102. In data output method 102, an information apparatus obtains content (e.g. a digital document) in step 100 for rendering or output at an output device. The information apparatus may includes an application (e.g. device driver), which implements RIP operation 110. The information apparatus generates an output data in step 120 and transmits the output data to the output device in step 130 for rendering. The output data relating to the content is in an acceptable form (e.g. in an appropriate output size and resolution) to the output engine (e.g. display engine, printer

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engine etc.) included in the output device. The output data in a conventional output method 102 is usually device dependent.

[0018] One drawback for the data output method 102 of Fig. 1A is that the information apparatus performs most if not the entire raster image processing operations 110 required for output. The RIP operations may require intensive computation. Many information apparatus such as mobile information device might have insufficient computing power and/or memory to carry out at an acceptable speed the RIP operations 110 required in an output process.

[0019] Another drawback for the conventional data output method 102 of Fig. 1A is that the generated output data is device dependent and therefore is typically not very portable to other output devices. As a result, the information apparatus may need to install multiple applications or device drivers for multiple output devices, which may further complicate its feasibility for use in information apparatuses with limited memory, storage and processing power.

[0020] Fig. 1B illustrates a flow diagram of another conventional data output method 104 in which the RIP is implemented in an output device. An example of an output device that implements process 104 is a high-speed laser printer which includes a printer controller for performing RIP operations and an output engine (e.g. printer engine) for rendering content. Printer controller may be internally installed or externally connected to an output device (printer in this example). In data output method 104, an information apparatus obtains content for output in step 100 and generates in step 160 an output data or print data for transmitting to the output device in step 170. Print data includes information related to the content and is usually encoded in a page description language (PDL) such as PostScript and PCL etc. In step 180, the printer receives the output data or print data (in a PDL). In step 190, a printer controller included in the printer interprets the PDL, performs RIP operations, and generates a printer-engine print data that is in a form acceptable to the printer engine (e.g. a raster image in an appropriate output size, bit depth, color space and resolution). In step 150 the printer engine renders the content with the printer-engine print data.

[0021] It will be understood that a reference to print data or output data including a language, such as PDL, should be interpreted as meaning that the print data or output data is encoded using that language. Correspondingly, a reference to a data output process generating a language, such as PDL, should be

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interpreted as meaning that the data output process encodes data using that language.

[0022] There are many drawbacks in the conventional data output method 104 shown in Fig 1B. These drawbacks are especially apparent for mobile computing devices with limited processing power and memory. One such drawback is that the output data or print data, which include a page description language (PDL) such as PostScript or PCL, can be very complex. Generating complex PDL may increase memory and processing requirements for an information apparatus. Furthermore, interpreting, decoding and then raster image processing complex PDL can increase computation, decrease printing speed, and increase the cost of the output device or its printer controller.

[0023] Another drawback is that the output data that includes PDL can creates a very large file size that would increase memory and storage requirements for the information apparatus, the output device and/or the printer controller etc. Large file size may also increase the bandwidth required in the communication link between the information apparatus and the output device.

[0024] Finally, to rasterize text in an output device, a printer controller may need to include multiple fonts. When a special font or international characters is not included or missing in the printer controller, the rendering or output can potentially become inaccurate or inconsistent.

SUMMARY OF THE INVENTION

[0025] Accordingly, this invention provides a convenient universal data output method in which an information apparatus and an output device or system share the raster image processing operations. Moreover, the new data output method eliminates the need to install a plurality of device-dependent dedicated drivers or applications in the information apparatus in order to output to a plurality of output devices.

[0026] In accordance with present invention, an electronic system and method of pervasive and universal output allow an information apparatus to output content conveniently to virtually any output device. The information apparatus may be equipped with a central processing unit, input/output control unit, storage unit, memory unit, and wired or wireless communication unit or adapters. The information apparatus preferably includes a client application that may be implemented as a software application, a helper application, or a device driver (a printer driver in case of a

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printer). The client application may include management and control capabilities with hardware and software components including, for example, one or more communication chipsets residing in its host information apparatus.

[0027] The client application in the information apparatus may be capable of communicating with, managing and synchronizing data or software components with an output device equipped with an output controller of present invention.

[0028] Rendering content in an output device refers to printing an image of the content onto an substrate in the case of a printing device; displaying an image of the content in the case of a displaying device; playing an audio representation of the content in a voice or sound output device or system.

[0029] An output controller may be a circuit board, card or software components residing in an output device. Alternatively, the output controller may be connected externally to an output device as an external component or "box." The output controller may be implemented with one or more combinations of embedded processor, software, firmware, ASIC, DSP, FPGA, system on a chip, special chipsets, among others. In another embodiment, the functionality of the output controller may be provided by application software running on a PC, workstation or server connected externally to an output device.

[0030] In conventional data output method 102 as described with reference to Fig. 1A, an information apparatus transmits output data to an output device for rendering. Output data corresponds to content intended for output and is mostly raster image processed (RIPed) and therefore is device dependent because raster image processing is a typical device dependent operation. Output data may be encoded or compressed with one or more compression or encoding techniques. In present invention, an information apparatus generates an intermediate output data for transmitting to an output device. The intermediate output data includes a rasterized image corresponding to the content; however, device dependent image processing operations of a RIP (e.g. color matching and halftoning) have not been performed. As a result, an intermediate output data is more device independent and is more portable than the output data generated by output method with reference to Fig 1A.

[0031] In one implementation of this invention, the intermediate output data includes MRC (Mixed raster content) format, encoding and compression techniques, which further provides

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improved image quality and compression ratio compared to conventional image encoding and compression techniques.

[0032] In an example of raster image process and data output method of the present invention, a client application such as a printer driver is included in an information apparatus and performs part of raster image processing operation such as rasterization on the content. The information apparatus generates an intermediate output data that includes an output image corresponding to the content and sends the intermediate output data to an output device or an output system for rendering. An output controller application or component included in the output device or output system implements the remaining part of the raster image processing operations such as digital halftoning, color correction among others.

[0033] Like conventional raster image processing methods, this invention provides a more balanced distribution of the raster image processing computational load between the Information apparatus and the output device or the output system. Computational intensive image processing operations such as digital halftoning and color space conversions can be implemented in the output device or output system. Consequently, this new raster image processing method reduces the processing and memory requirements for the information apparatus when compared to conventional data output methods described with reference to Fig 1A in which the entire raster image process is implemented in the information apparatus. Additionally, in this invention, a client application or device driver included in the information apparatus, which performs part of the raster image processing operation, can have a smaller size compared to a conventional output application included in the information apparatus, which performs raster image processing operation.

[0034] In another implementation, the present invention provides an information apparatus with output capability that is more universally accepted by a plurality of output devices. The information apparatus, which includes a client application, generates an intermediate output data that may include device independent attributes. An output controller includes components to interpret and process the intermediate output data. The information apparatus can output content to different output devices or output systems that include the output controller even when those output devices are of different brand, make, model and with different output engine and input data requirements. Unlike conventional output methods, a user does not need to preinstall in

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the information apparatus multiple dedicated device dependent drivers or applications for each output device.

[0035] The combination of a smaller-sized client application, a reduced computational requirement in the information apparatus, and a more universal data output method acceptable for rendering at a plurality of output devices enable mobile devices with less memory space and processing capabilities to implement data output functions which otherwise would be difficulty to implement with conventional output methods.

[0036] In addition, this invention can reduce the cost of an output device or an output system compared to conventional output methods 104 that include a page description language (PDL) printer controller. In the present invention, an information apparatus generates and sends an intermediate output data to an output device or system. The intermediate output data in one preferred embodiment includes a rasterized output image corresponding to the content intended for output. An output controller included in an output device or an output system decodes and processes the intermediate output data for output, without performing complex interpretation and rasterization compared to conventional methods described in process 104. In comparison, the conventional data output process 104 generates complex PDL and sends this PDL from an information apparatus to an output device that includes a printer controller (e.g. a PostScript controller or a PCL5 controller among others). Interpretation and raster image processing of a PDL have much higher computational requirements compared to decoding and processing the intermediate output data of this invention that include rasterized output image or images. Implementing a conventional printer controller with, for example, PDL increases component cost (e.g. memories, storages, ICs, software and processors etc.) when compared to using the output controller included in the data output method of this present invention.

[0037] Furthermore, an output data that includes PDL can create a large file size compared to an intermediate output data that includes rasterized output image. The data output method for this invention comparatively transmits a smaller output data from an information apparatus to an output device. Smaller output data size can speed up transmission, lower communication bandwidth, and reduce memory requirements. Finally, this invention can provide a convenient method to render content at an output device with or without connection to a static network. In conventional network printing, both information apparatus and output device must be

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connected to a static network. In this invention, through local communication and synchronization between an information apparatus and an output device, installation of hardware and software to maintain static network connectivity may not be necessary to enable the rendering of content to an output device.

[0038] According to the several aspects of the present invention there is provided the subject matter defined in the appended independent claims.

[0039] Additional objects and advantages of the present invention will be apparent from the detailed description of the preferred embodiment thereof, which proceeds with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0040] Fig. 1A is a flow diagram of a conventional data output method and its corresponding raster image process in accordance with prior art.

[0041] Fig. 1B is a flow diagram of a second conventional data output method and its corresponding raster image process for an output device that includes a conventional printer controller in accordance with prior art.

[0042] Figs. 2A and 2B are block diagrams illustrating components of an operating environment that can implement the process and apparatus of the present invention.

[0043] Fig. 3A is a schematic block diagram illustrating hardware/software components of an information apparatus implementation in accordance with present invention. The information apparatus includes an operating system.

[0044] Fig. 3A is a second schematic block diagram illustrating hardware/software components of an information apparatus implementation in accordance with present invention.

[0045] Fig. 4A is a block diagram of a conventional printing system or printer with a conventional printer controller.

[0046] Fig. 4B is a block diagram of a second conventional output system or output device.

[0047] Fig. 5A is a schematic block diagram of a printing system or printer with a conventional printer controller and an output controller in accordance with present invention.

[0048] Fig. 5B is a schematic block diagram of a second output system or output device that includes an output controller in accordance with present invention.

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[0049] Fig. 6A is a schematic block diagram illustrating hardware/software components of an output controller in accordance with present invention. The output controller includes an operating system.

[0050] Fig. 6B is a second schematic block diagram illustrating hardware/software components of an output controller in accordance with present invention. The output controller does not include an operating system.

[0051] Fig. 6C is a third schematic block diagram illustrating hardware/software components of an output controller in accordance with present invention. The output controller combines the functionality of a printer controller and an output controller of present invention.

[0052] Figs. 7A-7F illustrate various configurations and implementations of output controller with respect to an output device such as a printer.

[0053] Fig. 8A is a block diagram illustrating an exemplary implementation of hardware/software components of wireless communication unit.

[0054] Fig. 8B is block diagram illustrating a second exemplary implementation of hardware/software components of wireless communication unit.

[0055] Fig. 9 is a flow diagram of a universal data output method and its corresponding raster imaging process of the present invention.

[0056] Fig. 10 is a block diagram of a universal data output method of the present invention with respect to the components, system and apparatus described with reference to Fig 2.

[0057] Fig. 11 is a flow diagram illustrating one way of implementing a discovery process optionally included in the output process of Fig. 10.

[0058] Fig. 12A and 12B are flow diagrams of exemplary client application process included in the output process of Fig. 10.

[0059] Fig. 13A and 13B are flow diagrams of exemplary output device or output system process included in the output process of Fig. 10.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0060] Sets forth below are definitions of terms that are used in describing implementations of the present invention. These definitions are provided to facilitate understanding and illustration of implementations of the present invention and should

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in no way be construed as limiting the scope of the invention to a particular example, class, or category.

Output device profile (or object)

[0061] An output device profile (or object) includes software and data entity, which encapsulates within itself both data and attributes describing an output device and instructions for operating that data and attributes. An output device profile may reside in different hardware environments or platforms or applications, and may be transported in the form of a file, a message, a software object or component among other forms and techniques. For simplicity of discussion, a profile or object may also include, for example, the concept of software components that may have varying granularity and can consist of one class, a composite of classes, or an entire application.

[0062] The term profile or object used herein is not limited to software or data as its media. Any entity containing information, descriptions, attributes, data, instructions etc. in any computer-readable form or medium such as hardware, software, files based on or including voice, text, graphics, image, or video information, electronic signals in analog or digital form, etc., are all valid forms of profile and object definition.

[0063] A profile or object may also contain in one of its fields or attributes a reference or pointer to another profile or object, or a reference or pointer to data and or content. A reference to a profile or object may include one or more, or a combination of pointers, identifiers, names, paths, addresses or any descriptions relating to a location where an object, profile, data, or content can be found.

[0064] An output device profile may contain one or more attributes that may identify and describe, for example, the capabilities and functionalities of a particular output device such as a printer. An output device profile may be stored in the memory component of an output device, an information apparatus or in a network node. A network node includes any device, server or storage location that is connected to the network. As described below in greater detail, an information apparatus requesting output service may communicate with an output device. During such local service negotiation, at least a partial output device profile may be uploaded to the information apparatus from the output device. By obtaining the output device profile (or printer profile in the case of a printer), the information apparatus may learn about the

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capability, compatibility, identification, and service provided by the output device.

[0065] As an example, an output device profile may contain one or more of the following fields and or attribute descriptions. Each of following fields may be optional, and furthermore, each of the following fields or attributes may or may not exist in a particular implementation (e.g., may be empty or NULL):

[0066] Identification of an output device (e.g., brand, model, registration, IP address etc.)

- Services and feature sets provided by an output device (e.g., color or grayscale output, laser or inkjet, duplex, output quality, price per page, quality of service, etc.)
- Type of input languages, formats, output data and/or input requirements (e.g., PostScript, PCL, XML, RTL, etc.) supported by an output device.
- Device specific or dependent parameters and information (e.g., communication protocols, color space, color management methods and rendering intents, resolution, halftoning methods, dpi (dots-per-inch), bit depth, page size, printing speed, number of independent colors channels or ink etc.)
- Data and tables needed for image processing such as color table, halftone table, scale factor, encoding/decoding parameters and methods, compression and decompression parameters and method etc.
- Another profile which contain parameters and information about the output device and its service (e.g. color profiles, halftoning profiles, communication profiles, rasterization profiles, quality of service etc.).
- Payment information on a plurality of services provided by an output device.
- Information or security requirements and type of authentication an output device supports.
- Date and version of the output device profile, history of its modification and updates.
- Software components containing algorithms or instructions or data, which may be uploaded to run in an information apparatus. For example, a graphical user interface (GUI) software component may be uploaded to an information apparatus. The software component may be incorporated into or launched in the information apparatus by a client application of present invention to capture a user's preferences (e.g., print quality, page layout, number of copies, number of cards per page, etc.). In another example,

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software components may include methods, instructions or executables for compression/decompression, encoding/decoding, color matching or correction, segmentation, scaling, halftoning, encryption/decryption among others.

• Pointer or reference to one or more output device parameters, including one or more of the above described output device profile or object fields and or attribute descriptions. For example, a more up-to-date or original version of output device parameters may sometimes be stored in a network node (any device, server or storage location that is connected to the network), or within the information apparatus where it can be obtained by the client application. An output device profile may include pointer or pointers to these output device parameters.

Content (or data content, digital content, output content)

[0067] Content (or data content, digital content, output content) is the data intended for output, which may include texts, graphics, images, forms, videos, audio among other content types. Content may include the data itself or a reference to that data. Content may be in any format, language, encoding or combination, and it can be in a format, language or encoding that is partially or totally proprietary. A digital document is an example of content that may include attributes and fields that describe the digital document itself and or reference or references to the digital document or documents. Examples of a digital document may be any one or combination of file types: HTML, VHTML, PostScript, PCL, XML, PDF, MS Word, PowerPoint, JPEG, MPEG, GIF, PNG, WML, VWML, CHTML, HDML, ASCII, 2-byte international coded characters, etc. Content may be used interchangeably with the term data content, output content or digital content in the descriptions of present invention.

Intermediate output data

[0068] Output data (or print data in case of a printer) is the electronic data sent from an information apparatus to an output device. Output data is related to the content intended for output and may be encoded in a variety of formats and languages (e.g. postscript, PCL, XML), which may include compressed or encrypted data. Some output device manufacturers may also include in the output data (or print data) a combination of proprietary or non-proprietary languages, formats, encoding, compression, encryption etc.

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[0069] Intermediate output data is the output data of the present invention, and it includes the broader definition of an output file or data generated by an information apparatus, or a client application or device driver included in the information apparatus. An intermediate output data may contain text, vector graphics, images, video, audio, symbols, forms or combination and can be encoded with one or more of a page description language, a markup language, a graphics format, an imaging format, a metafile among others. An intermediate output data may also contain instructions (e.g. output preferences) and descriptions (e.g. data layout) among others. Part or all of an intermediate output data may be compressed, encrypted or tagged.

[0070] In a preferred embodiment of this invention, intermediate output data contains rasterized image data. For example, vector graphics and text information or objects that are not in image form included in content can be rasterized or conformed into image data in an information apparatus and included in an intermediate output data. Device dependent image processing operations of a RIP such as digital halftoning and color space conversions can be implemented at an output device or an output system.

[0071] The intermediate output data can be device dependent or device independent. In one implementation, the rasterized output image is device dependent if the rasterization parameters used, such as resolution, scale factor, bit depth, output size and or color space are device dependent. In another implementation of this invention, the rasterized image may be device independent if the rasterization parameters used are device independent. Rasterization parameter can become device independent when those parameters include a set of predetermined or predefined rasterization parameters based on a standard or a specification. With predefined or device independent rasterization parameters, a client application of present invention can rasterize at least a portion of the content and generate a device independent image or images included in the intermediate output data. By doing so, the intermediate output data may become device independent and therefore, become universally acceptable with output devices that have been pre-configured to accept the intermediate output data.

[0072] One advantage of rasterizing or converting text and graphics information into image data at the information apparatus is that the output device or printer controller no longer needs to perform complex rasterization operation nor do they need to include

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multiple fonts. Therefore, employing the intermediate output data and the data output method described herein could potentially reduce the cost and complexity of an output controller, printer controller and or output device.

[0073] One form of image data encoding is known as mixed raster content, or MRC. Typically, an image stored in MRC includes more than one image or bitmap layers. In MRC, an image can be segmented in different layers based on segmentation criteria such as background and foreground, luminance and chrominance among others. For example, an MRC may include three layers with a background layer, a foreground layer and a toggle or selector layer. The three layers are coextensive and may include different resolution, encoding and compression. The foreground and background layers may each contain additional layers, depending on the manner in which the respective part of the image is segmented based on the segmentation criteria, component or channels of a color model, image encoding representation (HLS, RGB, CMYK, YCC, LAB etc) among others. The toggle layer may designate, for each point, whether the foreground or background layer is effective. Each layer in a MRC can have different bit depths, resolution, color space, which allow, for example, the foreground layer to be compressed differently from the background layer. The MRC form of image data has previously been used to minimize storage requirements. Further, an MRC format has been proposed for use in color image fax transmission.

[0074] In one embodiment of present invention, the intermediate output data includes one or more rasterized output images that employ MRC format, encoding and or related compression method. In this implementation, different layers in the output image can have different resolutions and may include different compression techniques. Different information such as chrominance and luminance and or foreground and background information in the original content (e.g. digital document) can be segmented and compressed with different compression or encoding techniques. Segmented elements or object information in the original content can also be stored in different image layers and with different resolution. Therefore, with MRC, there is opportunity to reduce output data file size, retain greater image information, increase compression ratio, and improve image quality when compared to other conventional image encoding and compression techniques. Implementations of rasterization, raster image processing and

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intermediate output data that include MRC encoding in the present invention are described in more detail below.

Rasterization

[0075] Rasterization is an operation by which graphics and text in a digital document are converted to image data. For image data included in the digital document, rasterization may include scaling and interpolation. The rasterization operation is characterized by rasterization parameters including, among others bit depth and resolution. A given rasterization operation may be characterized by several more rasterization parameters, including output size, color space, color channels etc. Values of one or more of the rasterization parameters employed in a rasterization operation may be specified by default; values of one or more of the rasterization parameters may be supplied to the information apparatus as components of a rasterization vector. In a given application, the rasterization vector may specify a value of only one rasterization parameter, default values being employed for other rasterization parameters used in the rasterization operation. In another application the rasterization vector may specify values of more than one, but less than all, rasterization parameters, default values being employed for at least one other rasterization parameter used in the rasterization operation. And in yet another application the rasterization vector may specify values of all the rasterization parameters used in the rasterization operation.

[0076] Fig. 2A and 2B are block diagrams illustrating components of an operating environment that can implement the process and apparatus of present invention. Fig 2A shows an electronic system which includes an information apparatus 200 and an output device 220. The output device 220 includes an output controller 230. Fig. 2B illustrates a second implementation of an electronic system that includes an information apparatus 200 and an output system 250. The output system 250 includes an output device 220 and an output controller 230 which may be externally connected to, or otherwise associated with, the output device 220 in the output system 250.

[0077] Information apparatus 200 is a computing device with processing capability. In one embodiment, information apparatus 200 may be a mobile computing device such as palmtop computer, handheld device, laptop computer, personal digital assistant (PDA), smart phone, screen phone, e-book, Internet pad, communication pad, Internet appliance, pager, digital camera, etc. It is possible

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that information apparatus 200 may also include a static computing device such as a desktop computer, workstation, server, etc.

[0078] Fig. 3A and 3B are block diagrams illustrating examples of hardware/software components included in an information apparatus 200 of present invention.

[0079] Information apparatus 200 may contain components such as a processing unit 380, a memory unit 370, an optional storage unit 360 and an input/output control unit (e.g. communication manager 330). Information apparatus 200 may include an interface (not shown) for interaction with users. The interface may be implemented with software or hardware or a combination. Examples of such interfaces include, without limitation, one or more of a mouse, a keyboard, a touch-sensitive or non-touch-sensitive screen, push buttons, soft keys, a stylus, a speaker, a microphone, etc.

[0080] Information apparatus 200 typically contains one or more network communication unit 350 that interfaces with other electronic devices such as network node (not shown), output device 220, and output system 230. The network communication unit may be implemented with hardware (e.g., silicon chipsets, antenna), software (e.g., protocol stacks, applications) or a combination.

[0081] In one embodiment of the present invention, communication interface 240 between information apparatus 200 and output device 220 or output system 250 is a wireless communication interface such as a short-range radio interface including those implemented according to the Bluetooth or IEEE 802.11 standard. The communication interface may also be realized by other standards and/or means of wireless communication that may include radio, infrared, cellular, ultrasonic, hydrophonic among others for accessing one or more network node and/or devices. Wired line connections such as serial or parallel interface, USB interface and fire wire (IEEE 1394) interface, among others, may also be included. Connection to a local network such as an Ethernet or a token Ring network, among others, may also be implemented in the present invention for local communication between information apparatus 200 and output device 220. Examples of hardware/software components of communication units 350 that may be used to implement wireless interface between the information apparatus 200 and the output device 220 are described in more detail with reference to Figs. 8A and 8B below.

[0082] For simplicity, Fig. 3 illustrates one implementation where an information apparatus 200 includes one communication unit 350. However, it should be noted that an information apparatus 200

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may contain more than one communication unit 350 in order to support different interfaces, protocols, and/or communication standards with different devices and/or network nodes. For example, information apparatus 200 may communicate with one output device 220 through a Bluetooth standard interface or through an IEEE 802.11 standard interface while communicating with another output device 220 through a parallel cable interface. The information apparatus 200 may also be coupled to a wired or wireless network (e.g. the Internet or corporate network) to send, receive and/or download information.

[0083] Information apparatus 200 may be a dedicated device (e.g., email terminal, web terminal, digital camera, e-book, web pads, Internet appliances etc.) with functionalities that are pre-configured by manufacturers. Alternatively, information apparatus 200 may allow users to install additional hardware components and or application software 205 to expand its functionality.

[0084] Information apparatus 200 may contain a plurality of applications 205 to implement its feature sets and functionalities. As an example, a document browsing or editing application may be implemented to help user view and perhaps edit, partially or entirely, digital documents written in certain format or language (e.g., page description language, markup language, etc.). Digital documents may be stored locally in the information apparatus 200 or in a network node (e.g., in content server). An example of a document browsing application is an Internet browser such as Internet Explorer, Netscape Navigator, or a WAP browser. Such browsers may retrieve and display content (e.g. digital content) written in mark-up languages such as HTML, WML, XML, CHTML, HDML, among others. Other examples of software applications in the information apparatus 200 may include a document editing software such as Microsoft Word™ which also allows users to view and or edit digital documents that have various file extensions (e.g., doc, rtf, html, XML etc.) whether stored locally in the information apparatus 200 or in a network node. Still, other example of software applications 205 may include image acquisition and editing software.

[0085] As illustrated previously with reference to Fig. 1, there are many difficulties in providing output capability to an information apparatus 200 that has limited memory and processing capability. To address theses difficulties, information apparatus 200 includes a client application 210 that helps provide the universal data output capability of the present invention. Client

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application 210 may include software and data that can be executed by the processing unit 380 of information apparatus 200. Client application 210 may be implemented as a stand-alone software application or as a part of or feature of another software application, or in the form of a device driver, which may be invoked, shared and used by other application software 205 in the information apparatus 200. Client application 210 may also include components to invoke other applications 205 (e.g., a document browsing application, editing application, data and/or image acquisition application, a communication manager, a output manager etc.) to provide certain feature sets, as described below. Fig 3 illustrates a configuration where the client application 210 is a separate application from the other application 205 such as the case when the client application is a device driver; however, it should be noted that the client application 210 can be combined or being part of the other application not shown in Fig 3. Client application 210 may be variously implemented in an information apparatus 200 and may run on different operating systems or platforms. The client application 210 may also run in an environment with no operating system. For example, Fig. 3A illustrates an implementation where the information apparatus 200A includes an operating system 340A; while Fig. 3B illustrates an implementation where the information apparatus 200B does not include an operating system.

[0086] Client application 210 includes a rasterization component 310 to conform content into one or more raster output images according to one or more rasterization parameters; an intermediate output data generator component 320 that generates and/or encodes intermediate output data that includes the one or more output images; and a communications manager 330 that manages the communication and interaction with an output device 220 or system 250 or output controller 230. Communications manager can be implemented as part of the client application 210 (shown in Fig. 3) or as a separate application (not shown). Components in a client application can be implemented in software, hardware or combination. As an example, client application 210 may include or utilize one or more of the following:

- Components or operations to obtain content (e.g. digital document) for output. The client application 210 may obtain a digital document from other applications 205 (e.g. document browsing application, content creation and editing application,

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etc.), or the client application 210 may provide its own capability for user to browse, edit and or select a digital document.

• Components or operations to rasterize content that includes text, graphics and images among others objects or elements into one or more raster images according to a set of rasterization parameters such as scale factor, output size, bit depth, color space and resolution. The rasterization parameters may be obtained in various ways, for example, from an output device profile uploaded from an output device 220, or stored locally in information apparatus 200, or manually inputted by a user. Alternatively, rasterization parameters may be based on a predefined standard or specification stored in the information apparatus 200 as a set of defaults, or hard-coded in the client application 210, or calculated by the client application 210 after communicating with an output device 220, output controller 230, and/or a user.

• Components or operations to generate intermediate output data that includes at least one rasterized output image corresponding to the content (e.g. digital document). This process may further include one or combination of compression, encoding, encryption and color correction among others. The intermediate output data may include, for example, images, instructions, documents and or format descriptions, color profiles among others.

• Components or operations to transmit the intermediate output data to an output device 220 or system 250 through wired or wireless communication link 240.

[0087] The client application 210 may also optionally include or utilize one or more of the following components or operations:

• Components or operations to communicate with one or more output devices 220 to upload an output device profile.

• Components or operations to communicate directly or indirectly (such as through an operating system or component or object model, messages, file transfer etc.) with other applications 205 residing in the same information apparatus 200 to obtain objects, data, and or content needed, or related to the pervasive output process of present invention (e.g. obtain a digital document for printing).

• Components or operations to manage and utilize directly or indirectly functionalities provided by hardware components (e.g. communication unit 350) residing in its host information apparatus 200.

• Components or operations to provide a graphical user

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interface (GUI) in host information apparatus to interact with user.

• Components or operations to obtain user preferences. For example, a user may directly input his or her preferences through a GUI. A set of default values may also be employed. Default values may be pre-set or may be obtained by information apparatus 200 as result of communicating and negotiating with an output device 220 or output controller 230.

[0088] The above functionalities and process of client application 210 of present invention are described in further detail in the client application process with reference to FIG 12.

[0089] Output device 220 is an electronic system capable of outputting digital content regardless of whether the output medium is substrate (e.g., paper), display, projection, or sound. A typical example of output device 220 is a printer, which outputs digital documents containing text, graphics, image or any combination onto a substrate. Output device 220 may also be a display device capable of displaying still images or video, such as, without limitation, televisions, monitors, and projectors. Output device 220 can also be a device capable of outputting sound. Any device capable of playing or reading digital content in audio (e.g., music) or data (e.g., text or document) formats is also a possible output device 220.

[0090] A printer is frequently referred to herein as an example of an output device to simplify discussion or as the primary output device 220 in a particular implementation. However, it should be recognized that present invention applies also to other output devices 220 such as fax machines, digital copiers, display screens, monitors, televisions, projectors, voice output devices, among others.

[0091] Rendering content with an output device 220 refers to outputting the content on a specific output medium (e.g., papers, display screens etc). For example, rendering content with a printer generates an image on a substrate; rendering content with a display device generates an image on a screen; and rendering content with an audio output device generates sound.

[0092] A conventional printing system in general includes a raster image processor and a printer engine. A printer engine includes memory buffer, marking engine among other components. The raster image processor converts content into an image form suitable for printing; the memory buffer holds the rasterized image ready

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for printing; and the marking engine transfers colorant to substrate (e.g., paper).

[0093] The raster image processor may be located within an output device (e.g. included in a printer controller 410) or externally implemented (in an information apparatus 200, external controller, servers etc). Raster image processor can be implemented as hardware, software, or a combination (not shown). As an example, raster image processor may be implemented in a software application or device driver in the information apparatus 200. Examples of raster image processing operations include image and graphics interpretation, rasterization, scaling, segmentation, color space transformation, image enhancement, color correction, halftoning, compression etc.

[0094] Fig. 4A illustrates a block diagram of one conventional printing system or printer 400A that includes a printer controller 410 and a printer engine 420A. The printer controller 410 includes an interpreter 402 and a raster image processor 406, and the printer engine 420 includes memory buffer 424A and a marking engine 426A.

[0095] Marking engine may use any of a variety of different technologies to transfer a rasterized image to paper or other media or, in other words, to transfer colorant to a substrate. The different marking or printing technologies that may be used include both impact and non-impact printing. Examples of impact printing may include dot matrix, teletype, daisywheel, etc. Non-impact printing technologies may include inkjet, laser, electrostatic, thermal, dye sublimation, etc.

[0096] The marking engine 426 and memory buffer 424 of a printer form its printer engine 420, which may also include additional circuitry and components, such as firmware, software or chips or chipsets for decoding and signal conversion, etc. Input to a printer engine 420 is usually a final rasterized printer-engine print data generated by a raster image processor 406. Such input is usually device dependent and printer or printer engine specific. The printer engine 420 may take this device dependent input and generate or render output pages (e.g. with ink on a substrate).

[0097] When a raster image processor is located inside an output device 220, it is usually included in a printer controller 410 (as shown in Fig. 4A). A printer controller 410 may interpret, rasterize, and convert input print data in the form of a page description language (e.g., PostScript, PCL), markup language

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(e.g., XML, HTML) or other special document format or language (e.g. PDF, EMF) into printer-engine print data which is a final format, language or instruction that printer engine 420A can understand.

[0098] Print data sent to a printer with printer controller 410 is usually in a form (e.g. postscript) that requires further interpretation, processing or conversion. A printer controller 410 receives the print data, interprets, process, and converts the print data into a form that can be understood by the printer engine 420A. Regardless of the type of print data, conventionally, a user may need a device-specific driver in his or her information apparatus 200 in order to output the proper language, format, or file that can be accepted by a specific printer or output device 220.

[0099] Fig. 4B illustrates another conventional output device 400B. Output device 400B may be a printing device, a display device, a projection device, or a sound device. In the case that the output device is a printing device or a printer, the printer with reference to Fig. 4B does not include a printer controller 410. As an example, printer 400B may be a low-cost printer such as a desktop inkjet printer. RIP operations in this example may be implemented in a software application or in a device driver included in an information apparatus 200. The information apparatus 200 generates device dependent output data (or print data in case of a printer) by rasterizing and converting a digital document into output data (e.g. into a compressed CMKY data with one or more bits per pixel) that can be understood by an output engine (or printer engine in case of a printer) 420B.

[0100] Regardless of type or sophistication level, different output device 220 conventionally needs different printer drivers or output management applications in an information apparatus 200 to provide output capability. Some mobile devices with limited memory and processing power may have difficulty storing multiple device drivers or perform computational intensive RIP operations. It may also be infeasible to install a new device dependent or specific printer driver each time there is a need to print to a new printer. To overcome these difficulties, present invention provides several improvements to output device 220 or output system 250 as described in detail next.

[0101] In present invention, output device 220 may include an output controller 230 to help managing communication and negotiation processes with an information apparatus 200 and to

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process output data. Output controller 230 may include dedicated hardware or software or combination of both for at least one output device 220. Output controller 230 may be internally installed, or externally connected to one or more output devices 220. The output controller 230 is sometimes referred to as a print server or output server.

[0102] Fig 5A and 5B illustrate two exemplary internal implementations of the output controller 230 of present invention. Fig 5A illustrates the implementation of an output controller 230 inside a conventional printer with reference to Fig. 4A, which includes a conventional printer controller 410(5A). The output controller 230(5A) includes an interpreter 510A component for decoding the intermediate output data of present invention; and a converter component 530A for converting one or more decoded output images into a printer-controller print data that is suitable for input to the printer controller 410(5A). An optional image processing component 520A may be included in the output controller 230(5A).

[0103] Fig 5B illustrates the implementation of an output controller 230 included internally in a conventional output device 220 with reference to Fig. 4B, which does not include a printer controller. The output controller 230(5B) includes an interpreter 510B component for decoding the intermediate output data of present invention; an image processor 520B component for performing one or more image processing operations such as color space conversion, color matching and digital halftoning; and an optional encoder 530B component to conform the processed output images into an output-engine output data that is suitable for input to the output engine 420B if the result of the image processing is not already in required form suitable for the output engine 420B.

[0104] In one implementation, output device 220 may include a communication unit 550 or adapter to interface with information apparatus 200. Output device 220 may sometimes include more than one communication unit 550 in order to support different interfaces, protocols, or communication standards with different devices. For example, output device 220 may communicate with a first information apparatus 200 through a Bluetooth interface while communicating with a second information apparatus 200 through a parallel interface. Examples of hardware components of a wireless communication unit are described in greater detail below with reference to Figs. 8A and 8B.

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[0105] In one embodiment, output controller 230 does not include a communication unit, but rather utilizes or manages a communication unit residing in the associated output device 220 such as the illustration in Fig 5. In another embodiment, output controller 230 may include or provide a communication unit to output device 220 as shown in Fig. 6. For example, an output controller 230 with a wireless communication unit may be installed internally or connected externally to a legacy printer to provide it with wireless communication capability that was previously lacking.

[0106] Fig. 6 includes three functional block diagrams illustrating the hardware/software components of output controller 230 in three different implementations. Each components of an output controller 230 may include software, hardware, or combination. For example, an output controller 230 may include components using one or more or combinations of an application-specific integrated circuit (ASIC), a digital signal processor (DSP), a field programmable gate array (FPGA), firmware, system on a chip, and various communication chip sets. Output controller 230 may also contain embedded processors 670 A with software components or embedded application software to implement its feature sets and functionalities.

[0107] Output controller 230 may contain an embedded operating system 680. With an operating system, some or all functionalities and feature sets of the output controller 230 may be provided by application software managed by the operating system. Additional application software may be installed or upgraded to newer versions in order to, for example, provide additional functionalities or bug fixes. Fig. 6A and Fig 6C illustrates examples of implementation with an operating system 680 while Fig. 6B illustrates an example without the operating system 680 or the optional embedded processor 670.

[0108] Output controller 230 typically includes a memory unit 640, or may share a memory unit with, for example, printer controller 410. The memory unit and storage unit, such as ROM, RAM, flash memory and disk drive among others, may provide persistent or volatile storage. The memory unit or storage unit may store output device profiles, objects, codes, instructions or data (collectively referred to as software components) that implement the functionalities of the output controller 230. Part of the software components (e.g., output device profile) may be

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uploaded to information apparatus 200 during or before a data output operation.

[0109] An output controller 230 may include a processor component 670A and 670C, a memory component 650, an optional storage component 640, and an optional operating system component 680. Fig. 6 shows one architecture or implementation where the memory 650, storage 640, processor 670, and operating system 680 components, if exist, can be share or accessed by other operational components in the output controller 230 such as the interpreter 610 and image processor 650. Fig 6 shows two communication units 660A and 660B included in the output controller 230; however, the output controller 230 of present invention may include any number of communication units 660. It is also possible that the output controller does not contain any communication unit but rather utilizes the communication unit of an output device.

[0110] The output controller 230 may be connected externally to an output device 220 or integrated internally into the output device 220. Fig 5A and 5B illustrate implementations of output controller 230 inside an output device 220. The output controller 230, however, may also be implemented as an external box or station that is wired or wirelessly connected to an output device 220. An output controller 230 implemented as an external box or station to an output device 220 may contain its own user interface. One example of such an implementation is a print server connected to an output device 220 in an output system 250. Another configuration and implementation is to integrate or combine the functionalities of an output controller 230 with an existing printer controller 410 (referred to as "combined controller") if the output device 220 is a printer as shown with reference to Fig. 7C or 7F. A combined controller can also be internally integrated or externally connected to output device 220, and include functionalities of both printer controller 410 (e.g., input interpretation and or raster image processing) and output controller 230 of present invention. One advantage of this configuration is that the functionalities or components of output controller 230 and printer controller 410 may share the same resources, such as processing unit, memory unit, etc. Fig 6C illustrates an example of a combined controller implementation or output controller 230 where the printer controller 410C, interpreter 610C and converter 630C shares the use of the processor 670C, memory 650C and storage 640C, managed by an operating system 680C. Various exemplary implementations and configurations of an output controller 230 with respect to an

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output device 220 or output system 250 are illustrated in further detail with reference to FIG 7.

[0111] Other possible implementations of output controller 230 may include, for example, a conventional personal computer (PC), a workstation, and an output server or print server. In these cases, the functionalities of output controller 230 may be implemented using application software installed in a computer (e.g., PC, server, or workstation), with the computer connected with a wired or wireless connection to an output device 220. Using a PC, server, workstation, or other computer to implement the feature sets of output controller 230 with application software is just another possible embodiment of the output controller 230 and in no way departs from the spirit, scope and process of the present invention.

[0112] The difference between output controller 230 and printer controller 410 should be noted. Printer controller 410 and output controller 230 are both controllers and are both dedicated hardware and or software for at least one output device 220. Output controller 230 refers to a controller with feature sets, capabilities, and functionalities of the present invention. A printer controller 410 may contain functions such as interpreting an input page description language, raster image processing, and queuing, among others. An output controller 230 may include part or all of the features of a printer controller 410 in addition to the feature sets, functionalities, capabilities, and processes of present invention.

[0113] Functionalities and components of output controller 230 for the purpose of providing universal data output may include or utilize:

- Components and operations to receive output data from a plurality of information apparatus 200; the output data may include an intermediate output data containing at least one rasterized image related to the data content intended for output.
- Components and operations to interpret and/or decode the intermediate output data.
- Components and operations to process the intermediate output data. Such components and operations may include image processing functions such as scaling, segmentation, color correction, color management, GCR, image enhancement, decompression, decryption, and or halftoning among others.

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• Components and operations to generate an output-engine output data, the output-engine output data being in an output data format acceptable for input to an output engine.

• Components and operations to send the output-engine output data to the output engine.

[0114] When associated with an output device 220 that includes a printer controller 410, the output controller of present invention may further include or utilize:

• Components and operations to convert the intermediate output data into a printer-controller print data (e.g. a PDL such as PostScript and PCL), the printer-controller print data being in a format acceptable to a printer controller.

• Components and operations to send printer-controller print data to one or more printer controllers.

[0115] In addition to the above components and functionalities, output controller 230 may further include one or more of the following:

• Components and operations to communicate with one or more information apparatus 200 through a wired or wireless interface.

• Components and operations to communicate and or manage a communication unit included in the output controller 230 or output device 220.

• Components and operations to store at least part of an output device profile (a printer profile in case of a printer) in a memory component.

• Components and operations to respond to service request from an information apparatus 200 by transmitting at least part of an output device profile to the information apparatus requesting service. The output controller 230 may transmit the output device profiles or object in one or multiple sessions.

• Components and operations to broadcast or advertise the services provided by a host output device 220 to one or more information apparatus 200 that may request such services.

• Components and operations to implement payment processing and management functions by, for example, calculating and processing payments according to the services requested or rendered to a client (information apparatus 200).

• Components and operations to provide a user interface such as display screen, touch button, soft key, etc.

• Components and operations to implement job management functions such as queuing and spooling among others.

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• Components and operations to implement security or authentication procedures. For example, the output controller 230 may store in its memory component (or shared memory component) an access control list, which specifies what device or user may obtain service from its host (or connected) output device 220. Therefore, an authorized information apparatus 200 may gain access after confirming with the control list.

[0116] When output controller 230 is implemented as firmware, or an embedded application, the configuration and management of the functionalities of output controller 230 may be optionally accomplished by, for example, using controller management software in a host computer. A host computer may be a desktop personal computer (PC), workstation, or server. The host computer may be connected locally or through a network to the output device 220 or the controller 230. Communication between the host computer and the output controller 230 can be accomplished through wired or wireless communication. The management application software in the host computer can manage the settings, configurations, and feature sets of the output controller 230. Furthermore, host computer's configuration application may download and or install application software, software components and or data to the output controller 230 for the purpose of upgrading, updating, and or modifying the features and capabilities of the output controller 230.

[0117] Output device 220 in one implementation includes or is connected to output controller 230 described above. Therefore, functionalities and feature sets provided by output controller 230 are automatically included in the functionalities of output device 220. The output device 220 may, however, implement or include other controllers and/or applications that provide at least partially the features and functionalities of the output controller 230.

[0118] Therefore, the output device 220 may include some or all of the following functionalities:

• Components and operations to receive multiple service requests or queries (e.g., a service request, a data query, an object or component query etc.) from a plurality of information apparatus 200 and properly respond to them by returning components, which may contain data, software, instructions and/or objects.

• Components and operations to receive output data from a plurality of information apparatus 200; the output data may include an intermediate output data containing one or more rasterized image related to the content intended for output.

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• Components and operations to interpret and/or decoding the intermediate output data.

• Components and operations to process and/or convert the intermediate output data into a form (e.g. output-engine print data) suitable for rendering at an output engine associated with the output device.

• Components and operations to render a representation or an image related to the content onto an output medium (e.g. substrate or a display screen).

[0119] An output device 220 may further comprise optionally one or more of the following functionalities:

• Components and operations for establishing and managing a communication link with an information apparatus 200 requesting service; the communication link may include wired or wireless communication.

• Components and operations for storing at least part of an output device profile (e.g. printer profile) in a memory component.

• Components and operations to provide at least part of an output device profile (e.g., printer profile in case of a printer) to one or more information apparatus 200 requesting service. The output device 220 may transmit the output device profile in one or multiple sessions.

• Components and operations to advertise or broadcast services provided or available to one or more information apparatus 200.

• Components and operations to implement payment processing and management functions by, for example, calculating and processing payments according to the services requested by or rendered to a client (information apparatus 200).

• Components and operations to implement job management functionalities such as queuing and spooling among others.

• Components and operations to provide a user interface such as display screen touch button, soft key, power switch, etc.

• Components and operations to implement security or authentication procedures. For example, the output device 220 may store in its memory component (or a shared memory component) an access control list, which specifies what device or user may obtain service from it. Therefore, an authorized information apparatus 200 may gain access after confirming with the control list.

[0120] Figs. 7A - 7F illustrate various alternative configurations and implementations of output controller 230 with respect to an output device 230. Printer is sometimes used as an

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exemplary output device 230 to demonstrate the various configurations. It should be understood, however, the output device 230 of present invention is not limited to printers.

[0121] As described with reference to Fig 4., a printer may or may not contain a printer controller 410. Printer 400A that includes a printer controller 410 typically has higher speed and is more expensive than printer 400B which does not include a printer controller 410.

[0122] Fig. 7A shows that output controller 230 may be cascaded externally to one or more printers (only one shown). Information apparatus 200 communicates with output controller 230A, which then communicates with output device 220 such as a printer 220A. The communication link between the output controller 230A and the printer 220A may be a wired link or a wireless link, as described above. Fig 6A and 6B illustrates two examples of functional component design of the output controller that can implement the configuration illustrated in Fig 7A. The Image processor 620 in this implementation is optional.

[0123] Fig. 7B shows another implementation in which output controller 230B is installed as one or more circuit boards or cards internally inside printer 220B. The output controller 230B may co-exist with printer controller 410 and other components of the printer 220B. One example of this implementation is to connect output controller 230B sequentially with the printer controller 310. Fig 5A shows as an example of an implementation.

[0124] Fig. 7C shows another implementation in which the functionalities of output controller 230 and printer controller 410 are combined into a single controller (referred to as "combined controller") 230C. In this implementation, it is possible to reduce the cost of material when compared to implementing two separate controllers as shown in Fig 7B. As an example, the combined controller 230C may share the same processors, memories, and storages to run the applications and functionalities of the two types of controllers and therefore, may have lower component costs when compared to providing two separate controllers. Fig. 6C illustrates an example of a combined controller functional component implementation.

[0125] Some printers do not include a raster image processor or printer controller 410, as illustrated in Fig. 4B. An example of this type of printer is a lower cost desktop inkjet printer. Input to an inkjet printer may consist of a compressed CMYK data (proprietary or published) with one or more bits per pixel input.

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To output to a printer that does not include a printer controller, a device specific software application or a printer driver is typically required in an information apparatus 200 to perform raster image processing operations. Accordingly, output controller 230 can be implemented into a variety of output devices 220 and/or output systems 250 including printers that do not have printer controllers for performing raster image processing operations.

[0126] Fig. 7D and Fig 7E illustrate two implementations of output controller 230 in an output device 220 or system 250. The output device 230 or system 250 may include a display device, a projection device, an audio output device or a printing device. In the case when the output device 220D or 220E is a printer, it does not include a printer controller. Fig. 7D illustrates an implementation of an output controller 230D installed as an external component or "box" to output device 220D. For example, the output controller 230 may be implemented as an application in a print server or as a standalone box or station. In this configuration, some or all of raster image processing operations may be implemented in the output controller 230D. Output controller 230D receives intermediate output data from an information apparatus 200 and generates output-engine output data that is acceptable to the output engine included in the output device 220D. The output controller 230D may send the output data to the output device 220D through a wired or wireless communication link or connection. Fig 6A and 6B illustrates two example of functional component design of the output controller that can implement the configurations for both Fig. 7D and 7E.

[0127] Fig. 7E shows a fifth implementation of output controller 230E in which the output controller 230E is incorporated within output device 220E as one or more circuit boards or cards and may contain software and applications running on an embedded processor. As with output device 220D (Fig. 7D), output device 220E does not include a printer controller 410. Accordingly, the output controller 230E implements the functionalities and capabilities of present invention that may include part of or complete raster imaging processing operation.

[0128] Fig. 7F shows a sixth implementation, an external combined controller 230F that integrates the functionalities of a printer controller 310 and an output controller into a single external combined controller component or "box" 230F. The two controller functions may share a common processor as well as a common memory space to run applications of the two types of

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controllers. Under this configuration, either information apparatus 200 or the combined controller 230F could perform or share at least part of raster image processing functionality. Fig. 6C shows an example of functional components of a combined controller 230F.

[0129] Another implementation of the combined controller 230F shown in Fig 7F is to use an external computing device (PC, workstation, or server) running one or more applications that include the functionality of output controller 230 and printer controller 410.

[0130] The above are examples of different implementations and configurations of output controller 230. Other implementations are also possible. For example, partial functionalities of output controller 230 may be implemented in an external box or station while the remaining functionalities may reside inside an output device 220 as a separate board or integrated with a printer controller 410. As another example, the functionalities of output controller 230 may be implemented into a plurality of external boxes or stations connected to the same output device 220. As a further example, the same output controller 230 may be connected to service a plurality of output devices 220

[0131] Figs. 8A and 8B are block diagrams illustrating two possible configurations of hardware/software components of wireless communication units. These wireless communication units can be implemented and included in information apparatus 200, in output controller 230 and in output device 220. Referring to Fig. 8A, a radio adapter 800 may be implemented to enable data/voice transmission among devices (e.g., information apparatus 200 and output device 220) through radio links. An RF transceiver 814 coupled with antenna 816 is used to receive and transmit radio frequency signals. The RF transceiver 814 also converts radio signals into and from electronic signals. The RF transceiver 814 is connected to an RF link controller 810 by an interface 812. The interface 812 may perform functions such as analog-to-digital conversion, digital-to-analog conversion, modulation, demodulation, compression, decompression, encoding, decoding, and other data or format conversion functions.

[0132] RF link controller 810 implements real-time lower layer (e.g., physical layer) protocol processing that enables the hosts (e.g., information apparatus 200, output controller 230, output device 220, etc.) to communicate over a radio link. Functions performed by the link controller 810 may include, without limitation, error detection/correction, power control, data packet

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processing, data encryption/decryption and other data processing functions.

[0133] A variety of radio links may be utilized. A group of competing technologies operating in the 2.4 GHz unlicensed frequency band is of particular interest. This group currently includes Bluetooth, Home radio frequency (Home RF) and implementations based on IEEE 802.11 standard. Each of these technologies has a different set of protocols and they all provide solutions for wireless local area networks (LANs). Interference among these technologies could limit deployment of these protocols simultaneously. It is anticipated that new local area wireless technologies may emerge or that the existing ones may converge. Nevertheless, all these existing and future wireless technologies may be implemented in the present invention without limitation, and therefore, in no way depart from the scope of present invention.

[0134] Among the currently available wireless technologies, Bluetooth may be advantageous because it requires relatively lower power consumption and Bluetooth-enabled devices operate in piconets, in which several devices are connected in a point-to-multipoint system. Referring to Fig. 8B, one or more infrared (IR) adapters 820 may be implemented to enable data transmission among devices through infrared transmission. The IR adapters 820 may be conveniently implemented in accordance with the Infrared Data Association (IrDA) standards and specifications. In general, the IrDA standard is used to provide wireless connectivity technologies for devices that would normally use cables for connection. The IrDA standard is a point-to-point (vs. point-to-multipoint as in Bluetooth), narrow angle, ad-hoc data transmission standard.

[0135] Configuration of infrared adapters 820 may vary depending on the intended rate of data transfer. Fig. 8B illustrates one embodiment of infrared adapter 820. Transceiver 826 receives/emits IR signals and converts IR signals to/from electrical signals. A UART (universal asynchronous receiver/transmitter) 822 performs the function of serialization/deserialization, converting serial data stream to/from data bytes. The UART 822 is connected to the IR transceiver 826 by encoder/decoder (ENDEC) 824. This configuration is generally suitable for transferring data at relatively low rate. Other components (e.g., packet framer, phase-locked loop) may be needed for higher data transfer rates.

[0136] Figs. 8A and 8B illustrate exemplary hardware configurations of wireless communication units. Such hardware

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components may be included in devices (e.g., information apparatus 200, output controller 230, output device 220, etc.) to support various wireless communications standards. Wired links, however, such as parallel interface, USB, Firewire interface, Ethernet and token ring networks may also be implemented in the present invention by using appropriate adapters and configurations.

[0137] FIG 9 is a logic flow diagram of an exemplary raster imaging process (RIP) 902 that can implement the universal output method of present invention. Content (e.g. digital document) 900 may be obtained and/or generated by an application running in an information apparatus 200. For example, a document browsing application may allow a user to download and or open digital document 900 stored locally or in a network node. As another example, a document creating or editing application may allow a user to create or edit digital documents in his/her information apparatus 200.

[0138] A client application 210 in the information apparatus may be in the form of a device driver, invoked by other applications residing in the information apparatus 200 to provide output service. Alternatively, the client application 210 of present invention may be an application that includes data output and management component, in addition of other functionalities such as content acquisitions, viewing, browsing, and or editing etc. For example, a client application 210 in an information apparatus 200 may itself include components and functions for a user to download, view and or edit digital document 900 in addition of the output management function described herein.

[0139] Raster image process method 902 allows an information apparatus 200 such as a mobile device to pervasively and conveniently output content (e.g. a digital document) to an output device 220 or system 250 that includes an output controller 230. A client application 210 in an information apparatus 200 may perform part of raster image processing operations (e.g. rasterization operation). Other operations of raster image processing such as halftoning can be completed by the output device 220 or by the output controller 230. In conventional data output methods, raster image processing is either implemented entirely in an information apparatus (e.g. a printer that does not include a printer controller with reference to Fig. 1A) or in an output device (e.g. a printer that includes a printer controller with reference to Fig. 1B). Present invention provides a more balanced approach where raster image process operations are shared between an information

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apparatus 200 and an output device 220 or system 250. For example, content 600 may be processed (e.g. raster image processed) by different components or parts of an overall output system from a client application 210 to an output controller 230 before being sent to an output engine or a printer engine for final output in step 960. Because the raster image processing operations are not completely implemented in the information apparatus 200, there is less processing demand on the information apparatus 200. Therefore, present RIP process may enable additional mobile devices with less memory and processing capability to have data output capability.

[0140] In step 910, rasterization operation, a content (e.g. digital document), which may include text, graphics, and image objects, is conformed or rasterized to image form according to one or more rasterization parameters such as output size, bit depth, color space, resolution, number of color channels etc. During the rasterization operation, text and vector graphics information in the content are rasterized or converted into image or bitmap information according to a given set of rasterization parameters. Image information in the content or digital document may be scaled and or interpolated to fit a particular output size, resolution and bit depth etc. The rasterization parameters are in general device dependent, and therefore may vary according to different requirements and attributes of an output device 220 and its output engine. There are many ways to obtain device dependent rasterization parameters, as described in more detail below with reference to Fig 12A. Device dependent rasterization parameters, in one example, may be obtained from an output device profile stored in an information apparatus 200, an output device 220 or an output controller 230.

[0141] In an alternative implementation, rasterization parameters may be predetermined by a standard or specification. In this implementation, in step 910 the content 900 is rasterized to fit or match this predefined or standard rasterization parameters. Therefore, the rasterized output image becomes device independent. One advantage of being device independent is that the rasterized output image is acceptable with controllers, devices and/or output devices implemented or created with the knowledge of such standard or specification. A rasterized image with predefined or standardized attributes is usually more portable. For example, both the client application 210 and output device 220 or its output controller 230 may be preprogrammed to receive, interpret, and or

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output raster images based on a predefined standard and/or specification.

[0142] Occasionally, a predefined standard or specification for rasterization parameters may require change or update. One possible implementation for providing an easy update or upgrade is to store information and related rasterization parameters in a file or a profile instead of hard coding these parameters into programs, components or applications. Client application 210, output controller 230, and/or the output device 220 can read a file or a profile to obtain information related to rasterization parameters. To upgrade or update the standard specification or defaults requires only replacing or editing the file or the profile instead of replacing a software application or component such as the client application 210.

[0143] In step 920 the rasterized content in image form is encoded into an intermediate output data. The intermediate output data, which describes the output content, may include image information, instructions, descriptions, and data (e.g. color profile). The rasterized output image may require further processing including one or more of compression, encoding, encryption, smoothing, image enhancement, segmentation, color correction among others before being stored into the intermediate output data. The output image in the intermediate output data may be encoded in any image format and with any compression technique such as JPEG, BMP, TIFF, JBIG etc. In one preferred embodiment, a mixed raster content (MRC) format and its related encoding and/or compression methods are used to generate the output image. The advantages of using MRC over other image formats and techniques may include, for example, better compression ratio, better data information retention, smaller file size, and or relatively better image quality among others.

[0144] In step 930, the intermediate output data is transmitted to the output device 220 or output system 250 for further processing and final output. The transmission of the intermediate output data may be accomplished through wireless or wired communication links between the information apparatus 200 and the output device 220 and can be accomplished through one or multiple sessions.

[0145] In step 940, the output device 220 or output system 250 receives the transmitted intermediate output data. The output device 220 or output system 250 may include an output controller 230 to assist communicating with the information apparatus 200

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and/or processing the intermediate output data. Output controller 230 may have a variety of configurations and implementations with respect to output device 220 as shown in Fig. 7A-7F. Interpretation process 940 may include one or more of parsing, decoding, decompression, decryption, image space conversion among other operations if the received intermediate output data requires such processing. An output image is decoded or retrieved from the intermediate output data and may be temporarily stored in a buffer or memory included in the output device/output system (220/250) or output controller 230 for further processing.

[0146] If the intermediate output data includes components with MRC format or encoding techniques, it may contain additional segmented information (e.g. foreground and background), which can be used to enhance image quality. For example, different techniques or algorithms in scaling, color correction, color matching, image enhancement, anti-aliasing and or digital halftoning among others may be applied to different segments or layers of the image information to improve output quality or maximize retention or recovery of image information. Multiple layers may later be combined or mapped into a single layer. These image processing and conversion components and/or operations can be included in the output controller 230 of present invention.

[0147] In step 950, the decoded or retrieved output image from the intermediate output data may require further processing or conversion. This may include one or more of scaling, segmentation, interpolation, color correction, GCR, black generation, color matching, color space transformation, anti-aliasing, image enhancement, image smoothing and or digital halftoning operations among others.

[0148] In an embodiment where the output device 220 does not include a printer controller, an output controller 230 or an output device 220 that includes output controller, after performing the remaining portion of RIP operations (e.g. color space conversion and halftoning) on the output image, may further convert the output data in step 950 into a form that is acceptable for input to a printer engine for rendering.

[0149] In an alternative embodiment where the output device 220 or the output system 250 includes a conventional printer controller, the output controller may simply decodes and or converts the intermediate output data (print data in this example) into format or language acceptable to the printer controller. For example, a printer controller may require as input a page

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description language (e.g. PostScript, PCL, PDF, etc.), a markup language (HTML, XML etc) or other graphics or document format. In these cases, the output controller 230 may interpret, decompress and convert the intermediate print data into an output image that has optimal output resolution, bit depth, color space, and output size related to the printer controller input requirements. The output image is then encoded or embedded into a printer-controller print data (e.g. a page description language) and sent to the printer controller. A printer-controller print data is a print data that is acceptable or compatible for input to the printer controller. After the printer controller receives the printer-controller print data, the printer controller may further perform operations such as parsing, rasterization, scaling, color correction, image enhancement, halftoning etc on the output image and generate an appropriate printer-engine print data suitable for input to the printer engine.

[0150] In step 960, the output-engine output data or printer-engine print data generated by the output controller 230 or the printer controller in step 950 is sent to the output engine or printer engine of the output device for final output.

[0151] Fig. 10 illustrates a flow diagram of a universal data output process of the present invention that includes the raster image processing illustrated with reference to Fig. 9. A universal data output process allows an information apparatus 200 to pervasively output content or digital document to an output device. The data output process may include or utilize:

- A user interface component and operation where a user initiates an output process and provides an indication of the selected output content (e.g. digital document) for output.
- A client application component or operation that processes the content indicated for output, and generates an intermediate output data. The intermediate output data may include at least partly a raster output image description related to the content.
- An information apparatus component or operation that transmits the intermediate output data to one or more selected output device 220.
- An output device component (e.g. output controller) or operation that interprets the intermediate output data and may further process or convert the output data into a form more acceptable to an output engine for rendering of the content.

[0152] With reference to Fig. 10, a user in step 1000 may initiate the universal output method or process 1002. Typically, a

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user initiates the output process by invoking a client application 210 in his/her information apparatus 200. The client application 210 may be launched as an independent application or it may be launched from other applications 205 (such as from a document browsing, creating or editing application) or as part of or component of or a feature of another application 205 residing in the same information apparatus 200. When launched from another application 205, such as the case when the client application is a device driver or helper application, the client application 210 may obtain information, such as the content (e.g. digital document) from that other application 205. This can be accomplished, for example, by one or combinations of messages or facilitated through an operating system or a particular object or component model etc.

[0153] During output process 1002, a user may need to select one or more output devices 220 for output service. An optional discovery process step 1020 may be implemented to help the user select an output device 220. During the discovery process step 1020, a user's information apparatus 200 may (1) search for available output devices 220; (2) provide the user with a list of available output devices 220; and (3) provide means for the user to choose one or more output devices 220 to take the output job. An example of a discovery process 1020 is described below in greater detail with reference to Fig. 11.

[0154] The optional discovery process 1020 may sometimes be unnecessary. For example, a user may skip the discovery process 1020 if he or she already knows the output device (e.g., printer) 220 to which the output is to be directed. In this case, the user may simply connect the information apparatus 200 to that output device 220 by wired connections or directly point to that output device 220 in a close proximity such as in the case of infrared connectivity. As another example, a user may pre-select or set the output device or devices 220 that are used frequently as preferred defaults. As a result, the discovery process 1020 may be partially or completely skipped if the default output device 220 or printer is found to be available.

[0155] In stage 1030, the client application may interact with output device 220, the user, and/or other applications 205 residing in the same information apparatus 200 to (1) obtain necessary output device profile and/or user preferences, (2) perform functions or part of raster image processing operations such as rasterization, scaling and color correction, and/or (3) convert or encode at least partially the rasterized content (e.g. digital

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document) into an intermediate output data. The processing and generation of the intermediate output data may reflect in part a relationship to an output device profile and/or user preferences obtained, if any. The intermediate output data generated by the client application 210 is then transmitted through wired or wireless local communication link(s) 240 to the output controller 230 included or associated with the selected output device 220 or output system 250. An exemplary client application process is described in greater detail with reference to FIG 12.

[0156] In step 1040, the output controller 230 of present invention receives the intermediate output data. In the case where the selected output device 230 does not include a printer controller, the output controller 230 of present invention may further perform processing functions such as parsing, interpreting, decompressing, decoding, color correction, image enhancement, GCR, black generation and halftoning among others. In addition, the output controller 230 may further convert or conform the intermediate output data into a form or format suitable for the output engine (e.g. printer engine in the case of a printer). The generated output-engine output data from the output controller is therefore, in general, device dependent and acceptable for final output with the output engine (or the printer engine in case of a printer) included in the selected output device 220 or output system 250.

[0157] In the case where the selected output device 220 is a printer, and when the printer includes or is connected to a printer controller, the output controller 230 may generate the proper language or input format required to interface with the printer controller (referred to as printer-controller print data). The printer controller may for example require a specific input such as a page description language (PDL), markup language, or a special image or graphics format. In these cases, the output controller 230 in step 1040 may interpret and decode the intermediate output data, and then convert the intermediate output data into the required printer-controller print data (e.g. PDL such as PostScript or PCL). The printer-controller print data generated by the output controller is then sent to the printer controller for further processing. The printer controller may perform interpretation and raster image processing operations among other operations. After processing, the printer controller generates a printer-engine print data suitable for rendering at the printer engine.

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[0158] In either case, the output controller 230 or printer controller generates an output-engine output data that is suitable for sending to or interfacing with the output engine or the printer engine included in the output device for rendering. The output data may be temporarily buffered in components of the output device 220. An implementation of the output device process 1040 is described in greater detail with reference to FIG 13.

[0159] The steps included in the universal pervasive output process 1002 may proceed automatically when a user requests output service. Alternatively, a user may be provided with options to proceed, cancel, or input information at each and every step. For example, a user may cancel the output service at any time by, for example, indicating a cancellation signal or command or by terminating the client application 210 or by shutting down the information apparatus 200 etc.

[0160] Fig. 11 is a flow diagram of an example of a discovery process 720, which may be an optional step to help a user locate one or more output devices 220 for an output job. The discovery process 1020 may, however, be skipped partially or entirely. Implementation of discovery process 1020 may require compatible hardware and software components residing in both the information apparatus 200 and the output device 220. The information apparatus 200 may utilize the client application 210 or other application 205 in this process. The discovery process 1020 may include:

- An information apparatus 200 communicating with available output devices 220 to obtain information and attributes relating to the output device 220 and or its services such as output device capability, feature sets, service availability, quality of service, condition.
- An Information apparatus 200 provides the user information on each available and or compatible output devices 220.
- A user selects or the client application 210 (automatically or not) selects one or more output devices 220 for the output service from the available or compatible output devices 220.

[0161] Various protocols and or standards may be used during discovery process 1020. Wireless communication protocols are preferred. Wired communication, on the other hand, may also be implemented. Examples of applicable protocols or standards may include, without limitation, Bluetooth, HAVi, Jini, Salutation, Service Location Protocol, and Universal Plug-and-play among others. Both standard and proprietary protocols or combination may be implemented in the discovery process 1020. However, these

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different protocols, standards, or combination shall not depart from the spirit and scope of present invention.

[0162] In one implementation an application (referred here for simplicity of discussion as a "communication manager," not shown) residing in the information apparatus 200 helps communicate with output device 220 and manages service requests and the discovery process 1020. The communication manager may be a part of or a feature of the client application 210. Alternatively or in combination, the communication manager may also be a separate application. When the communication manager is a separate application, the client application 210 may have the ability to communicate, manage or access functionalities of the communication manager.

[0163] The discovery process 1020 may be initiated manually by a user or automatically by a communication manager when the user requests an output service with information apparatus 200.

[0164] In the optional step 1100, a user may specify searching or matching criteria. For example, a user may indicate to search for color printers and or printers that provide free service. The user may manually specify such criteria each time for the discovery process 1020. Alternatively or in combination, a user may set default preferences that can be applied to a plurality of discovery processes 1020. Sometimes, however, no searching criteria are required: the information apparatus 200 may simply search for all available output devices 220 that can provide output service.

[0165] In step 1101, information apparatus 200 searches for available output devices 220. The searching process may be implemented by, for example, an information apparatus 200 (e.g. with the assistance of a communication manager) multi-casting or broadcasting or advertising its service requests and waiting for available output devices 220 to respond. Alternatively or in combination, an information apparatus 200 may "listen to" service broadcasts from one or more output devices 220 and then identify the one or more output devices 220 that are needed or acceptable. It is also possible that multiple output devices 220 of the same network (e.g., LAN) register their services with a control point (not shown). A control point is a computing system (e.g., a server) that maintains records on all service devices within the same network. An information apparatus 200 may contact the control point and search or query for the needed services.

[0166] In step 1102, if no available output device 220 is found, the communication manager or the client application 210 may

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provide the user with alternatives 1104. Such alternatives may include, for example, aborting the discovery process 1020, trying discovery process 1020 again, temporarily halting the discovery process 1020, or being notified when an available output device 220 is found. As an example, the discovery process 1020 may not detect any available output device 220 in the current wired/wireless network. The specified searching criteria (if any) are then saved or registered in the communication manager. When the user enters a new network having available output devices 220, or when new compatible output devices 220 are added to the current network, or when an output device 220 becomes available for any reason, the communication manager may notify the user of such availability.

[0167] In step 1106, if available output devices 220 are discovered, the communication manager may obtain some basic information, or part of or the entire output device profile, from each discovered output device 220. Examples of such information may include, but not limited to, device identity, service charge, subscription, service feature, device capability, operating instructions, etc. Such information is preferably provided to the user through the user interface (e.g., display screen, speaker, etc.) of information apparatus 200.

[0168] In step 1108, the user may select one or more output devices 220 based on information provided, if any, to take the output job. If the user is not satisfied with any of the available output device 220, the user may decline the service. In this case, the user may be provided with alternatives such as to try again in step 1110 with some changes made to the searching criteria. The user may choose to terminate the service request at any time. In step 1112, with one or more output devices 220 selected or determined, the communication link between information apparatus 200 and the selected output device or devices 220 may be "locked". Other output devices 220 that are not selected may be dropped. The output process 1020 may then proceed to the client application process of step 1030 of Fig. 10.

[0169] Fig. 12A is a flow diagram of an exemplary client application process with reference to step 1030 of Fig. 10. A client application process 1202 for universal output may include or utilize:

- A client application 210 that obtains content (e.g. digital document) intended for output.
- A client application 210 that obtains output device parameters (e.g. rasterization parameters, output job parameters).

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One example of implementation is to obtain the output device parameters from an output device profile (e.g. printer profile), which includes device dependent parameters. Such profile may be stored in an output controller 230, output device 220 or information apparatus 200.

• A client application 210 that may optionally obtain user preferences through (1) user's input (automatic or manual) or selections or (2) based on preset preference or pre-defined defaults or (3) combination of the above.

• A client application 210 that rasterizes at least part of the content intended for output (e.g. a digital document) according to one or more rasterization parameters obtained from previous steps such as through output device profile, user selection, predefined user preferences, predefined default or standard etc.

• A client application 210 that generates an intermediate output data containing at least part of the rasterized image related at least partly to the content intended for output.

• A client application that transmits the intermediate output data to an output device 220 or output controller 230 for further processing and or final output.

[0170] A client application 210 may obtain content (e.g. digital document) 900 or a pointer or reference to the content in many ways. In a preferred embodiment, the client application 210 is in the form of a device driver or an independent application, and the content or its reference can be obtained by the client application 210 from other applications 205 in the same information apparatus 200. To illustrate an example, a user may first view or download or create a digital document by using a document browsing, viewing and or editing application 205 in his/her information apparatus 200, and then request output service by launching the client application 210 as a device driver or helper application. The client application 210 communicates with the document browsing or editing application to obtain the digital document or reference to the digital document. As another example, the client application 210 is an independent application and it launches another application to help locate and obtain the digital document for output. In this case, a user may first launch the client application 210, and then invoke another application 205(e.g. document editing and or browsing application) residing in the same information apparatus 200 to view or download a digital document. The client application 210 then communicates with the document

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browsing or editing application to obtain the digital document for output.

[0171] In another embodiment, the client application 210 itself provides multiple functionalities or feature sets including the ability for a user to select the content (e.g. digital document) for output. For example, the client application 210 of present invention may provide a GUI where a user can directly input or select the reference or path of a digital document that the user wants to output.

[0172] In order to perform rasterization operation on content (e.g. digital document) 900, the client application 210 in step 1210 needs to obtain device dependent parameters of an output device 220 such as the rasterization parameters. Device dependent parameters may be included in an output device profile. A client application 210 may obtain an output device profile or rasterization parameters in various ways. As an example, an output device profile or rasterization parameters can be obtained with one or combination of the following:

- The client application communicates with an output device 220 to upload output device profile or information related to one or more rasterization parameters.
- The client application 210 obtains the output device profile from a network node (e.g. server).
- A user selects an output device profile stored in the user's information apparatus 200.
- The client application 210 automatically retrieves or uses a default profile, predefined standard values or default values among others.
- The client application 210 obtains output device parameters by calculating, which may include approximation, based at least partly on the information it has obtained from one or combination of an output device 220, a user, default values, and a network node.

[0173] It is important to note that step 1210 is an optional step. In some instance, part of or the entire output device profile or related device dependent information may have been already obtained by the client application 210 during the prior optional discovery process (step 1020 in FIG 10). In this case, step 1210 may be partially or entirely skipped.

[0174] In one implementation, the client application 210 communicates with one or more output devices 220 to upload output device profiles stored in the memory or storage components of those

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one or more output devices 220 or their associated one or more output controllers 230. In some instance, the uploaded output device profile may contain partially or entirely references or pointers to device parameters instead of the device parameters themselves. The actual output device parameters may be stored in a network node or in the information apparatus 200, where they can be retrieved by the client application 210 or by other applications 205 using the references or pointers. It should be noted that a plurality of information apparatuses 200 may request to obtain output device profile or profiles from the same output device 220 at the same time or at least during overlapping periods. The output device 220 or its associated output controller 230 may have components or systems to manage multiple communication links and provide the output device profile or profiles concurrently or in an alternating manner to multiple information apparatuses 200. Alternatively, an output device 220 may provide components or systems to queue the requests from different information apparatuses 200 and serve them in a sequential fashion according to a scheme such as first come first served, quality of service, etc. Multi-user communication and service management capability with or without queuing or spooling functions may be implemented by, for example, the output controller 230 as optional feature sets.

[0175] In another implementation, one or more output device profiles may be stored locally in the information apparatus 200. The client application 210 may provide a GUI where a user can select a profile from a list of pre-stored profiles. As an example, the GUI may provide the user with a list of output device names (e.g. makes and models), each corresponding to an output device profile stored locally. When the user selects an output device 220, the client application 210 can then retrieve the output device profile corresponding to the name selected by the user.

[0176] In certain cases, during a discovery or communication process described earlier, the client application 210 may have already obtained the output device ID, name, or reference or other information in a variety of ways described previously. In this case, the client application 210 may automatically activate or retrieve an output device profile stored in the information apparatus 200 based on the output device ID, name, or reference obtained without user intervention.

[0177] In yet another implementation, the client application 210 may use a set of pre-defined default values stored locally in a user's information apparatus 200. Such defaults can be stored in

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one or more files or tables. The client application 210 may access a file or table to obtain these default values. The client application 210 may also create or calculate certain default values based on the information it has obtained during previous steps (e.g. in optional discovery process, based on partial or incomplete printer profile information obtained, etc). A user may or may not have an opportunity to change or overwrite some or all defaults.

[0178] Finally, if, for any reason, no device dependent information is available, the client application 210 may use standard output and rasterization parameters or pre-defined default parameters. The above illustrates many examples and variations of implementation, these and other possible variations in implementation do not depart from the scope of the present invention.

[0179] In step 1220, the client application 210 may optionally obtain user preferences. In one exemplary implementation, the client application 210 may obtain user preferences with a GUI (graphical user interface). For simplicity, a standard GUI form can be presented to the user independent of the make and model of the output device 220 involved in the output process. Through such an interface, the user may specify some device independent output parameters such as page range, number of cards per page, number of copies, etc. Alternatively or in combination, the client application 210 may also incorporate output device-dependent features and preferences into the GUI presented to the user. The device-dependent portion of the GUI may be supported partly or entirely by information contained in the output device profile obtained through components and processes described in previous steps. To illustrate, device dependent features and capabilities may include print quality, color or grayscale, duplex or single sided, output page size among others.

[0180] It is preferred that some or all components, attributes or fields of user preferences have default values. Part or all default values may be hard-coded in software program in client application 210 or in hardware components. Alternatively, the client application 210 may also access a file to obtain default values, or it may calculate certain default values based on the information it has obtained during previous steps or components (e.g. from an output device profile). A user may or may not have the ability to pre-configure, or change or overwrite some or all defaults. The client application 210 may obtain and use some or all defaults with or without user intervention or knowledge.

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[0181] In step 1230, the client application 210 of present invention performs rasterization operation to conform a content (e.g. a digital document), which may includes objects and information in vector graphics, text, and images, into one or more output images in accordance with the rasterization parameters obtained in previous steps. During rasterization process, text and vector graphics object or information in the content is rasterized or converted into image or bitmap form according to the given set of rasterization parameters. Image information in the content may require scaling and interpolation operations to conform the rasterization parameters. Rasterization process may further include operations such as scaling, interpolation, segmentation, image transformation, image encoding, color space transformation etc. to fit or conform the one or more output images to the given set of rasterization parameters such as target output size, resolution, bit depth, color space and image format etc.

[0182] In step 1240, the client application 210 generates an intermediate output data that includes the rasterized one or more output images. The intermediate output data of the present invention may contain image information, instructions, descriptions, and data such as color profile among others. Creating and generating intermediate output data may further include operations such as compression, encoding, encryption, smoothing, segmentation, scaling and or color correction, among others. The image or images contained in an intermediate output data may be variously encoded and/or implemented with different image formats and/or compression methods (e.g. JPEG, BMP, TIFF, JBIG etc or combination). One preferred implementation is to generate or encode the output image in the intermediate output data with mixed raster content (MRC) description. The use of MRC in the data output process of present invention provides opportunities to improve the compression ratio by applying different compression techniques to segmented elements in the content. In addition, MRC provides opportunities to maintain more original content information during the encoding process of the output image and, therefore, potentially improve output quality.

[0183] In step 1250, the client application 210 transmits intermediate output data to an output device 220 through local communication link 240. The communication link may be implemented with wired or wireless technologies and the transmission may include one or multiple sessions.

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[0184] It should be recognized that FIG 12A illustrates one example of a client application process 1030 in the data output method 1002 of present invention. Other implementations with more or less steps are possible, and several additional optional processes not shown in Fig 12 may also be included in the client application process 1030. Use of these different variations, however, does not result in a departure from the scope of the present invention. As an example, an optional authentication step may be included when the selected output device 220 provides service to a restricted group of users. Various authentication procedures may be added in step 1210 when client application 210 obtains output device profile by communicating with an output device or an output controller. As another example, authentication procedures may also be implemented in step 1250 when the client application transmits intermediate output data to one or more output devices 220 or output controllers 230. A simple authentication may be implemented by, for example, comparing the identity of an information apparatus 200 with an approved control list of identities stored in the output device 220 or output controller 230. Other more complex authentication and encryption schemes may also be used. Information such as user name, password, ID number, signatures, security keys (physical or digital), biometrics, fingerprints, voice among others, may be used separately or in combination as authentication means. Such identification and or authentication information may be manually provided by user or automatically detected by the selected output device or devices 220 or output controller 230. With successful authentication, a user may gain access to all or part of the services provided by the output device 220. The output device profile that the client application 210 obtains may vary according to the type or quality of service requested or determined. If authentication fails, it is possible that a user may be denied partially or completely access to the service. In this case, the user may be provided with alternatives such as selecting another output device 220 or alternative services.

[0185] Another optional process is that a user may be asked to provide payment or deposit or escrow before, during or after output service such as step 1210 or 1250 with reference to Fig. 12. Examples of payment or deposit may include cash, credit card, bankcard, charge card, smart card, electronic cash, among others. The output controller 220 may provide payment calculation or

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transaction processing as optional feature sets of present invention.

[0186] FIG 12B illustrates another exemplary client application output process 1030 with which an information apparatus 200 can pervasively and universally output content to one or more output devices 220 associated with or equipped with an output controller 230 of present invention.

[0187] The process illustrated in FIG 12B is similar to the process described in FIG 12A except that step 1210, obtaining output device profile, is skipped. In this embodiment, the client application 210 utilizes a set of hard-coded, standard or pre-defined output device parameters including rasterization parameters with which the client application 210 can perform rasterization operation and other required image processing functions. Users may be provided with the option of changing these parameters or inputting alternative parameters. Rasterization parameters include output size, output resolution, bit depth, color space, color channels, scale factors etc. These pre-defined parameters typically comply with a specification or a standard. The same specification and standard may also defined or describe at least partly the intermediate output data. Predefined standard parameters can be stored in a file or profile in an information apparatus 200, an output controller 230, and/or in an output device 220 for easy update or upgrade.

[0188] In client output process 1204, since the rasterization parameters are predefined, the client application 210 may not need to upload printer profiles from the selected output device 230. Consequently, no two-way communication between the information apparatus 200 and the output device or devices 220 is necessary in this process 1204 when compared with process 1202 illustrated in Fig. 12A. The client application 210 performs rasterization operation 1225 based on standard and/or predefined parameters and generates a rasterized output image with predefined or standard properties of those rasterization parameters. The resulting intermediate output data, which includes at least one rasterized output image, is transmitted from the information apparatus 200 to an output device 220 in step 1250 or to its associated output controller 230 for rendering or output. The intermediate output data generated in process 1202 in general is less device dependent compared to the intermediate output data generated in the process 1202 shown in Fig 12A. The output controller 230 included or associated with the output device 220 may be preprogrammed to

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interpret the raster output image, which includes properties or attributes that correspond to those standard or predefined parameters.

[0189] The standard or predefined rasterization parameters may be hard coded or programmed into the client application 210 and/or the output controller 230. However, instead of hard coding those parameters, one technique to facilitate updates or changes is to store those standard parameters in a default file or profile. The standard or predefined parameters contained in the file or profile can be retrieved and utilized by applications in an information apparatus 200 (e.g. client application 210) and/or by applications or components in an output device 220 or the output controller 230. In this way, any necessary updates, upgrades or required changes to those predefined or standard parameters can be easily accomplished by replacing or modifying the file or profile instead of modifying or updating the program, application or components in the information apparatus 200, output device 220 and/or output controller 230.

[0190] A client application process 1204 providing universal output capability to information apparatus 200 may include or utilize:

- A client application 210 that obtains content (e.g. digital document) intended for output.
- A client application 210 that optionally obtains user preferences (in step 1220) through (1) user's input (automatic or manual) or selections or (2) based on preset preference or pre-defined defaults or (3) combination of the above.
- A client application 210 that rasterizes content (in step 1230 or 1225) according to pre-defined or standard rasterization parameters.
- A client application 210 that generates intermediate output data (in step 1240) for rendering or output at an output device 220; the intermediate output data containing at least partially a rasterized image related to the content intended for output.
- A client application 210 that transmits the intermediate output data to an output device 220 (in step 1250) for further processing and final output.

[0191] One advantage of the client output process 1204 of Fig 12B compared to the process 1202 illustrated in Fig 12A is that the generated intermediate output data is in general less device dependent. The device independent attribute allows the intermediate output data to be more portable and acceptable to more output

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devices equipped or associated with output controllers. Both data output processes (1202 and 1204) enable universal output; allowing a user to install a single client application 210 or components in an information apparatus 200 to provide output capability to more than one output device 220.

[0192] FIG 13A illustrates one example of an output device process 1302 and its associated raster imaging method of present invention. In this output device process 1302, an output device 220 is capable of receiving an intermediate output data from an information apparatus 200. The output device process 1302 and its operations may include or utilize:

- An output device/system or output controller that receives intermediate output data (in step 1300). The intermediate output data includes at least partially a raster output image describing at least part of the content for rendering at the output device 220 or system 250.
- An output device/system or output controller that interprets (in step 1310) the intermediate output data; in one preferred embodiment, the intermediate output data includes an output image utilizing one or more MRC formats or components.
- An output device/system or output controller that performs image processing operation (in step 1320) on the raster image. The image processing operation may include but not limited to image decompression, scaling, halftoning, color matching, among others.
- An output device/system or output controller that converts and or generates (in step 1330) output-engine output data that is in a format or description suitable for input to an output engine (e.g. printer engine in case of a printer) included in an output device 220.
- An output engine in an output device 220 that renders or generates a final output (e.g. the output-engine output data) in step 1370.

[0193] The output device 220 or output system 250 may include an output controller 230 internally or externally to assist the management and operation of the output process 1302. As shown in Fig 7, there are many possible configurations and implementations of an output controller 230 associated to an output device 220 Herein and after, output controller 230 is regarded as an integral part of the output device to which it is attached. Hence, the following described output device operations may be partially or completely performed by the output controller associated with it.

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[0194] In step 1300, output device process 1302 is initiated by client application 210 transmitting an intermediate output data to output device 220 or output system 250. In step 1310, the output device 220 reads and interprets the intermediate output data, containing at least one raster output image relating to the content intended for output. During the reading and interpretation process 1310, the output device 220 may include components that parse the intermediate output data and perform operations such as decompression, decoding, and decryption among others. The output image may be variously encoded and may include one or more compression methods.

[0195] In the event that the method of image encoding includes MRC format, then, in one example implementation, during decoding and mapping of the output image in step 1310, the lower resolution layer and information in an image that includes MRC may be mapped, scaled or interpolated to a higher-resolution output image to produce a better image quality. Therefore, step 1310, in the event that the intermediate output data includes MRC component, each layer in an MRC image can be decompressed, processed, mapped and combined into a single combined output image layer. Step 1310 may also include scaling, color space transformation, and/or interpolation among others. In addition to the possibility of mapping methods using different scaling and interpolation ratio with different layers, another advantage of using MRC is that segmentation information contained in MRC can be utilized to apply different image processing and enhancement techniques to data in different layers of an MRC image in step 1320.

[0196] In step 1320, the output device 220 may further perform image processing operations on the decoded output image. These image processing operations may include, for example, color correction, color matching, image segmentation, image enhancement, anti-aliasing, image smoothing, digital watermarking, scaling, interpolation, and halftoning among others. The image processing operations 1320 may be combined or operated concurrently with step 1310. For example, while each row, pixel, or portion of the image is being decoded and or decompressed, image processing operations 1320 is applied. In another implementation, the image processing 1320 may occur after the entire output image or a large portion of the image has been decoded or decompressed.

[0197] If the intermediate output data includes MRC component, then in step 1320, there are additional opportunities to improve image quality. An image encoded in MRC contains segmented

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information that a traditional single layer image format does not usually have. As an example, foreground can be in one layer, and background in another. As another example, chrominance information may be in one layer and luminance may be in another. This segmented information in MRC may be used to apply different or selective image processing methods and algorithms to different layers or segments to enhance image quality or retain or recover image information. Different image processing techniques or algorithms may include color matching, color correction, black generation, halftoning, scaling, interpolation, anti-aliasing, smoothing, digital watermarking etc. For example, one can apply colorimetric color matching to foreground information and perceptual color matching to background information or vice versa. As another example, error diffusion halftoning can be applied to foreground and stochastic halftoning can be applied to background or vice versa. As yet another example, bi-cubic interpolation can be applied to a layer and bi-linear or minimum distance interpolation can be applied to a different layer.

[0198] In step 1330, the output device 220 or the output controller 230 may convert the processed image (e.g. halftoned) into a form acceptable to the output engine of output device 220. This conversion step is optional, depending on the type, format and input requirement of a particular output device engine (e.g. printer engine in case of a printer). Different output engines may have different input raster image input requirements. As an example different output engines may require different input image formats, number of bits or bytes per pixel, compression or uncompressed form, or different color spaces (e.g. such as RGB, CMY, CMYK, or any combination of Hi-Fi color such as green, orange, purple, red etc). Incoming raster image data can be encoded in a row, in a column, in multiple rows, in multiple columns, in a chunk, in a segment, or a combination at a time for sending the raster data to the output engine. In some cases, step 1330 may be skipped if the result of step 1320 is already in a form acceptable to the output device engine. In other cases, however, further conversion and or processing may be required to satisfy the specific input requirement of a particular output device engine.

[0199] It is important to note that the above described processing from step 1310 to step 1330 may require one or more memory buffers to temporarily store processed results. The memory buffer can store or hold a row, a column, a portion, or a chunk, of the output image in any of the steps described above. Storing and

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retrieving information into and from the memory buffer may be done sequentially, in an alternating fashion, or in an interlaced or interleaved fashion among other possible combinations. Step 1310 to step 1330 operations can be partially or completely implemented with the output controller 230.

[0200] In step 1370, the output device engine included in the output device 220 or output system 250 receives the output-engine output data generated in step 1330 or step 1320. The output-engine output data is in a form that satisfies the input requirements and attributes of the output engine, such as color space, color channel, bit depth, output size, resolution, etc. The output engine then takes this output-engine output data and outputs or renders the data content through its marking engine or display engine.

[0201] One advantage of data output method 1002 that includes output device process 1302 is that it has less processing requirements on an information apparatus 200 compared to conventional process with reference to Fig 1A, and therefore, enables more information apparatus 200 with relatively lower processing power and memory space to have output capability.

[0202] For example, some image processing functions, such as halftoning (e.g. error diffusion) may require substantial processing and computing power. In data output process 1002 that includes output device process 1302, halftoning is performed in step 1320 by an output device component (e.g. the output controller 230) included in the output device 220 or the output system 250, not in the information apparatus 200; therefore reducing the computational requirements for the information apparatus 200. Another advantage of data output 1302 is that the intermediate output data is less device dependent than the output data generated by conventional output method 102 with reference to Fig 1A. The device independence provides opportunity to allow a single driver or application in an information apparatus 200 to output intermediate output data to a plurality of output devices 220 that include output controllers 230.

[0203] Some output devices 220 may contain a printer controller 410. An example of this type of output device or printer is a PostScript printer or PCL printer among others. FIG 13B illustrates an example of an output device process 1304 with a printer that includes a printer controller 410. As discussed in Fig 1, a printer with a printer controller requires input such as page description language (e.g. PostScript, PCL etc.), markup language

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(HTML, XML etc), special image format, special graphics format, or a combination, depending on the type of the printer controller.

[0204] There are many printing system configurations for providing the data output capability and process to a printer or a printing system that includes a printer controller. In one example, the existing printer controller in the output device 220 may incorporate the feature sets provided by the output controller to form a "combined controller" as described previously with reference to Figs 7C and 7F. In another example, the output controller 230 of present invention may be connected sequentially or cascaded to an existing printer controller; the output controller 230 can be internally installed (with reference to FIG. 7B) or externally connected (with reference to FIG. 7A) to the output device 220. For output device 220 that includes a printer controller, the output controller 230 may simply decode the intermediate output data in step 1310 and then convert it into a form acceptable for input to the printer controller in step 1350.

[0205] An output device process 1304 and operations for an output device 220 or system 250 that includes a printer controller 410 may include or utilize:

- An output controller 230 or components in an output device 220 or system 250 that receives an intermediate print data or output data (with reference to step 1300), the intermediate print data includes at least a raster image related at least in part to the content for rendering at the output device 220.
- An output controller 230 or components in an output device 220 or system 250 that interprets the intermediate output data (with reference to step 1310); in one preferred embodiment, the intermediate output data includes an output image utilizing one or more MRC format or components.
- An output controller 230 or components in an output device 220 or system 250 that converts the intermediate output data into a printer-controller print data (with reference to step 1350); the printer-controller print data includes a format or language (e.g. PDL, PDF, HTML, XML etc.) that is acceptable or compatible to the input requirement of a printer controller.
- A printer controller or components in an output device 220 or system 250 that receives a printer controller print data; the printer controller may parse, interpret and further process (e.g. rasterization, scaling, image enhancement, color correction, color matching, halftoning etc.) and convert the printer-controller print data into a printer-engine print data (with reference to step

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1360); the printer-engine print data comprising of a format or description acceptable for input to a printer engine in the output device 220 or the output system 250.

- A printer engine or components in an output device 220 or system 250 that renders or generates a final output (with reference to step 1370) with the input printer engine print data.

[0206] In output device process 1304, step 1300 (receiving intermediate output data) and step 1310 (interpret intermediate output data) are identical to step 1300 and step 1310 in output device process 1302, which have been described in previous sections with reference to Fig. 13A.

[0207] In step 1350, the output controller 230 converts the intermediate print data into a printer-controller print data that is in a form compatible or acceptable for input to a printer controller. For example, a printer controller may require as input a specific page description language (PDL) such as PostScript. The output controller 230 then creates a PostScript file and embeds the output image generated or retrieved in step 1310 into the PostScript file. The output controller 230 can also create and embed the output image from step 1310 into other printer controller print data formats, instructions or languages.

[0208] In step 1360, the printer controller receives printer-controller print data generated in step 1350 that includes an acceptable input language or format to the printer controller. The printer controller may parse, interpret, and decode the input printer-controller print data. The printer controller may further perform raster image processing operations such as rasterization, color correction, black generation, GCR, anti-aliasing, scaling, image enhancement, and halftoning among others on the output image. The printer controller may then generate a printer-engine print data that is suitable for input to the printer engine. The type and or format of printer-engine print data may vary according to the requirement of a particular printer engine.

[0209] It is important to note that the above described process from step 1310 to step 1360 may require one or more memory buffer to temporarily store processed results. The memory buffer can store or hold a row, a column, a portion, or a chunk, of the output image in any of the steps described above. Storing and retrieving information into and from the memory buffer may be done sequentially, alternated, or in an interlaced or interleaved fashion among other possible combinations. Process and operations

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of step 1310 to step 1360 can be implemented with output controller 230.

[0210] In step 1370, the printer engine included in the output device 220 or output system 250 generates or renders the final output based on the printer-engine print data generated in step 1360. For example, the printer-engine print data may be in CMY, CMYK, and RGB etc, and this may be in one or more bits per pixel format, satisfying the size and resolution requirement of the printer engine. The printer engine included the output device 220 may take this print data and generate or render an output page through its marking engine.

[0211] Having described and illustrated the principles of our invention with reference to an illustrated embodiment, it will be recognized that the illustrated embodiment can be modified in arrangement and detail without departing from such principles. In view of the many possible embodiments to which the principles of our invention may be applied, it should be recognized that the detailed embodiments are illustrative only and should not be taken as limiting the scope of our invention. Rather, I claim as my invention all such embodiments as may come within the scope of the following claims and equivalents thereto.

[0212] Unless the context indicates otherwise, a reference in a claim to the number of instances of an element, be it a reference to one instance or more than one instance, requires at least the stated number of instances of the element but is not intended to exclude from the scope of the claim a structure or method having more instances of that element than stated. Specifically, but without limitation, a reference in a claim to an or one output device or system, to an or one image, or to a or one rasterization parameter is not intended to exclude from the scope of the claim a structure or method having, including, employing or supplying two or more output devices or system, images or rasterization parameters.

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CLAIMS

1. A method of operating an information apparatus that is on a local area network for outputting an image of a digital document that can be accessed by the information apparatus, the digital document including at least part of a text or graphics information, said method comprising:

rasterizing the digital document on the information apparatus to generate image data,

creating an intermediate output data from the image data,

transmitting the intermediate output data to an output device that is on said local area network and includes an output engine that outputs images with a device-specific output size and resolution,

recovering the image data from the intermediate output data,

converting the image data to instructions compatible with the output engine, based at least in part on the device-specific output size and resolution of the output engine,

providing the instructions to the output engine, and

operating the output engine in response to said instructions and thereby outputting an image of the digital document.

2. A method according to claim 1, wherein the output engine is one of a marking engine, a display engine and a projection engine.

3. A method according to claim 1, wherein the intermediate output data includes a mixed raster content encoding.

4. A method according to claim 1, wherein the output device is printing device that includes a printer controller and an output controller, the method further comprising,

generating with the output controller a print data that is acceptable to the printer controller and including the recovered image data into the print data, and

passing the print data to the printer controller for converting the image data into instructions compatible with the output engine, based at least in part on the device-specific output size and resolution of the marking engine.

5. A method according to claim 4, in which the print data includes a page description language and the method comprises generating with the output controller a page description language

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(PDL) representation of the digital document to the printer controller and interpreting with the printer controller the PDL representation and converting the image data based at least in part on said device-specific output size and resolution.

6. A method according to claim 1, wherein the image included in the intermediate output data is encoded at least with predetermined standard output size and resolution and the rasterizing step includes calculating at least one scale factor relating the output size and resolution of the digital document to said predetermined standard output size and resolution and employing said scale factor as a rasterization parameter in the rasterizing step.

7. A method according to claim 6, wherein the predetermined standard output size and resolution is included in the output device and the step of converting the image data to instructions compatible with the output engine further includes converting the image data from at least the standard output size and resolution to the output size and resolution of the output engine.

8. A method according to claim 1, wherein the step of creating the intermediate output data includes at least one of compression, encoding, encryption and color correction.

9. A method according to claim 1, wherein the step of creating the intermediate output data includes creating an intermediate output data that includes at least one of an image, instructions, and a color profile.

10. A method according to claim 1, wherein the step of recovering the raster image data from the intermediate output data includes at least one of decoding, decryption, and decompression.

11. A method according to claim 1, wherein the step of converting the image data to instructions includes at least one of color space conversion, scaling, interpolation, color matching and halftoning.

12. A method according to claim 1, including obtaining a rasterization vector to the information apparatus and using said rasterization vector in the rasterizing step.

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13. A method according to claim 12, wherein the rasterization vector has at least one component related to the output device and includes one or more of an output size, resolution, color space, and bit depth.

14. A method according to claim 12, wherein at least one component of the rasterization vector is based on a predetermined standard value or default.

15. A method according to claim 12, wherein the rasterization vector is obtained from the output device.

16. A method according to claim 1, wherein the method includes selecting an output device description from a plurality of output device descriptions presented to a user of the information apparatus.

17. A method according to claim 12, comprising inputting user preferences as components of a rasterization vector and using said rasterization vector in the rasterizing step.

18. A method of outputting an image of a digital document that can be accessed by an information apparatus to an output system, the output system including information related to predetermined standard rasterization parameter values that include one or more of bit depth, color space, output size, and resolution, said method comprising:

generating image data by rasterizing the digital document on the information apparatus in accordance at least in part with at least one predetermined standard rasterization parameter value,

creating on the information apparatus an intermediate output data that includes the image data,

transmitting the intermediate output data from the information apparatus to an output system that includes an output engine that outputs an image with at least one device specific value that includes bit depth, color space, output size, or resolution,

recovering the image data from the intermediate output data,

converting the image data with the at least one predetermined standard rasterization parameter value to instructions compatible with the output engine that include the at least one device specific value,

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providing the instructions to the output engine, and

operating the output engine in response to said instructions and thereby outputting an image of the digital document.

19. A method according to claim 18, wherein the output device is a printing device and the output engine is a marking engine.

20. A method according to claim 18, comprising selecting said output system from among a plurality of available output systems and uploading at least one value specifying said predetermined rasterization parameters to the information apparatus,

21. A method of outputting an image of a digital document that can be accessed by an information apparatus, the digital document including at least part of a text or graphics information, said method comprising:

selecting an output device model from a menu of models presented by the information apparatus, each model of output device including an output engine, and each output engine being characterized by a value of a rasterization vector,

accessing a value of the rasterization vector related to the output engine of the selected model,

rasterizing the digital document on the information apparatus in accordance with said rasterization vector to generate image data,

creating an intermediate output data on the information apparatus that includes the image data,

transmitting the intermediate output data from the information apparatus to an output device of said selected model,

recovering the image data from the intermediate output data,

converting the image data to instructions compatible with the output engine of the output device,

providing the instructions to the output engine of the output device, and

operating the operating engine in response to said instructions and thereby outputting an image of the digital document.

22. A method according to claim 21, wherein the rasterization vector is obtained form the output device.

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23. A method according to claim 21, wherein the output device is a printing device and the output engine is a marking engine.

24. A method of outputting an image of a digital document that can be accessed by an information apparatus, said method comprising:

rasterizing the digital document on the information apparatus to generate image data,

creating an intermediate output data on the information apparatus, the intermediate output data including the image data, the image data being composed of a background layer and at least one foreground layer,

transmitting the intermediate output data to an output device that includes an output engine,

recovering the image data from the intermediate output data,

converting the image data into instructions compatible with the output engine,

providing the instructions to the output engine, and

operating the output engine in response to said instructions and thereby outputting an image of the digital document.

25. A method according to claim 24, wherein the image data comprises a background layer and at least one pair of layers composed of a foreground layer and a mask layer.

26. An imaging system comprising:

a local area network having a propagation medium and at least first and second nodes, said first node including an information apparatus and said second node including an output device, said output device including an output engine for outputting images,

a first means on the information apparatus for rasterizing a digital document to generate image data,

a second means on the information apparatus for creating an intermediate output data that includes the image data,

a third means on the information apparatus for impressing the intermediate output data on the propagation medium, and

an output controller at the second node for retrieving the image data from the intermediate output data and converting the image data into instructions compatible with the output engine.

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27. An imaging system according to claim 26, wherein the information apparatus includes a means for storing values for the predetermined standard size and resolution and the first means is adapted to rasterize the digital document to said predetermined standard output size and resolution.

28. An imaging system according to claim 26, wherein the output device includes a means for uploading to the information apparatus an output device profile that specifies device specific rasterization parameter values that include one or more of bit depth, output size and resolution to the information apparatus.

29. A method of outputting an image of a digital document that can be accessed by an information apparatus, said method including:

(a) establishing bidirectional communication between the information apparatus and at least two output devices,

(b) receiving a message from a first available output device specifying a feature of the first available output device,

(c) determining from the message from the available output device whether the feature of the available output device matches a requirement for outputting the digital document,

(d) if so, selecting said available output device and transmitting image data to the selected output device, and otherwise receiving a message from another available output device specifying a feature of the other available output device, and

(e) repeating steps (c) and (d).

30. A method according to claim 29, comprising, prior to step (b), transmitting from the information apparatus a message that calls for a receiving output device to transmit a message that specifies a feature of the respective output device.

31. A method according to claim 29 in which the feature includes one or more of a quality of service, a price indicator, a status indicator, an availability indicator, and an output data format indicator.

32. An output controller for processing intermediate output data that includes image data and has a first bit depth and resolution, the image data corresponding to content that includes

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at least part of a text or graphics information, the controller comprising:

means for retrieving the image data from the intermediate output data, and

means for carrying out an image processing operation on the data, said image processing operation adjusting at least one of bit depth, color space and a combination of resolution and output size of an image represented by the data.

33. The controller of claim 32 further comprising means for receiving the intermediate output data via a short-range wireless communication channel.

34. The controller of claim 32 in which the image data includes mixed raster content encoding, and the means for retrieving the image data from the intermediate output data comprises means for generating an output image data from at least part of the mixed raster content data.

35. The controller of claim 32 in which the means for carrying out image processing operations on the data, includes means for carrying out one or more of a color correction operation, a color matching operation, a color management operation, a scaling operation, an interpolation operation, a color space conversion, a decompression, a decryption, and a halftoning operation.

36. The controller of claim 32 in which the first bit depth and resolution correspond to a predefined standard value included in the controller.

37. The controller of claim 32 in which the means for carrying out an image processing operation on the data adjusts at least one of bit depth, color space, and a combination of output size and resolution to a value corresponding to a specific input requirement of an output engine.

38. The controller of claim 32 in which the output controller is included in the output device.

39. The controller of claim 32 in which the output controller is included in one of a server, an external station, a board, a card, and a data access point.

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40. The controller of claim 32 further comprising means for storing one or more output device profiles.

41. An output controller method for processing intermediate output data that includes image data and having a first bit depth and resolution, the image data corresponding to content that includes at least part of a text or graphics information, the method comprising:

retrieving the image data from the intermediate output data, and

carrying out an image processing operation on the data, said image processing operation adjusting at least one of bit depth, color space and a combination of resolution and output size of an image represented by the data.

42. The controller method of claim 41 further comprising receiving the intermediate output data via a short-range wireless communication channel.

43. The controller method of claim 41 in which the image data includes data encoded with mixed raster content.

44. The controller method of claim 41 wherein the step of carrying out an image processing operation on the data, includes carrying out one or more of a color correction operation, a color matching operation, a color management operation, a scaling operation, an interpolation operation, a color space conversion, a halftoning operation, a compression operation, a decompression operation, and a decryption operation.

45. In a computer readable medium, data output controller software for processing intermediate output data that includes image data and has a first bit depth, and resolution, the image data corresponding to content that includes text or graphics information, the controller software comprising:

software for retrieving the image data from the intermediate output data, and

software for carrying out an image processing operation on the data, said image processing operation adjusting at least one of bit depth, color space and a combination of resolution and output size of an image represented by the data.

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46. The medium of claim 45 further comprising software for establishing a short-range wireless communicating channel with an information apparatus.

47. The medium of claim 46 further comprising software for providing an output device profile over the communication channel.

48. The medium of claim 45 further comprising software for calculating and collecting payment information as compensation for rendering of the content by the output device.

49. The medium of claim 45 wherein the software includes software for retrieving the image data from data encoded with mixed raster content.

50. The medium of claim 45 wherein the software for carrying out an image processing operation on the data includes software for carrying out one or more of a color correction operation, a color matching operation, a color management operation, a scaling operation, an interpolation operation, a color space conversion, and a halftoning operation.

51. The medium of claim 45 in which the first bit depth and resolution correspond to respective values that are included in said software for retrieving image data and carrying out image processing operations.

52. The medium of claim 45 in which the output controller software is included in a server, an external station, a board, and a data access point.

53. In a computer readable medium, an information apparatus data output software for managing output of content to a selected output device, comprising:

software for accessing at least part of said content;

software for establishing a communication channel between the information apparatus and one or more output devices;

software for receiving over the communication channel at least one attribute corresponding to the one or more output devices;

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software for selecting one of said one or more output devices for rendering content based at least in part on the received attributes;

software for conforming at least part of the content into one or more output images with the at least one attribute related at least in part to the selected output device;

software for generating at the information apparatus an output data that includes said one or more output images; and

software for delivering the output data for rendering by the selected output device.

54. The medium of claim 53 in which the software for establishing a communication channel includes software for establishing a wireless communication channel.

55. The medium of claim 53 further comprising software for discovering the selected output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

56. The medium of claim 53 further comprising software for providing payment information over the communication channel as compensation for the rendering of the content by the selected output device.

57. A method of operating an information apparatus with access to content, for managing output of said content to an output device, comprising:

establishing a communication channel between the information apparatus and the output device;

receiving over the communication channel an output device profile associated with the output device;

obtaining one or more image attributes associated with the output device employing the output device profile;

conforming at least part of the content into one or more output images with said one or more image attributes;

generating an output data associated with the output device, the output data

including said one or more output images; and

delivering the output data to the output device for rendering.

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58. The method of claim 57, wherein the output device is one of a plurality of output devices and the method includes the step of selecting the output device from said plurality of output devices.

59. The method of claim 57, comprising obtaining image attributes that include one or more of resolution, color space, output size, resolution, bit depth, number of color channels, compression method, an image format indicator, and rendering intent.

60. The method of claim 57 comprising encoding said one or more output images with mixed raster content encoding.

61. A method of operating an information apparatus with access to content, for managing output of said content to an output device, comprising:

establishing a communication channel between the information apparatus and an output device;

receiving over the communication channel at least an indication from the output device related to rendering the content at the output device;

obtaining one or more rasterization parameters related to the output device;

conforming at least part of the content into one or more output images with said one or more rasterization parameters; and delivering an output data to the output device for rendering, the output data including said one or more output images.

62. The method of claim 61 comprising establishing a short-range wireless communication channel.

63. The method of claim 61 wherein the output device is one of a plurality of output devices and the method includes the step of selecting the output device from among said plurality of output devices.

64. The method of claim 61 wherein the output device is one of a plurality of output devices and the step of receiving at least an indication includes receiving at least an indication from one or more output devices related to rendering the content at the output devices respectively.

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65. The method of claim 61 comprising obtaining, as said one or more rasterization parameters, one or more of resolution, color space, output size, resolution, bit depth, and number of color channels.

66. The method of claim 61 in which the conforming of at least part of the content includes one or more of a color correction operation, a color matching operation, a color management operation, a scaling operation, an interpolation operation, a color space conversion, a compression, a decompression, a segmentation, a de-segmentation, a storing, a retrieving and a halftoning operation.

67. A method of operating an information apparatus with access to content, for managing output of said content to an output device, comprising:

establishing a communication channel between the information apparatus and one or more output devices;

receiving over the communication channel at least one attribute corresponding to said one or more output devices;

selecting one of said one or more output devices for rendering content based at least in part on the received attributes;

conforming at least part of the content into one or more output images with at least one rasterization parameter related at least in part to the selected output device;

generating an output data that includes said one or more output image ; and

delivering the output data for rendering by the selected output device.

68. The method of claim 67, comprising establishing a wireless communication channel.

69. The method of claim 68, comprising conforming at least part of the content with rasterization parameters that include one or more of resolution, color space, output size, resolution, bit depth, and number of color channels.

70. The method of claim 68 further comprising providing payment information over the communication channel as compensation for the rendering of the content by the selected output device.

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71. A method of operating an information apparatus with access to content, the content includes at least part of a text or graphics information, for managing output of content to one or more output devices, comprising:

establishing a communication channel between the information apparatus and one or more output devices with short range wireless communication;

conforming at least part of the content into one or more output images with at least one image attribute associated with at least one predefined standard rasterization parameter values related to an intermediate output data format;

generating a device independent intermediate output data that includes said one or more output images; and

delivering via the communication channel the intermediate output data to at least one of said one or more output devices for rendering.

72. In a computer readable medium, an information apparatus data output software for managing output of content to an output device, comprising:

software for accessing at least part of the content;

software for managing a communication channel between the information apparatus and the output device;

software for receiving over the communication channel one or more components associated with the output device;

software for conforming at least part of the content into one or more output images with one or more rasterization parameters related at least in part to said one or more components;

software for generating an output data including at least said one or more output images; and

software for directing the output data over the communication channel to the output device for rendering.

73. A method of operating a printing device that includes a printer engine for rendering data encoded in a raster form, said method comprising:

receiving by short range wireless communication an intermediate data which includes image data corresponding to at least part of the content,

extracting the image data from said intermediate data,

converting the image data to data in a page description language form,

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converting the data in the page description language to the raster form rendered by the printer engine, and

supplying the data in the raster form to the printer engine.

74. An output device for rendering content, said output device including:

a communication unit to receive via short range wireless communication an intermediate output data in which includes at least part of the content encoded in image data form with a first bit depth and a first resolution, said intermediate output data including graphics or text elements exclusively encoded with image data,

an interpreter for receiving the intermediate output data and retrieving said image data from said intermediate output data,

a processor for carrying out at least one image processing operation on the interpreted data, said processing operation adjusting at least one of bit depth, color space and a combination of output size and resolution of the interpreted data, and

an output engine for receiving data from said processor and employing the data received from the processor to render the content.

75. The output device of claim 74, wherein the output device is a printer, the output engine is a printer engine, and the processor is an image processor, and the second bit depth is less than the first bit depth.

76. A method of outputting content encoded in image data having a first bit depth and a first resolution, the content including at least part of a text or graphics element, said method comprising:

receiving an intermediate output data that include the image data related to content,

interpreting the intermediate output data and retrieving said image data from the intermediate output data,

carrying out at least one processing operation on the interpreted image data, said processing operation adjusting at least one of bit depth, color space and a combination of output size and resolution of the interpreted data, and

employing the data generated by the processing operation to render the content.

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77. In a data output device for rendering content managed with an information apparatus, the data output device including an output engine that imparts output on a medium in accordance with output data received at the output device, a communication unit that communicates with one or more devices, and a memory storage that stores data for rendering; the improvement comprising:

means for providing at least an indication related to one or more data formats acceptable to the controller in connection with rendering content at the output device; and

means for receiving an intermediate output data related to the content managed from the information apparatus, the intermediate output data corresponding to at least part of the content and includes data in accordance with said one or more acceptable data formats.

78. The output device of claim 77 further comprising means for establishing a wireless communication channel with an information apparatus.

79. The output device of claim 78 including means for providing over the communication channel as said indication one or more of an output device identification, an intermediate output data indicator, a quality of service indicator, a price indicator, a status indicator, an output device attribute indicator, a rasterization parameter indicator, a format indicator, and a language indicator.

80. The output device of claim 78 further comprising means for providing over the communication channel an output device profile.

81. The output device of claim 77 further comprising means for converting the intermediate output data into an output data that is acceptable for rendering with the output device.

82. The output device of claim 77 further including means for receiving intermediate output data that includes at least one output image corresponding to at least part of the content.

83. The output device of claim 77 wherein the means for receiving an intermediate output data includes means for receiving

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the intermediate output data that includes data in accordance with MRC encoding.

84. The output device of claim 83 further comprising means for performing at least one image processing operation on the output image; the image processing operation including one or more of a color correction operation, a color matching operation, a color space conversion, a color management operation, a scaling operation, an interpolation operation, and a halftoning operation.

85. The output device of claim 77 further comprising means for conforming the intermediate output data into a print data that is acceptable to a printer controller associated with a printing device.

86. The output device of claim 77 in which the output medium is one or more of a substrate, a paper, a display screen, and a projector.

87. The output device of claim 77 in which the output device further comprises means for storing one or more output device profiles with one or more attributes corresponding to the output devices.

88. The output device of claim 77 further comprising means for receiving plural service requests from plural information apparatuses, the output device providing the at least part of the output device profile to each of the plural information apparatuses.

89. The output device of claim 77 in which the output device includes a printer.

90. The output device of claim 77 in which the output device further includes means for implementing payment processing as compensation for rendering of the output content on the output device.

91. The output device of claim 77 in which the output device further includes means for implementing job management functionalities with one or more of data output job queuing and spooling.

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92. The output device of claim 77 in which the output device further includes means for implementing a security procedure that limits access to the rendering provided by the selected output device.

93. The output device of claim 77 in which the output device further includes means for converting the output data content into a form compatible with the output engine.

94. An information apparatus for managing outputting of content to an output device, the content accessible at least partly by the information apparatus, the information apparatus comprising:

a communication unit to communicate with the output device,

a user interface for interacting with a user;

means for establishing a communication channel between the information apparatus and the output device;

means for receiving over the communication channel one or more components associated with the output device enabling the content to be rendered by the output device;

means for conforming at least part of the content into one or more output images with said one or more components;

means for generating an intermediate output data including said one or more output images and for rendering by the output device; and

means for delivering the intermediate output data to the output device for rendering.

95. The apparatus of claim 94, for managing outputting of content to an output device selected from a plurality of output devices, wherein the communication unit communicates with said plurality of output devices, and the apparatus includes means to select an output device from said plurality of output devices.

96. The apparatus of claim 94 in which the one or more components includes one or more of a rasterization vector, a price indicator, an availability indicator, a status indicator, an output data format indicator, and a quality of service indicator.

97. The apparatus of claim 94 in which the communication channel includes a wireless communication channel.

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98. The apparatus of claim 94 further comprising means for sending payment information over the communication channel as compensation for the rendering of the content by the output device.

99. An information apparatus for managing the outputting of content to an output device, the content accessible at least partly by the information apparatus, the information apparatus comprising:

a communication unit to communicate with one or more output devices;

a user interface for interacting with a user;

means for obtaining one or more device dependent attributes associated with the output device;

means for conforming at least part of the content into one or more output images with said one or more device dependent attributes, at least part of said one or more output images including mixed raster content encoding;

means for generating an intermediate output data including said one or more output images; and

means for delivering the intermediate output data to the output device for rendering.

100. The apparatus of claim 99 in which the means for obtaining one or more device dependent attributes includes means for obtaining from one or more sources that includes a user input, a network server, a default value stored in the information apparatus, and from the output device,

101. The apparatus of claim 99 further comprising means for establishing a wireless communication with one or more output devices.

102. The apparatus of claim 101 further comprising means for obtaining over the communication channel an output device profile that includes the device dependent attributes.

103. The apparatus of claim 101 further comprising means for sending payment information over the communication channel as compensation for the rendering of the content by the output device.

104. The apparatus of claim 99 in which the means for conforming includes means for conforming at least part of the content into at least one output image by one or more of a

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rasterization operation, a scaling operation, an interpolation operation, and a compression operation.

105. The apparatus of claim 99 in which the mixed raster content data includes at least a foreground layer.

106. An information apparatus capable of outputting content to an output device; the content accessible at least partly by the information apparatus, the information apparatus comprising:

a communication unit to communicate with an output device;

a user interface for interacting with a user;

means for establishing a communication channel between the information apparatus and the output device with short range wireless communication;

means for conforming at least part of the content into at least one output image with at least one predefined standard rasterization parameter values;

means for generating an intermediate output data including the one or more output image, the intermediate output data being at least partly device independent; and

means for delivering via the established communication channel the intermediate output data to the output device for rendering.

107. The apparatus of claim 106 wherein the communication unit communicates with a plurality of output devices and the information apparatus includes means for selecting an output device of said plurality to receive the intermediate output data.

108. The apparatus of claim 106 further comprising means for obtaining over the communication channel an output device profile.

109. The apparatus of claim 106 further comprising means for obtaining over the communication channel information related to the intermediate output data format.

110. The apparatus of claim 106 further comprising means for sending payment information over the communication channel as compensation for the rendering of the content by the output device.

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111. The apparatus of claim 106 in which the predefined standard rasterization values is included in the information apparatus.

112. The apparatus of claim 106 in which the means for conforming includes means for performing one or more of a rasterization operation, a scaling operation, an interpolation operation, and a compression operation.

113. The apparatus of claim 106 in which the means for conforming conforms at least part of the content into an output image that includes mixed raster content encoding.

114. A data output method for rendering at an output device content at least partly accessible with an information apparatus, comprising:

obtaining at the information apparatus one or more rasterization parameters corresponding to the output device;

conforming at the information apparatus at least part of the data content into one or more output images with said one or more rasterization parameters;

transmitting an intermediate output data from the information apparatus to an output controller that is distinct from the information apparatus and associated with the selected output device, the intermediate output data including said one or more output image;

converting at the output controller, the intermediate output data into an output data acceptable for rendering at the output device.

115. The method of claim 114 comprising obtaining the one or more rasterization parameters from one or more of the output device or user input or default value.

116. The method of claim 114 in which the one or more output images are associated with different slides, pages or cards.

117. The method of claim 114 in which the conforming includes one or more of a rasterization operation, a scaling operation, an interpolation operation, and a compression operation.

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118. The method of claim 114 in which the content includes text or graphics elements and the conforming of at least part of the content include rasterizing the content into image form.

119. The method of claim 114 comprising transmitting the intermediate output data by wireless communication.

120. The method of claim 114 in which the output controller is included in the output device.

121. The method of claim 114 further comprising performing at the output controller one or more image processing operations on the one or more output images included in the intermediate output data, the one or more image processing operations including one or more of a color correction operation, a color matching operation, a color management operation, a scaling operation, an interpolation operation, a color space conversion, a compression operation, and a halftoning operation.

122. The method of claim 114 in which the output device is a printing device and the method further comprising conforming the intermediate output data into a print data that is acceptable to a printer controller associated with the output device.

123. The method of claim 114 further comprising obtaining at the information apparatus a data content for rendering at the selected output device.

124. A data output method for rendering content at least partly accessible with an information apparatus, comprising:

establishing a communication channel between the information apparatus and one or more output devices with short range wireless communication;

conforming at the information apparatus at least part of the data content into one or more output images with at least one predefined or standard rasterization parameters;

generating at the information apparatus a device independent intermediate output data, the intermediate output data including the one or more output images ;

delivering via the established communication channel the intermediate output data from the information apparatus to said one or more output devices for rendering; and

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converting at said one or more output devices the intermediate output data into an output data acceptable for rendering by an output engine included in said one or more output devices.

125. The method of claim 124 further comprising discovering the selected output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

126. A data output method for rendering at an output device content at least partly accessible with an information apparatus, comprising:

selecting an output device with an output engine for rendering the data content;

conforming at least part of the content into one or more output images with at least one rasterization parameter related at least in part to the selected output device; generating an intermediate output data that includes said one or more output images;

delivering the intermediate output data for rendering by the selected output device;

receiving at the selected output device the intermediate output data;

performing one or more image processing operations on said one or more output images; and

converting at the selected output device the intermediate output data into an output data acceptable for rendering by the output engine included in the selected output device.

127. The method of claim 126 further comprising discovering the selected output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

128. The method of claim 127 in which the information apparatus discovers the one or more output devices with wireless communication.

129. The method of claim 127 in which discovering the one or more output devices includes the information apparatus sending an

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output service request and awaiting a response from one or more output devices.

130. The method of claim 127 in which discovering the one or more output devices includes one or more output devices posting their availability and the information apparatus contacting one or more of the one or more output devices.

131. The method of claim 127 in which discovering the one or more output devices includes the information apparatus obtaining from a service node information about the one or more output devices and the information apparatus contacting one or more of the one or more output devices.

132. The method of claim 127 in which discovering one or more output devices involves determining if the one or more output devices satisfy one or more output service requirements.

133. The method of claim 127 further comprising obtaining at least partial output device profile form the one or more output devices that are discovered.

134. The method of claim 127 further comprising providing at the information apparatus information related to the one or more output devices discovered by the information apparatus and obtaining from a user a selection of the selected output device.

135. The method of claim 126 in which the selecting includes automatic selection by one or more components of the information apparatus.

136. A raster image processing method for processing content into an output data acceptable for rendering by an output engine included in an output device, the output data corresponding to data content accessible at least partly from an information apparatus, the method comprising:

rasterizing at the information apparatus at least part of the content into one or more output images with at least one rasterization parameter associated with the output device;

generating at the information apparatus an intermediate output data for rendering of the data content at the output device,

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the intermediate output data including said one or more output images;

transmitting the intermediate output data from the information apparatus for rendering at the output device;

performing at least one image processing operation, at an output controller that is distinct from the information apparatus and associated with the output device, on said one or more output images included in the intermediate output data; and

conforming at the output controller the intermediate output data into the output data acceptable for rendering by the output engine.

137. The method of claim 136 comprising rasterizing at least part of the content into said one or more output images with rasterization parameters that include one or more of resolution, color space, output size, and bit depth.

138. The method of claim 136 comprising encoding said one or more images with mixed raster content encoding.

139. The method of claim 136 comprising transmitting the intermediate output data by wireless communication.

140. The method of claim 136 comprising performing at least one image processing operation, on the one or more output images that includes one or more of a color correction operation, a color matching operation, a color management operation, a scaling operation, an interpolation operation, a color space conversion, and a halftoning operation.

141. The method of claim 136 comprising conforming the intermediate output data by performing one or more of compression, decompression, segmentation, de-segmentation, storing, and retrieving.

142. A raster image processing method for processing content into a print data acceptable for rendering by a printer engine included in a printing device, the printing device including a printer controller, the print data corresponding to content accessible at least partly from an information apparatus, the method comprising:

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rasterizing at the information apparatus at least part of the content into one or more output images with at least one rasterization parameter;

generating at the information apparatus an intermediate output data that includes the one or more output images;

transmitting at the information apparatus the intermediate output data from the information apparatus to a processor distinct from the information apparatus and associated with the printing device;

converting at the processor the intermediate output data into a print data acceptable to the printer controller, and

raster image processing at the printer controller the print data for rendering by the printer engine.

143. The method of claim 142 comprising rasterizing at least part of the content with rasterization parameters including one or more of resolution, color space, output size, bit depth, and rendering intent.

144. The method of claim 142 comprising encoding the one or more images with mixed raster content encoding.

145. The method of claim 142 comprising transmitting the intermediate output data by wireless communication.

146. The method of claim 142 further comprising interpreting the intermediate output data and retrieving the one or more output images.

147. The method of claim 146 further comprising one or more operations on the one or more output images that include one or more of compression, decompression, segmentation, de-segmentation, storing, retrieving, color correction, color management, scaling, interpolation, color space conversion, and decryption.

148. The method of claim 142 in which the converting of the intermediate output data includes embedding the one or more output image information into the print data.

149. A method of processing content, comprising:

creating raster data by rasterizing at least part of the content;

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creating one or more images with at least two raster-form layers for storing segmented information associated with at least part of the content;

storing at least part of the raster data into the at least two raster-form layers according to the segmented information; and

transmitting an output data that includes said one or more images by local short range communication to an output device or system for rendering.

150. The method of claim 149 comprising creating raster data by rasterizing content that includes at least part of a text or graphics information.

151. The method of claim 149 comprising creating one or more images with each raster-form layer including one or more image attributes that differentiate it from other layers, the one or more attributes including one or more of resolution, color space, output size, bit depth, and compression method, digital watermark, and rendering intent.

152. The method of claim 149 comprising creating one or more images with at least two raster-form layers for storing segmented information that includes an association with one or more of a background and a foreground, and a luminance and a chrominance.

153. The method of claim 149 comprising creating one or more images with at least two raster-form layers for storing segmented information that includes an association with one or more of a text, a graphics, an image, a video, and an audio.

154. The method of claim 149 comprising creating one or more images with at least two raster-form layers, and at least one a selector layer.

155. The method of claim 150 further comprising one or more operations on one or more of the raster-form layers that include one or more of compression, decompression, segmentation, de-segmentation, storing, retrieving, color correction, color management, scaling, interpolation, color space conversion, encryption, digital watermarking, and halftoning.

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156. The method of claim 149 comprising transmitting the output data by short-range wireless communication.

157. A raster image processor for processing content, comprising:

means for creating raster data by rasterizing at least part of the content,

mean for creating one or more images with at least two raster-form layers for storing segmented information associated with at least part of the content,

means for storing at least part of the raster data into the at least two raster-form layer according to the segmented information, and

means for passing said one or more images for delivery to an output device or system.

158. The processor of claim 157 in which the content includes text or graphics information.

159. The processor of claim 157 wherein the means for creating one or more images creates raster-form layers that each include one or more image attributes that differentiate it from other layers, the one or more attributes including one or more of resolution, color space, output size, resolution, bit depth, compression method, digital watermark, and rendering intent.

160. The processor of claim 158 further comprising means for performing one or more operations on one or more of the raster-form layers, said one or more operations including one or more of compression, decompression, segmentation, de-segmentation, storing, retrieving, color correction, color management, scaling, interpolation, color space conversion, encryption, digital watermarking, and halftoning.

161. The processor of claim 157 further comprising means for delivering the one or more images to an output device or system with short-range wireless communication.

162. The method of claim 157 in which the output device or system includes printing device.

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163. A raster image processing method for processing content into output data acceptable for rendering by an output engine included in an output device, the output data corresponding to content accessible at least partly from an information apparatus, the method comprising:

rasterizing at the information apparatus at least part of the content into an output image with at least two raster-form data layers and a selector mask layer, each raster-form data layer being associated with a segmentation type associated to an attribute related to information contained in the data content;

performing at least one image processing operation, at a processor distinct from the information apparatus and associated with the output device, on each data layer of the output image; and

conforming at the processor the output image into a form acceptable for rendering by the output engine.

164. The method of claim 163 comprising rasterizing content that includes at least part of a text or graphics information.

165. The method of claim 163 comprising rasterizing content into raster-form layers that each include one or more attributes that differentiate it from other layers, the one or more attributes including one or more of resolution, color space, output size, bit depth, and rendering intent.

166. The method of claim 163 comprising rasterizing content into raster-form data layers each associated with segmentation information that includes an association with one or more of a background and a foreground, and a luminance and a chrominance.

167. The method of claim 163 in which the segmented information includes an association with one or more of text, graphics, image, video, and audio.

168. The method of claim 163 comprising performing image processing operations that include one or more of a compression, decompression, segmentation, de-segmentation, storing, retrieving, color correction, color management, scaling, an interpolation, color space conversion, encryption, digital watermarking, and halftoning.

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169. The method of claim 163 further comprising transmitting the output image to the processor with short-range wireless communication.

170. The method of claim 57 further comprising providing payment information over the communication channel as compensation for the rendering of the content by the output device.

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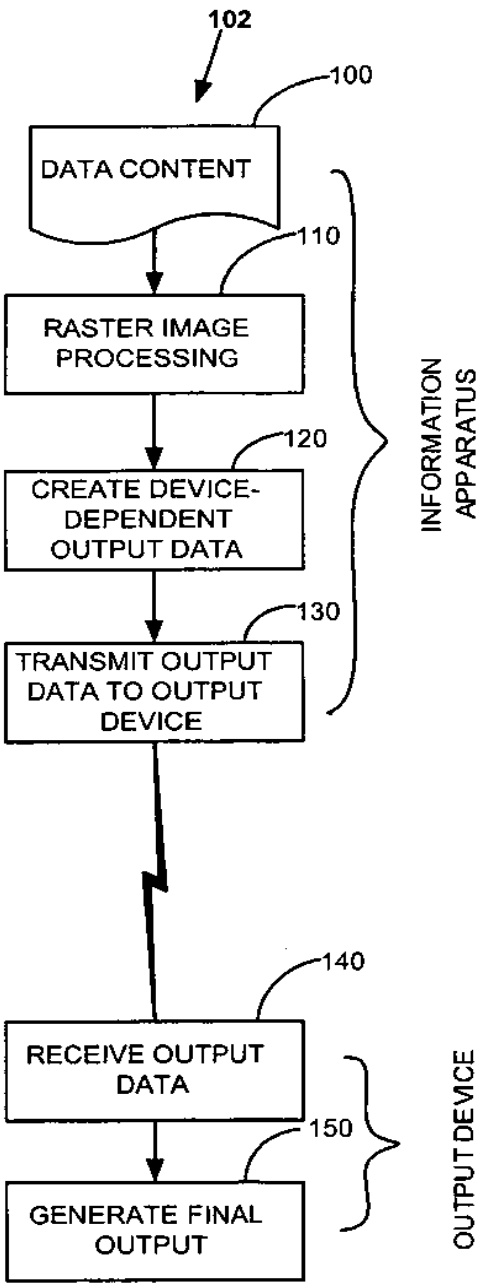


FIG 1 A

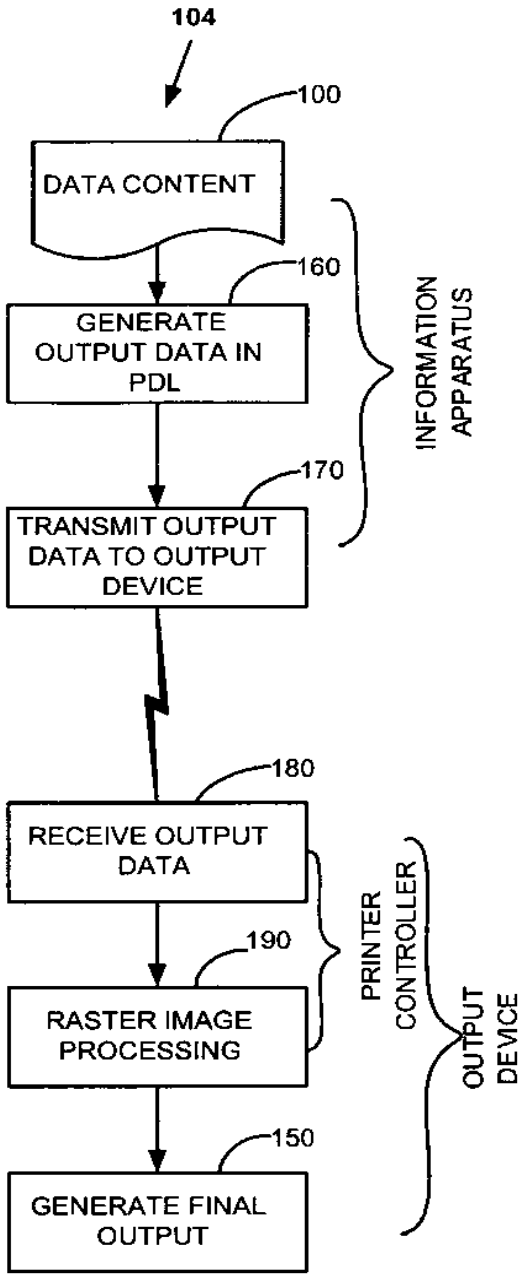


FIG 1 B

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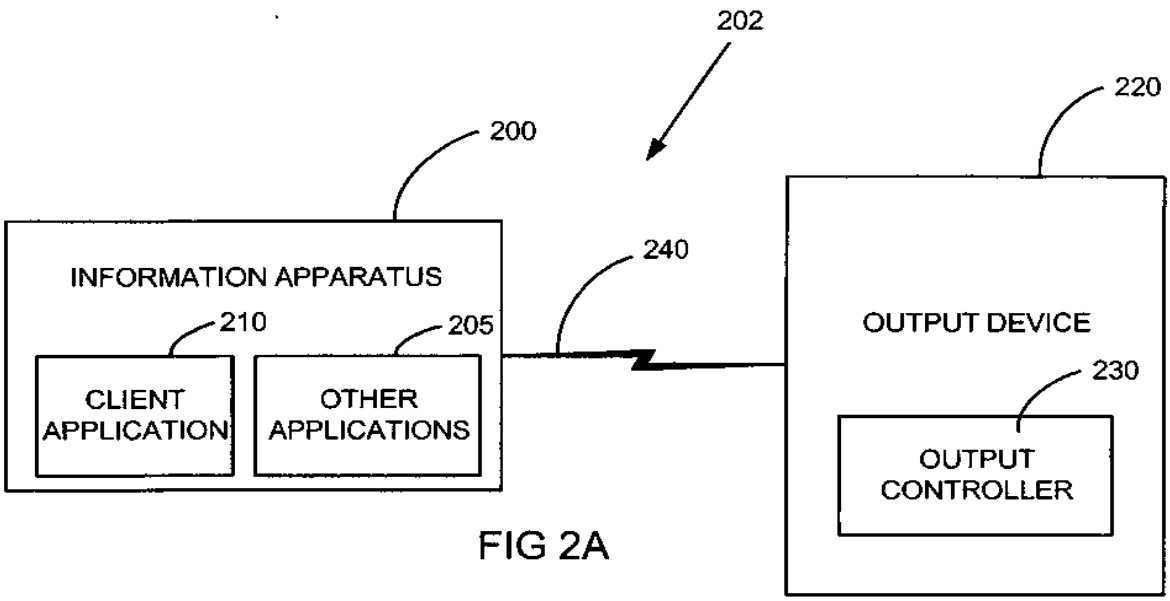


FIG 2A

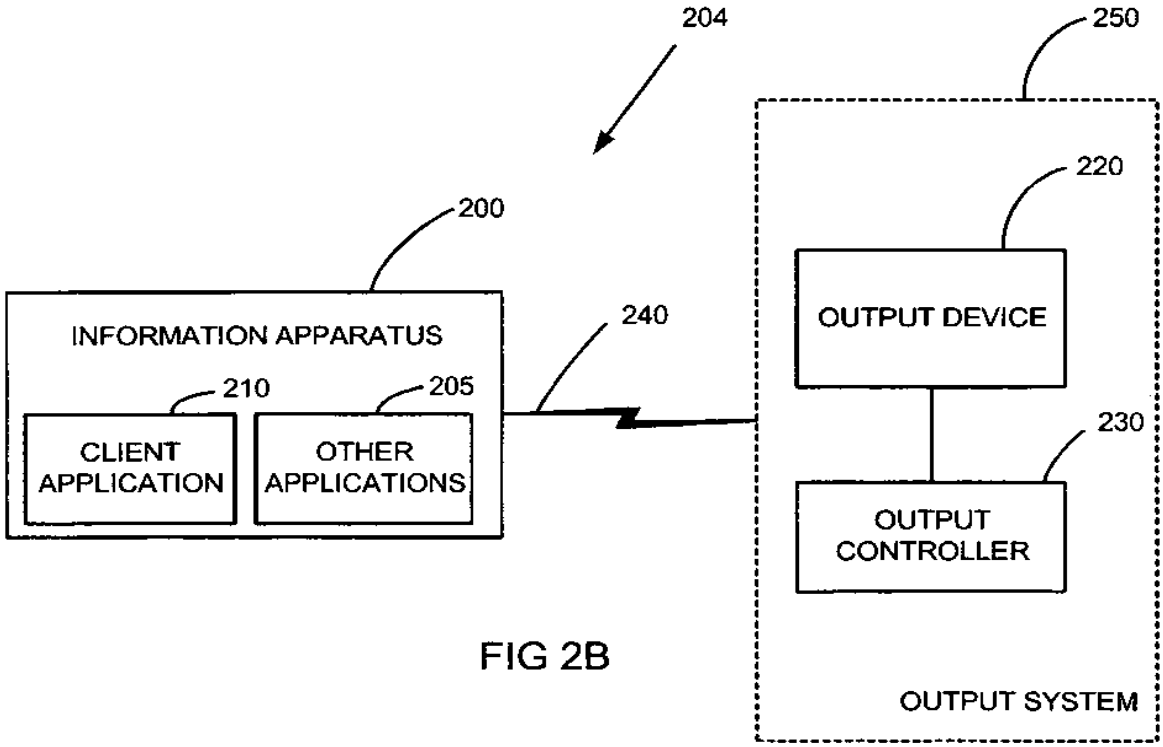


FIG 2B

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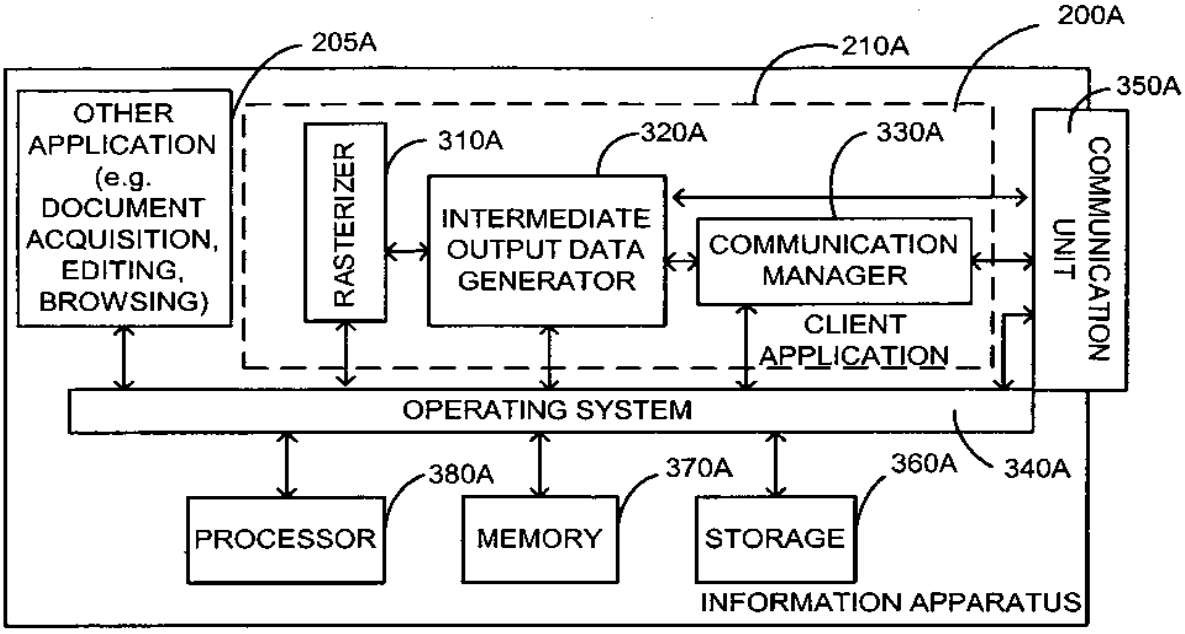


FIG 3A

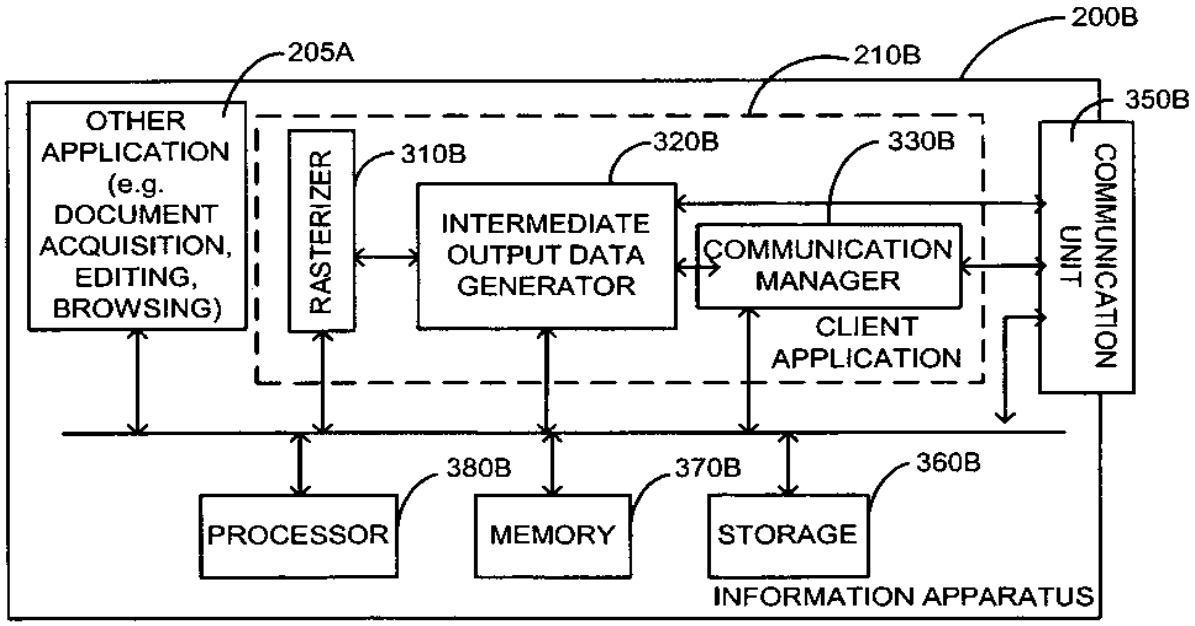


FIG 3B

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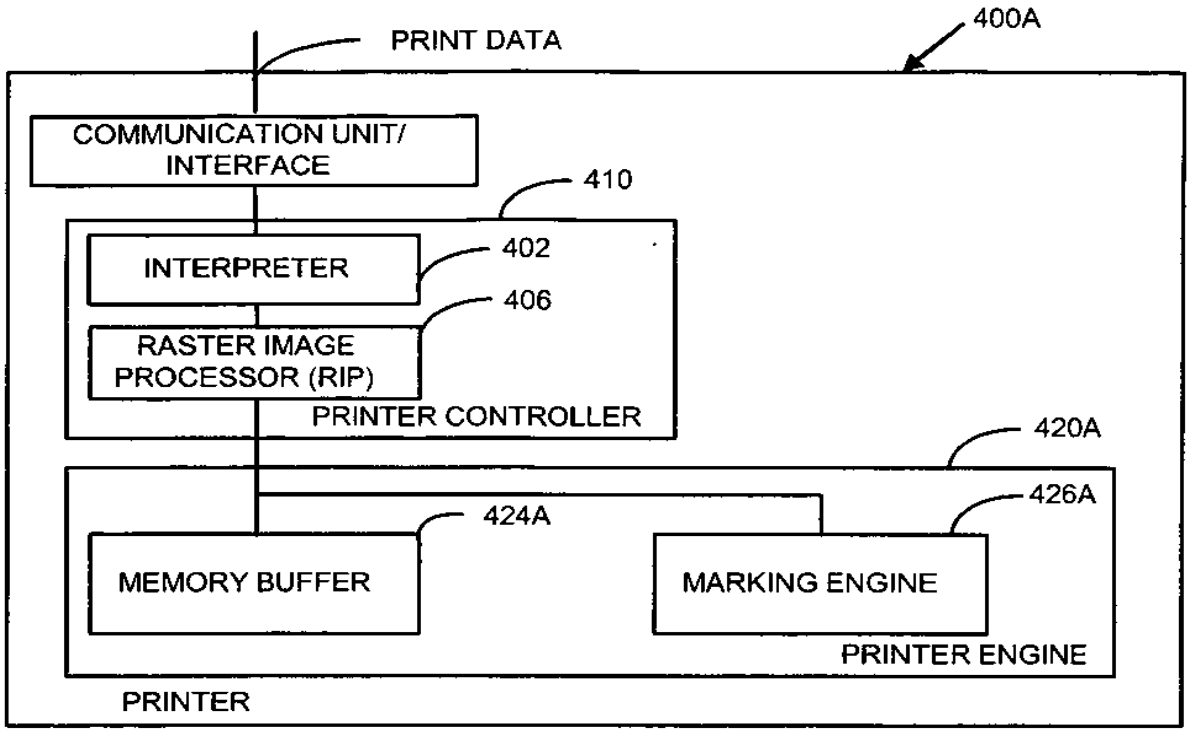


Fig. 4 A

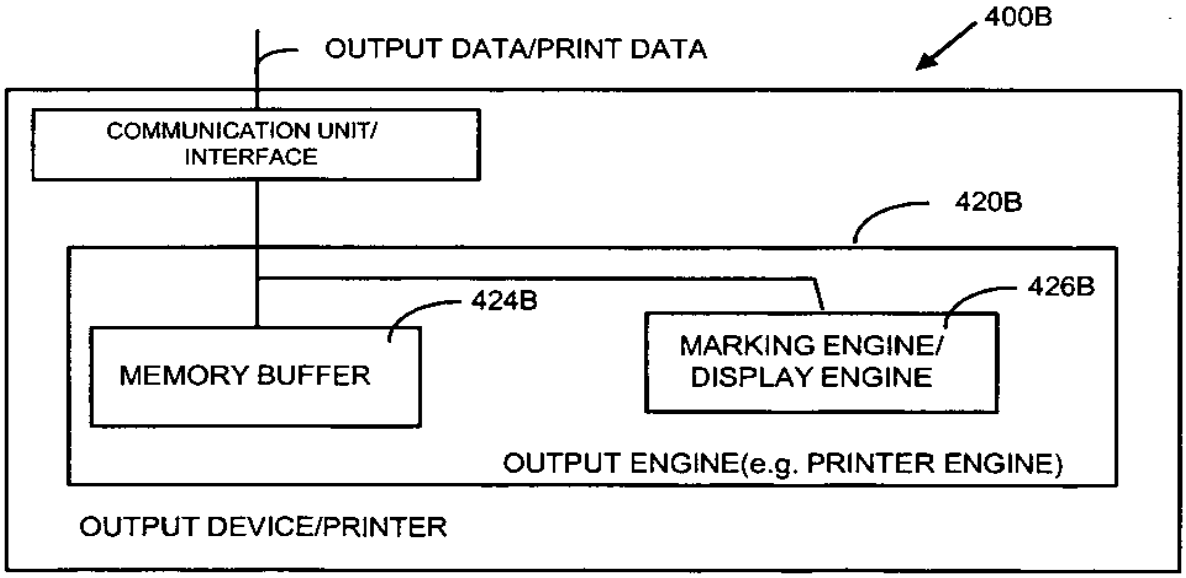


Fig. 4 B

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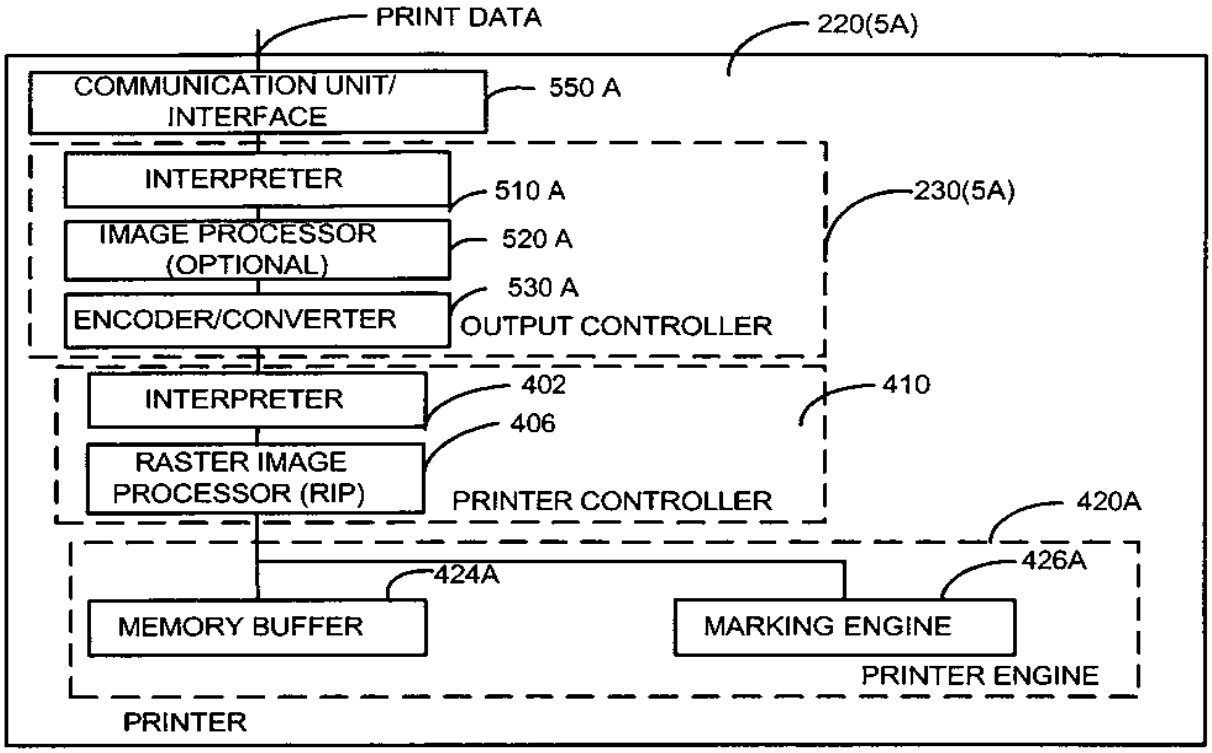


Fig. 5 A

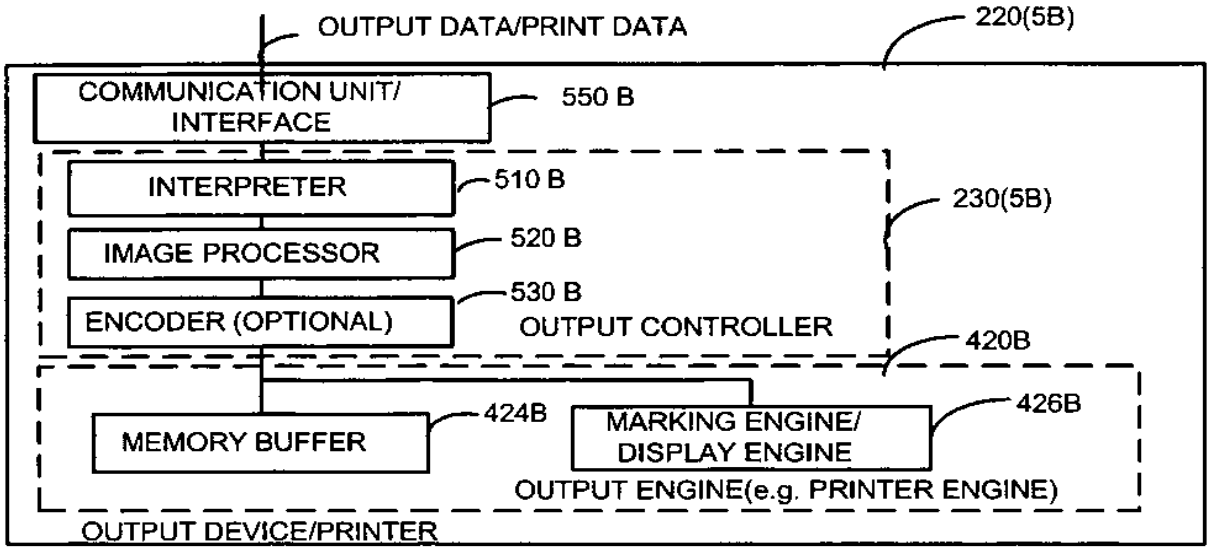


Fig. 5 B

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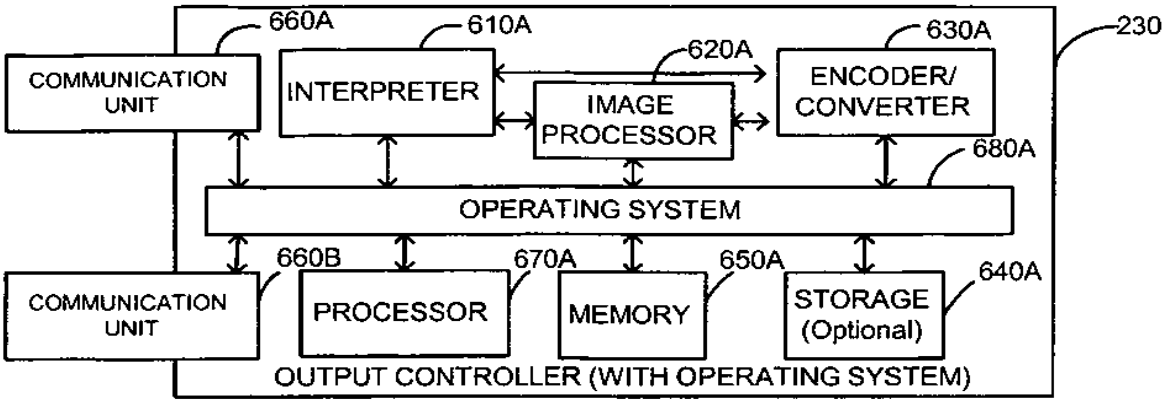


Fig 6 A

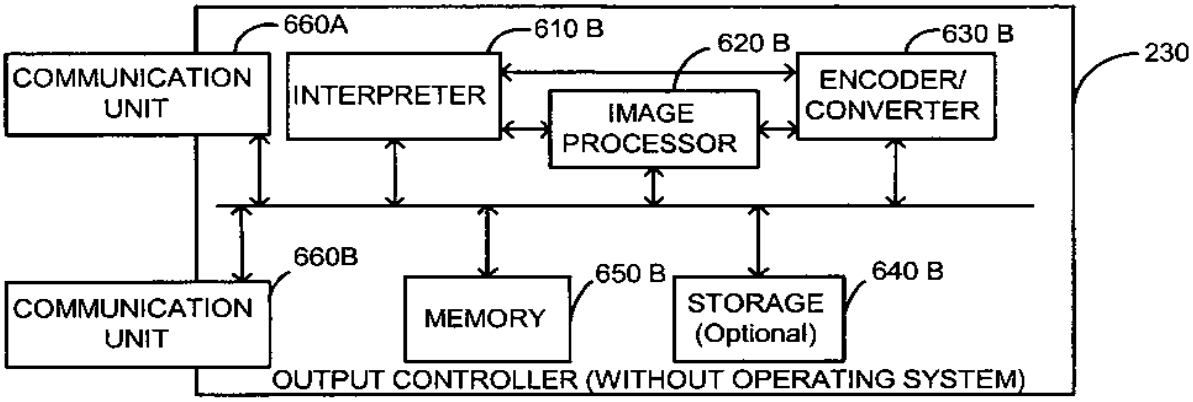


FIG 6 B

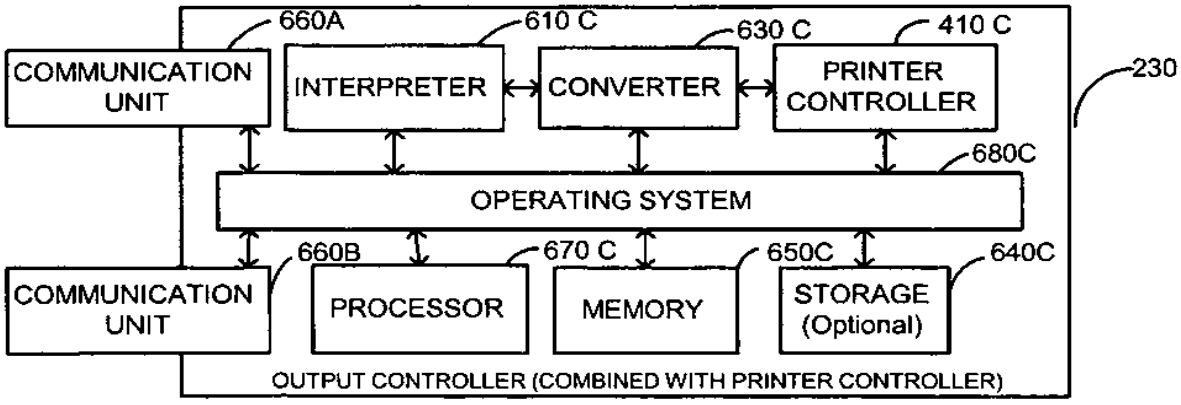


FIG 6 C

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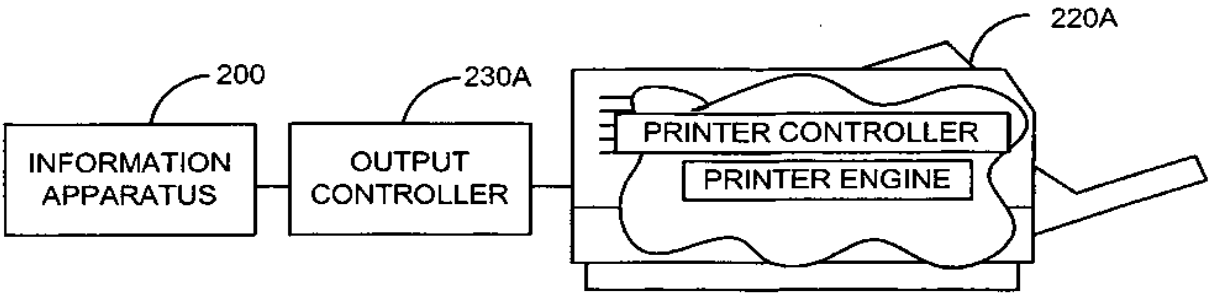


Fig. 7A

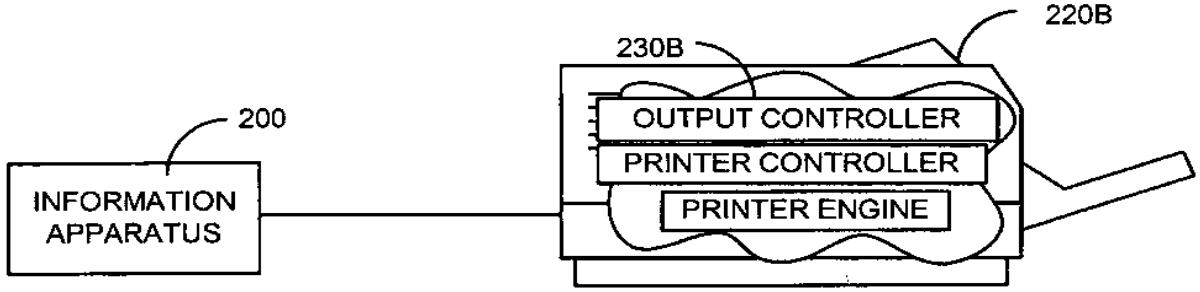


Fig. 7B

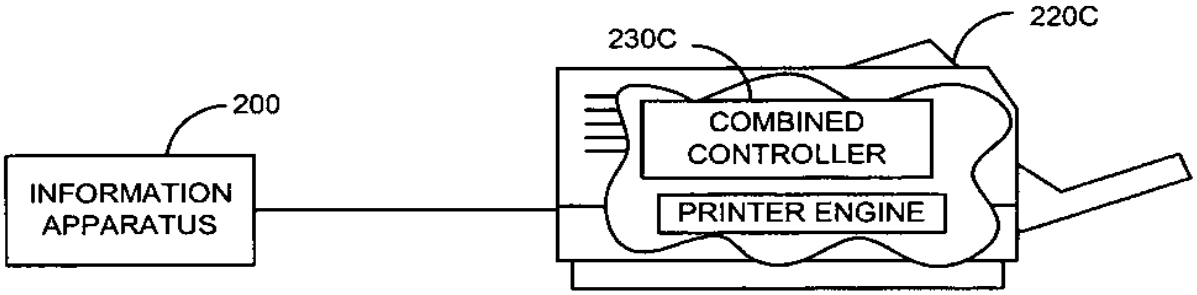


Fig. 7C

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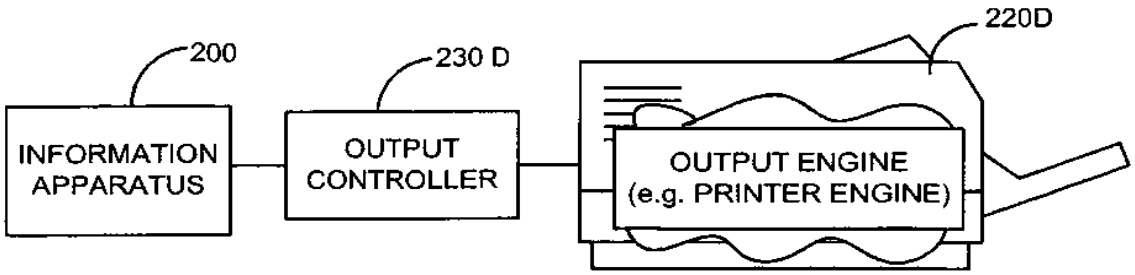


FIG 7D

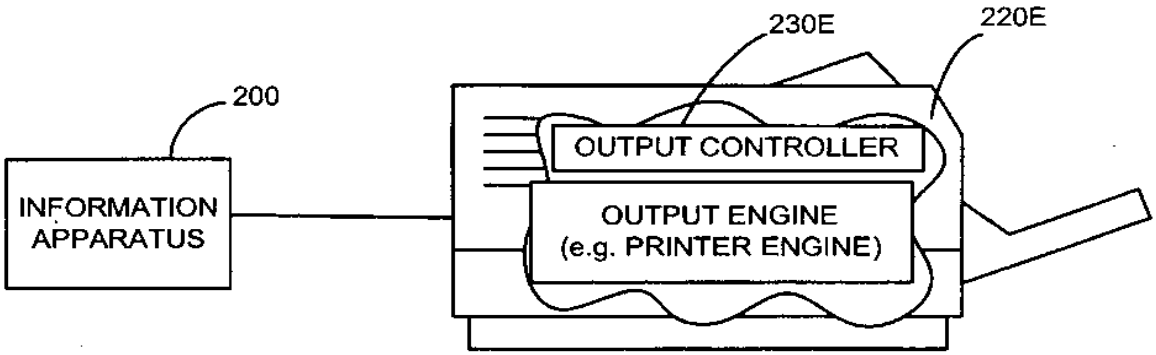


FIG 7E

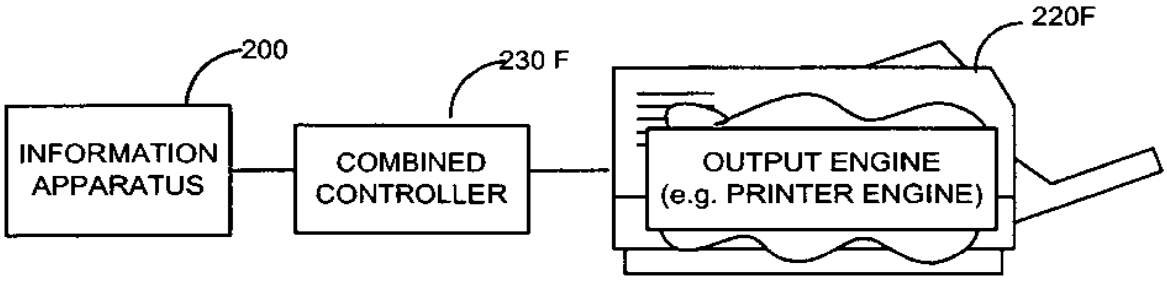


FIG 7F

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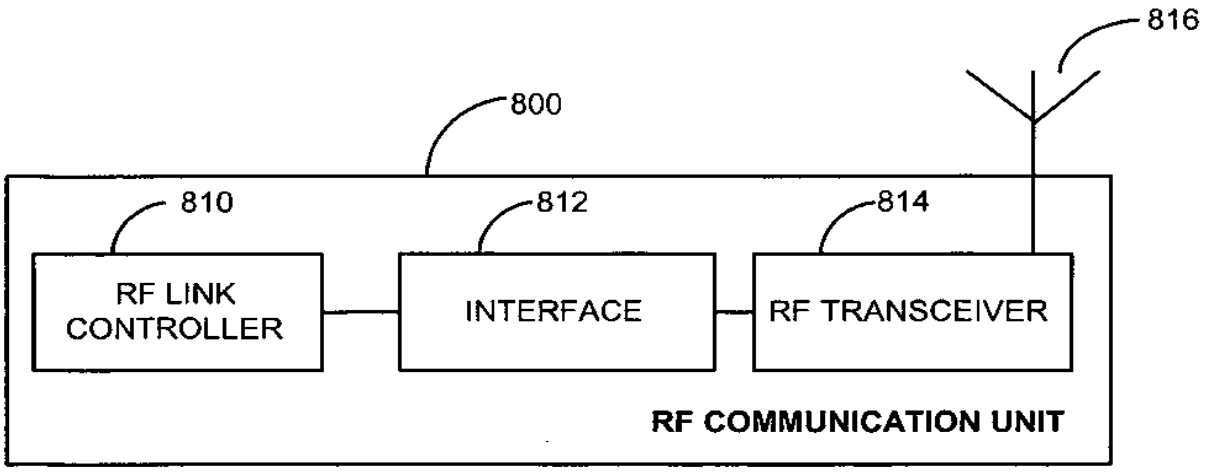


FIG 8A

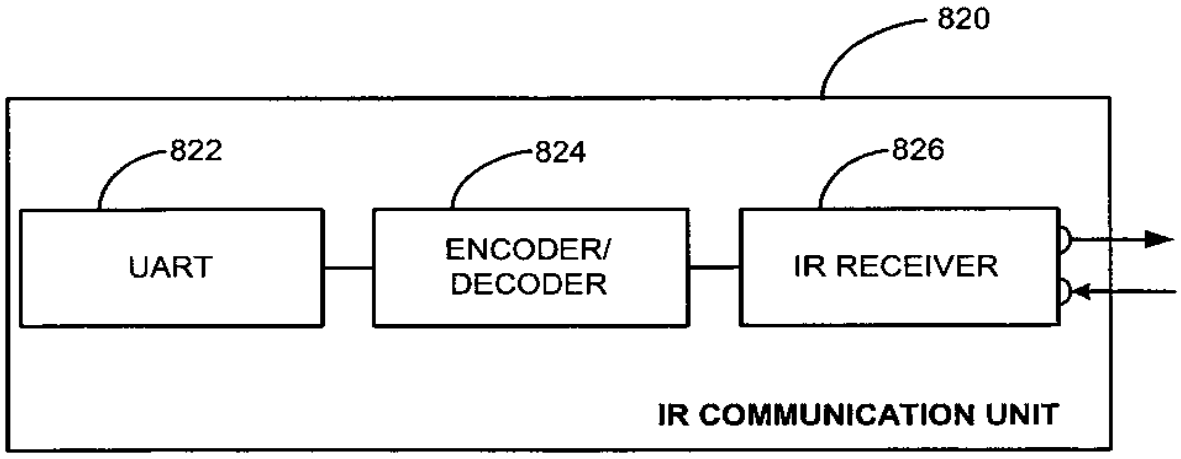


FIG 8B

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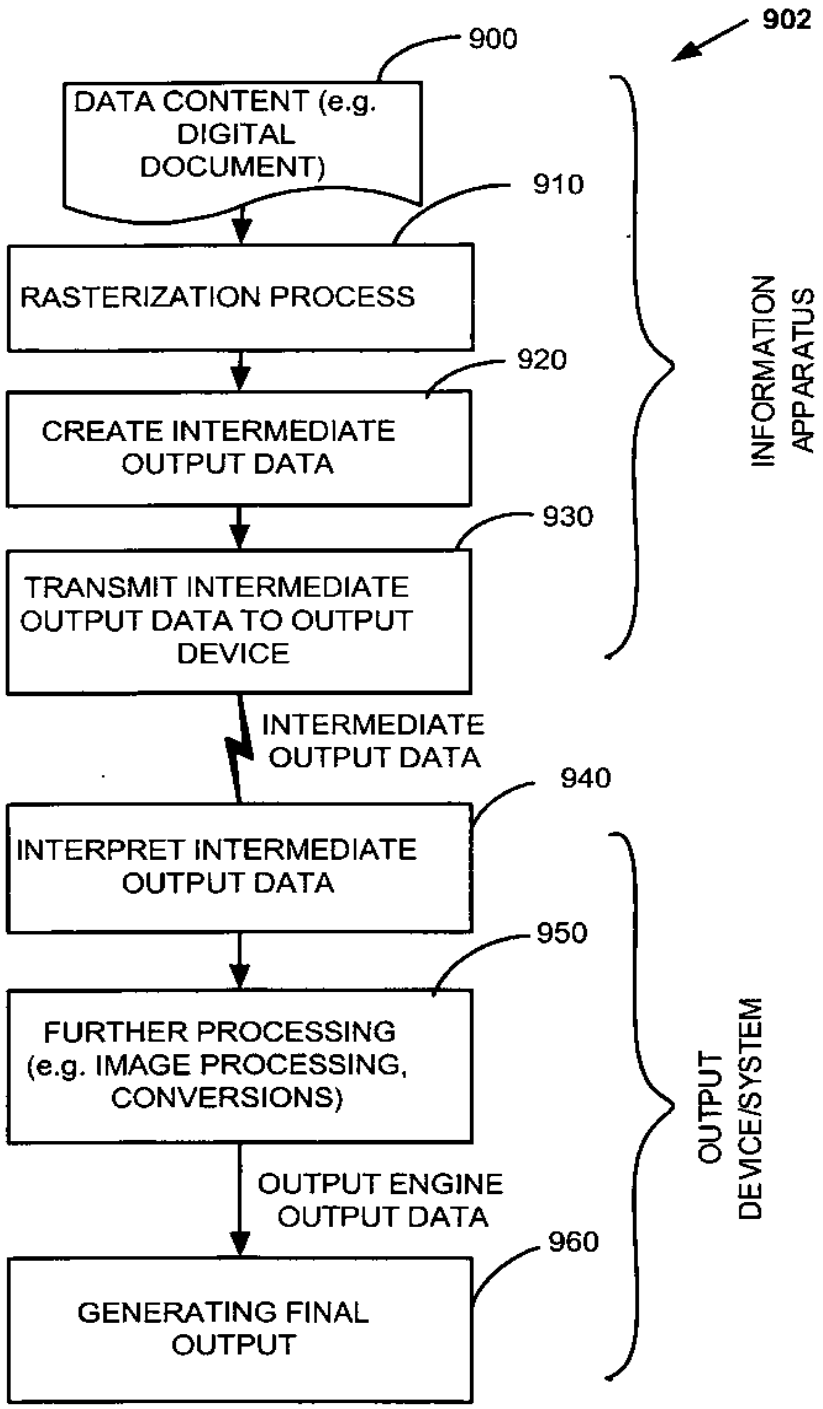


FIG 9

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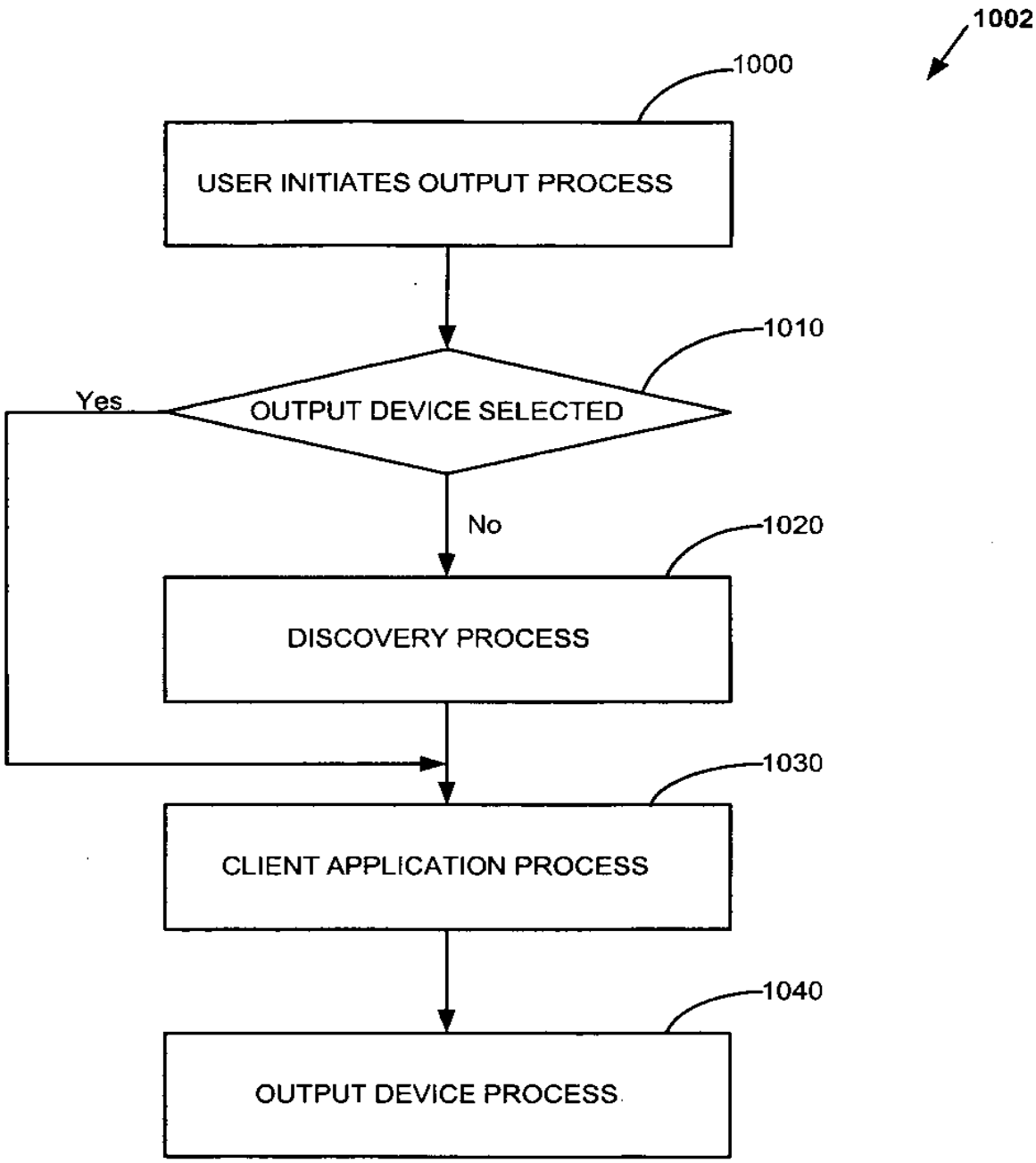


FIG 10

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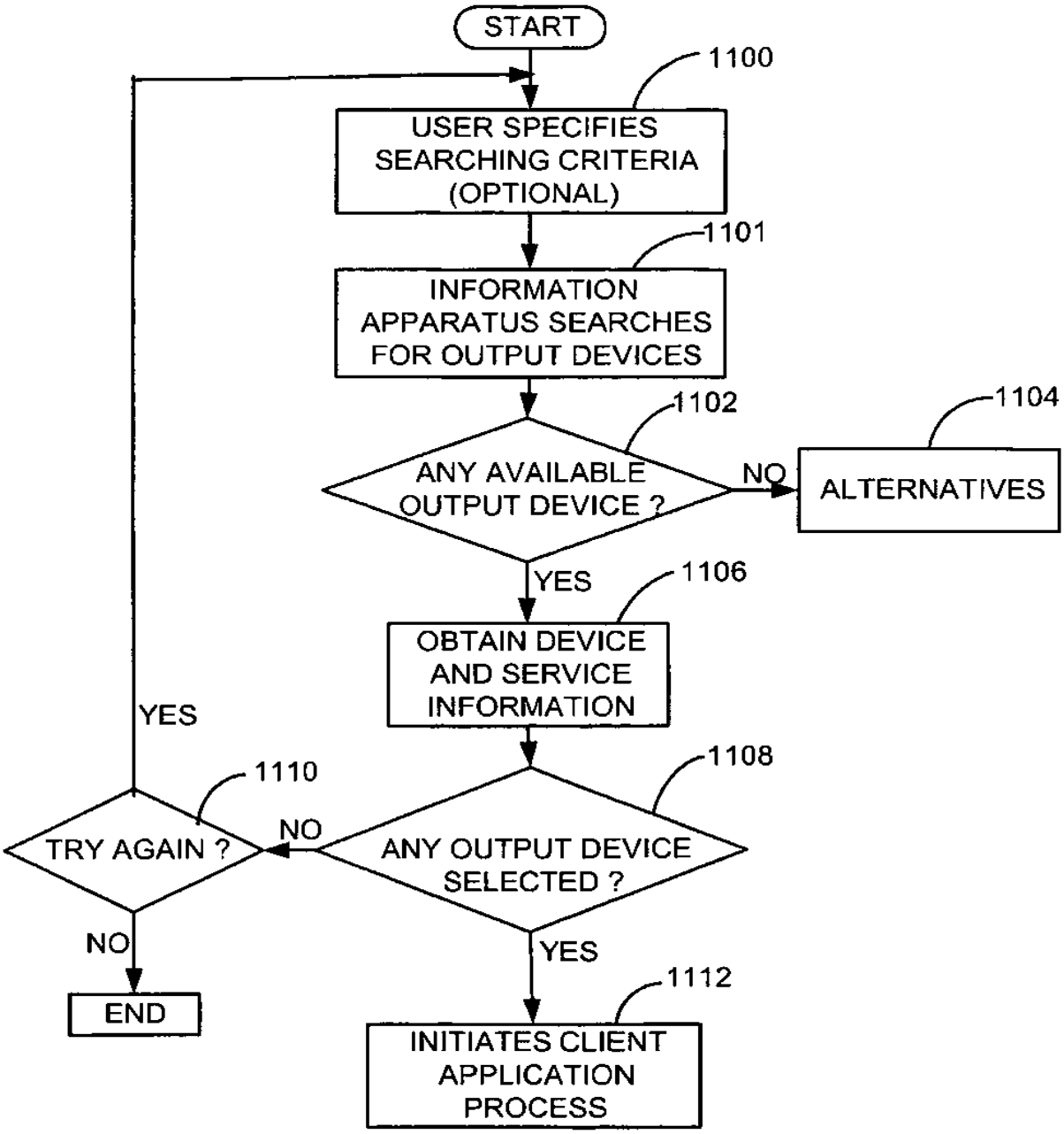


FIG 11

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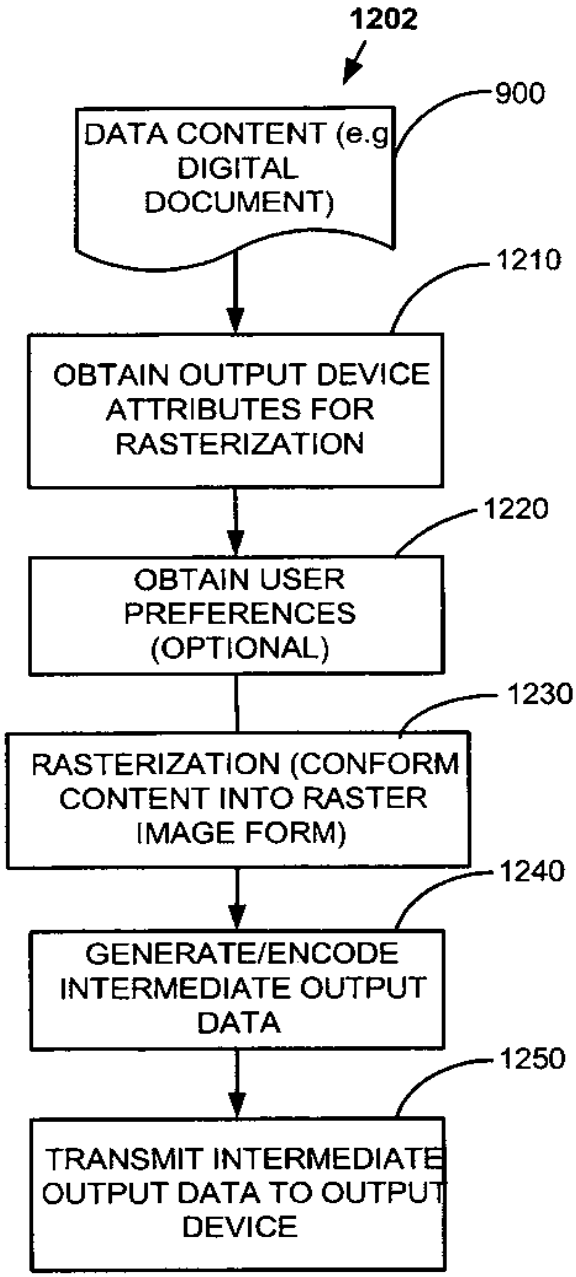


FIG 12 A

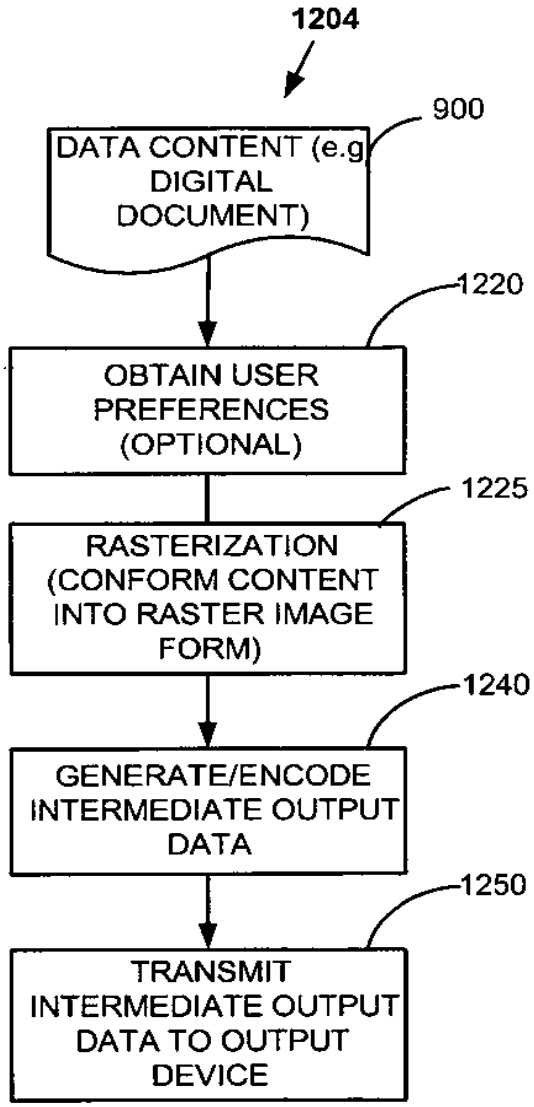


FIG 12 B

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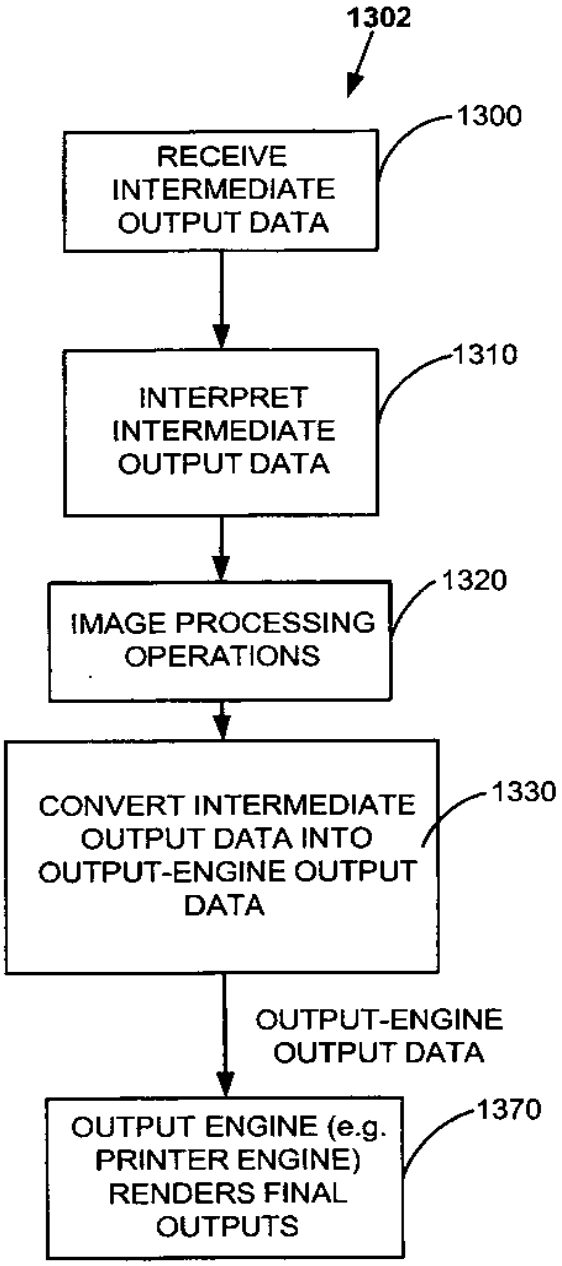


FIG 13 A

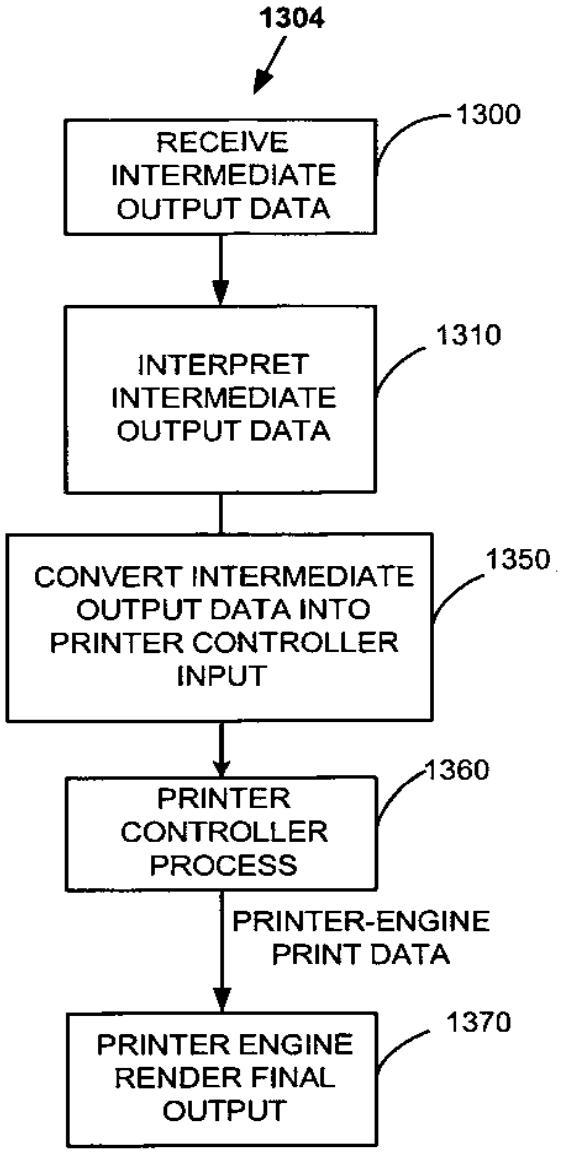


FIG 13 B

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System for universal data output

Application Number	201010144174	**Application Date**	2002.01.21
Publication Number	101834892A	**Publication Date**	2010.09.15
Priority Information	2001/1/19 US 60/262,764		
International Classification	H04L29/08;G06F3/12		
Applicant(s) Name	Flexiworld Technologies Inc.		
Address			
Inventor(s) Name	Chang William Ho;Liu Christina Ying		
Patent Agency Code	11219	**Patent Agent**	xia kai xie lina

Abstract

The present invention relates to a system for universal data output. An information apparatus that is on a local area rasterizes a digital document on the information apparatus to generate image data and creates an intermediate output data from the image data. The intermediate output data is transmitted to an output device that is on the local area network and includes an output engine that outputs images with a device-specific output size and resolution. The image data is recovered from the intermediate output data and is converted to instructions compatible with the output engine, based at least in part on the device-specific output size and resolution of the output engine. The method further includes providing the instructions to the output engine and operating the output engine in response to the instructions and thereby outputting an image of the digital document.

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System for universal data output

Application Number	201010144167	**Application Date**	2002.01.21
Publication Number	101833430A	**Publication Date**	2010.09.15
Priority Information	2001/1/19 US 60/262,764		
International Classification	G06F3/12;G06F3/00;H04L29/08		
Applicant(s) Name	Flexiworld Technologies Inc.		
Address			
Inventor(s) Name	Chang William Ho;Liu Christina Ying		
Patent Agency Code	11219	**Patent Agent**	xia kai xie lina

Abstract

The present invention relates to a system for universal data output. An information apparatus that is on a local area rasterizes a digital document on the information apparatus to generate image data and creates an intermediate output data from the image data. The intermediate output data is transmitted to an output device that is on the local area network and includes an output engine that outputs images with a device-specific output size and resolution. The image data is recovered from the intermediate output data and is converted to instructions compatible with the output engine, based at least in part on the device-specific output size and resolution of the output engine. The method further includes providing the instructions to the output engine and operating the output engine in response to the instructions and thereby outputting an image of the digital document.

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Title, Abstract, Paragraphs [0001], [0002] and [0003] as shown in Chinese Patent ZL201010144809.3

Title

WIRELESS OUTPUT OF DIGITAL CONTENT FROM A MOBILE INFORMATION APPARATUS

Abstract

A method of wireless data output from a mobile information apparatus, the method includes obtaining digital content over a graphical user interface at the wireless mobile information apparatus; opening a wireless communication channel; receiving an indication related to one or more wireless output device over wireless communication; selecting a wireless output device; conforming the digital content into one or more output images that includes at least a compression operation and generating an intermediate output data that includes the one or more compressed output images, the intermediate output data being in accordance to a predefined or standard format or language; and transmitting over wireless communication the intermediate output data from the wireless mobile information apparatus to the selected wireless output device for rendering of the digital content. The wireless output device includes an output controller for decoding and for decompressing the intermediate output data.

Description

[0001] This application is a divisional application Chinese patent application no. 02806907.2 (PCT/US2002/019901) filed on 21 January 2002, titled as System for Universal Data Output.

[0002] Cross Reference to Related Application

[0003] This application claims benefit of provisional U.S. application no. 60/262,764, filed January 19, 2001, the entire disclosure of which is hereby incorporated by reference.

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Allowed Claims for Chinese Patent ZL201010144809.3
(Publication No. CN101825996B)

1. A wireless mobile data output method for rendering digital content to a wireless output device from a wireless mobile information apparatus, the wireless mobile information apparatus being a distinct device from the wireless output device and including a wireless communication unit for wireless communication and a graphical user interface for interacting with a user, the wireless output device having an output controller that is internally included or externally attached for decoding and for decompressing an intermediate output data, the method comprising:

obtaining at the wireless mobile information apparatus at least part of a digital content and displaying at least part of the digital content over the graphical user interface to the user;

opening at the wireless mobile information apparatus a wireless communication channel with the wireless communication unit;

receiving at the wireless mobile information apparatus via the wireless communication unit and over the wireless communication channel at least an indication related to a wireless output device;

selecting at the wireless mobile information apparatus a selected wireless output device based at least in part on the received indication;

conforming at the wireless mobile information apparatus at least part of the digital content into one or more output images, the one or more output images being encoded with one or more image layers that includes compression;

generating at the wireless mobile information apparatus the intermediate output data that includes said one or more output images, at least one image layer including data encoded with compression, and the intermediate output data conforming to a predefined or standard format, language, or compression, and the generating of the intermediate output data at the wireless mobile information apparatus includes an encoding operation and a compression operation;

establishing a wireless connection between the wireless mobile information apparatus and the selected wireless output device; and

transmitting over the wireless connection the intermediate output data from the wireless mobile information apparatus to the selected wireless output device for rendering of the digital content, the rendering of the digital content at the wireless output device includes decompressing and decoding the intermediate output data at the output controller associated with the wireless output device.

2. A wireless mobile data output method for rendering digital content to a wireless output device from a wireless mobile information apparatus, the wireless mobile information apparatus being a distinct device from the wireless output device and including a wireless communication unit for wireless communication and a graphical user interface for interacting with a user, the method comprising:

opening a wireless communication channel between the wireless mobile information apparatus and the wireless output device;

authenticating wireless access to one or more wireless output devices by sending over the wireless communication channel one or more security keys, and in dependence of a successful authentication, establishing a secure wireless connection from the wireless mobile information apparatus to the wireless output device;

obtaining at the wireless mobile information apparatus at least part of the digital content;

conforming at the wireless mobile information apparatus at least part of the digital content into one or more output images and encoding the one or more output images into one or more image layers, at least one image layer includes data being encoded with a compression and different image layers include different compression techniques;

generating at the wireless mobile information apparatus an intermediate output data that includes said one or more output images, the intermediate output data conforming at least partly to a predefined or standard format, language or compression method, and the generating of the intermediate output data at the wireless mobile information apparatus includes a compression operation and an encoding operation; and

delivering the intermediate output data over the secured wireless connection to the said wireless output device for rendering of the digital content, the rendering of the digital content at the wireless output device includes decompressing and decoding the intermediate output data at an output controller associated with the wireless output device.

3. A wireless mobile data output method for rendering digital content to a wireless output device from a wireless mobile information apparatus, wherein the wireless mobile information apparatus includes at least one wireless communication unit for wireless communication and a graphical user interface for interacting with a user, the

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wireless mobile information apparatus being a distinct device from the wireless output device, the method comprising:

opening a wireless communication channel for searching one or more wireless devices that are available;

searching over the wireless communication channel for one or more wireless devices that are available;

discovering over the wireless communication channel one or more wireless devices that are available for wireless connection;

receiving over the wireless communication channel an attribute corresponding to each discovered wireless device, the attribute including at least one of a name, an identity, a device type, an address, and an indication of a supported output device profile, individually or in combination;

selecting a wireless output device from among the one or more discovered wireless devices based at least in part on the attribute that is received over the wireless communication channel;

obtaining a security key at the wireless mobile information apparatus, the security key for enabling wireless data transfer to the selected wireless output device;

sending at least part of the security key over the wireless communication channel for authentication at the selected wireless output device and requesting the selected wireless output device to open a secured wireless connection for data transfer;

receiving over the wireless communication channel a response related to an authentication; and if the received response is positive, establishing a secure wireless connection between the wireless mobile information apparatus and the selected wireless output device;

obtaining at the wireless mobile information apparatus at least part of the digital content;

conforming at the wireless mobile information apparatus at least part of the digital content into an output data encoded with a format or language for transmitting to the selected output device, the conforming of the intermediate output data at the wireless mobile information apparatus includes a compression operation and an encoding operation; and

transmitting the output data from the wireless mobile information apparatus to the selected wireless output device over the said secured wireless connection for rendering the digital content.

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4. A wireless mobile data output method for rendering digital content to a wireless output device from a wireless mobile information apparatus, the digital content being at least partly accessible with the wireless mobile information apparatus, the wireless mobile information apparatus being a distinct device from the wireless mobile information apparatus and including a wireless communication unit for wireless communication and a touch sensitive screen for interacting with a user, the method comprising:

opening a wireless communication channel directly between the wireless mobile information apparatus and the wireless output device;

receiving over the wireless communication channel at least a device dependent attribute associated with one or more wireless output devices, the device dependent attribute including at least one of a name, an identity, a device type, an address, and an indication of a supported output device profile, individually or in any combination;

selecting over the touch sensitive screen a wireless output device based at least in part on the received device dependent attribute;

obtaining at the wireless mobile information apparatus at least part of the digital content;

conforming at the wireless mobile information apparatus at least part of the digital content into one or more output images;

generating at the wireless mobile information apparatus a device dependent intermediate output data that includes said one or more output images, the generated device dependent intermediate output data having a relationship at least partly to the device dependent attribute received over the wireless communication channel from the one or more wireless output device, and the generating of the device dependent intermediate output data at the wireless mobile information apparatus includes a compression operation and an encoding operation; and

transmitting the device dependent intermediate output data over the wireless communication channel for rendering of the digital content.

5. The method according to claim 4 further comprising authenticating wireless access to one or more wireless output devices by sending over the wireless communication channel one or more security keys.

6. The method according to claim 4 further comprising searching wirelessly at the wireless mobile information apparatus for wireless output devices available for

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wireless communication; and means for discovering one or more wireless output devices.

7. The method according to claim 4 further comprising transmitting over the wireless connection from the wireless mobile information apparatus to the selected wireless output device payment information as payment for rendering of the digital content at the selected wireless output device.

8. The method of claim 4 in which conforming at the wireless mobile information apparatus at least part of the digital content into one or more output images includes encoding the one or more output images into one or more image layers and at least one image layer includes data being encoded with a compression operation.

9. The method of claim 8 in which the at least one image layer includes two or more image layers and each image layer includes data being encoded with a distinct resolution.

10. A wireless mobile information apparatus with access to digital content for rendering at a wireless output device, the wireless mobile information apparatus being a distinct device from the wireless output device and including a wireless communication unit for wireless communication and a graphical user interface for interacting with a user, the wireless output device having an output controller that is internally included or externally attached for decoding and for decompressing an intermediate output data, the wireless mobile information apparatus comprising:

means for obtaining at the wireless mobile information apparatus at least part of a digital content and displaying at least part of the digital content over the graphical user interface to the user;

means for opening at the wireless mobile information apparatus a wireless communication channel;

means for receiving at the wireless mobile information apparatus via the wireless communication unit and over the wireless communication channel at least an indication related to a wireless output device;

means for selecting at the wireless mobile information apparatus a selected wireless output device based at least in part on the received indication;

means for conforming at the wireless mobile information apparatus at least part of the digital content into one or more output images, the one or more output images being encoded with one or more image layers that includes compression;

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means for generating at the wireless mobile information apparatus the intermediate output data that includes said one or more output images, at least one image layer including data encoded with compression, and the intermediate output data conforming to a predefined or standard format, language, or compression, and the generating of the intermediate output data at the wireless mobile information apparatus includes an encoding operation and a compression operation;

means for establishing a wireless connection between the wireless mobile information apparatus and the selected wireless output device; and

means for transmitting over the wireless connection the intermediate output data from the wireless mobile information apparatus to the selected wireless output device for rendering of the digital content, the rendering of the digital content at the wireless output device includes decompressing and decoding the intermediate output data at the output controller associated with the wireless output device.

11. The apparatus according to claim 10 further comprising means for searching wirelessly at the wireless mobile information apparatus for wireless output devices available for wireless communication, and means for discovering one or more wireless output devices.

12. The apparatus of claim 10 in which the means for establishing a wireless connection with the selected wireless output device further comprises means for authenticating wireless access to the output device, including sending over the wireless communication channel one or more of an identity of the wireless mobile information apparatus, a user name, password, ID number, signature, physical or digital security key, biometric, fingerprint, and a voice, individually or in any combination.

13. The apparatus according to claim 10 further comprising means for obtaining user preferences over the graphical user interface of the wireless mobile information apparatus, the user preferences being parameters related to rendering of the digital content at the selected wireless output device.

14. The apparatus according to claim 10 further comprising means for transmitting over the wireless connection from the wireless mobile information apparatus to the selected wireless output device payment information as payment for rendering of the digital content at the selected wireless output device.

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15. The apparatus of claim 10 in which the encoding of the one or more output images in one or more image layers includes encoding each image layer with a distinct resolution.

16. The apparatus according to claim 10 in which the wireless mobile information apparatus is one of a laptop computer, a mobile phone, a smart phone, an Internet pad, an Internet appliance, a digital camera, and a PDA, individually or in any combination.

17. A wireless mobile information apparatus with access to at least a part of digital content for rendering at a wireless output device, the wireless mobile information apparatus being a distinct device from the wireless output device and including a wireless communication unit for wireless communication and a graphical user interface for interacting with a user, the wireless mobile information apparatus comprising:

means for opening a wireless communication channel between the wireless mobile information apparatus and the wireless output device;

means for authenticating wireless access to one or more wireless output devices by sending over the wireless communication channel one or more security keys, and in dependence of a successful authentication, establishing a secure wireless connection from the wireless mobile information apparatus to the wireless output device;

means for obtaining at the wireless mobile information apparatus at least part of the digital content;

means for conforming at the wireless mobile information apparatus at least part of the digital content into one or more output images and encoding the one or more output images into one or more image layers, at least one image layer includes data being encoded with a compression operation and different image layers include different compression techniques;

means for generating at the wireless mobile information apparatus an intermediate output data that includes said one or more output images, the intermediate output data conforming at least partly to a predefined or standard format, language or compression method, and the generating of the intermediate output data at the wireless mobile information apparatus includes a compression operation and an encoding operation; and

means for delivering the intermediate output data over the secured wireless connection to the said wireless output device for rendering of the digital content the

rendering of the digital content at the wireless output device includes decompressing and decoding the intermediate output data at an output controller associated with the wireless output device.

18. The apparatus according to claim 17 further comprising means for searching wirelessly at the wireless mobile information apparatus for wireless output devices available for wireless communication; means for discovering one or more wireless output devices; and means for selecting a wireless output device found in the search based at least in part on the received indication from the wireless output device over the wireless communication channel.

19. The apparatus according to claim 17 further comprising means for obtaining user preferences over the graphical user interface of the wireless mobile information apparatus, the preferences relating to parameters for rendering of the digital content at the wireless output device.

20. The apparatus according to claim 17 further comprising means for transmitting payment information over the secure wireless connection as payment for rendering of the digital content at the wireless output device.

21. The apparatus of claim 17 in which said security key comprises one or more of an identity of the wireless mobile information apparatus, a user name, password, ID number, signatures, physical or digital security key, biometric, fingerprint, and a voice, individually or in any combination.

22. The apparatus of claim 17 in which the encoding of the one or more output images into one or more image layers includes encoding each image layer with a distinct resolution.

23. The apparatus of claim 17 in which the means for conforming at the wireless mobile information apparatus at least part of the digital content into one or more output images includes at least one of a rasterization operation, a scaling operation, an interpolation operation, a decoding operation, an encoding operation, a color correction operation, a color space transformation, a color matching operation, a halftoning operation, an image processing operation, an image enhancement, a segmentation, a digital watermark, a conversion operation, a smoothing operation, an

anti-aliasing operation, and a compression operation, individually or in any combination.

24. A mobile wireless mobile information apparatus with access to at least a part of digital content for rendering at a wireless output device, wherein the wireless mobile information apparatus includes at least one wireless communication unit for wireless communication and a graphical user interface for interacting with a user, the wireless mobile information apparatus being a distinct device from the wireless output device, the wireless mobile information apparatus comprising:

means for opening a wireless communication channel for searching one or more wireless devices that are available;

searching over the wireless communication channel for one or more wireless devices that are available;

means for discovering over the wireless communication channel one or more wireless devices that are available for wireless connection;

means for receiving over the wireless communication channel an attribute corresponding to each discovered wireless device, the attribute including at least of a name, an identity, a device type, an address, and an indication of a supported output device profile, individually or in combination;

means for selecting a wireless output device from among the one or more discovered wireless devices based at least in part on the attribute that is received over the wireless communication channel;

means for obtaining a security key at the wireless mobile information apparatus, the security key for enabling wireless data transfer to the selected wireless output device;

means for sending at least part of the security key over the wireless communication channel for authentication at the selected wireless output device and requesting the selected wireless output device to open a secured wireless connection for data transfer;

means for receiving over the wireless communication channel a response related to an authentication from the wireless output device; and if the received response is positive, establishing a secure wireless connection between the wireless mobile information apparatus and the selected wireless output device;

means for obtaining at the wireless mobile information apparatus at least part of the digital content;

means for conforming at the wireless mobile information apparatus at least part of the digital content into an output data encoded with a format or language for

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transmitting to the selected output device, the conforming of the intermediate output data at the wireless mobile information apparatus includes a compression operation and an encoding operation; and

means for transmitting the output data from the wireless mobile information apparatus to the selected wireless output device over the said secured wireless connection for rendering the digital content.

25. The apparatus of claim 24 in which the wireless mobile information apparatus is one of a laptop computer, a mobile phone, a smart phone, an Internet pad, an Internet appliance, a digital camera, and a PDA, individually or in any combination.

26. The apparatus of claim 24 in which the said security key comprises at least one of an identity of the wireless mobile information apparatus, a user name, password, ID number, signatures, physical or digital security keys, biometrics, fingerprints, and a voice, individually or in any combination.

27. The apparatus of claim 24 in which the output data includes compressed data and the compressed data includes one or more of an audio data, a video data, and an image data, individually or in any combination.

28. The apparatus of claim 24 in which the means for conforming at the wireless mobile information apparatus at least part of the digital content into an output data includes conforming at least part of the digital content into a device dependent output data that is related at least in part to the attribute received over the wireless communication channel and from the selected wireless output device.

29. The apparatus of claim 24 in which conforming at the wireless mobile information apparatus at least part of the digital content into an output data includes conforming at least part of the digital content into device independent output data that is related at least in part to a predefined or standard format or language.

30. A wireless mobile information apparatus with access to at least a part of digital content for rendering at a wireless output device, the digital content being at least partly accessible with the wireless mobile information apparatus, the wireless mobile information apparatus being a distinct device from the wireless mobile information apparatus and including a wireless communication unit for wireless communication

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and a touch sensitive screen for interacting with a user, the wireless mobile information apparatus comprising:

means for opening a wireless communication channel directly between the wireless mobile information apparatus and the wireless output device;

means for receiving over the wireless communication channel at least a device dependent attribute associated with one or more wireless output devices from the one or more wireless output device, the device dependent attribute including at least one of a name, an identity, a device type, an address, and an indication of a supported output device profile, individually or in any combination;

means for selecting over the touch sensitive screen a wireless output device based at least in part on the received device dependent attribute;

means for obtaining at the wireless mobile information apparatus at least part of the digital content;

means for conforming at the wireless mobile information apparatus at least part of the digital content into one or more output images;

means for generating at the wireless mobile information apparatus a device dependent intermediate output data that includes said one or more output images, the generated device dependent intermediate output data having a relationship at least partly to the device dependent attribute received over the wireless communication channel from the one or more wireless output device, and the generating of the device dependent intermediate output data at the wireless mobile information apparatus includes a compression operation and an encoding operation; and

means for transmitting the device dependent intermediate output data over the wireless communication channel for rendering of the digital content.

31. The apparatus according to claim 30 further comprising means for authenticating wireless access to one or more wireless output devices by sending over the wireless communication channel one or more security keys.

32. The apparatus according to claim 30 further comprising means for searching wirelessly at the wireless mobile information apparatus for wireless output devices available for wireless communication; and means for discovering one or more wireless output devices.

33. The apparatus according to claim 30 further comprising means for transmitting over the wireless connection from the wireless mobile information apparatus to the

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selected wireless output device payment information as payment for rendering of the digital content at the selected wireless output device.

34. The apparatus of claim 30 in which the means for conforming at the wireless mobile information apparatus at least part of the digital content into one or more output images includes encoding the one or more output images into one or more image layers and at least one image layer includes data being encoded with a compression operation.

35. The apparatus of claim 34 in which the at least one image layer includes two or more image layers and each image layer includes data being encoded with a distinct resolution.

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发明名称：从移动信息装置无线输出数字内容

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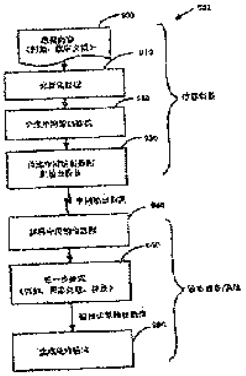
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从移动信息装置无线输出数字内容

(57) 摘要

一种从移动信息装置无线数据输出的方法，该方法包括：通过无线移动信息装置处的图形用户界面获得数字内容；开启无线通信信道；通过无线通信接收与一个或多个无线输出设备有关的指示；选择无线输出设备；将数字内容一致化为至少包括压缩操作的一个或多个输出图像，以及生成包括一个或多个压缩的输出图像的中间输出数据，该中间输出数据与预先定义的或标准的格式或语言一致；以及通过无线通信将中间输出数据从无线移动信息装置传送到选择的无线输出设备，以供对数字内容进行渲染。无线输出设备包括用于解码和解压缩中间输出数据的输出控制器。



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1. 一种用于将数字内容从无线移动信息装置渲染到无线输出设备的无线移动数据输出方法，所述无线移动信息装置是与所述无线输出设备不同的设备，并且包括用于进行无线通信的无线通信单元以及用于与用户进行交互的图形用户界面，所述无线输出设备具有包括在内部或附接在外部的用于解码和解压缩中间输出数据的输出控制器，所述方法包括：

在所述无线移动信息装置处获得数字内容的至少一部分，并且在所述图形用户界面上向所述用户显示所述数字内容的至少一部分；

在所述无线移动信息装置处开启与所述无线通信单元通信的无线通信信道；

在所述无线移动信息装置处经由所述无线通信单元并且在所述无线通信信道上接收至少与无线输出设备相关的指示；

在所述无线移动信息装置处选择至少部分地基于所接收到的指示来选定的无线输出设备；

在所述无线移动信息装置处将所述数字内容的至少一部分一致化为一个或多个输出图像，所述一个或多个输出图像以包括压缩的一个或多个图像层来进行编码；

在所述无线移动信息装置处生成所述中间输出数据，所述中间输出数据包括所述一个或多个输出图像、包括以压缩进行编码的数据的至少一个图像层，并且所述中间输出数据一致化为预先定义的或标准的格式、语言或者压缩，并且在所述无线移动信息装置处生成所述中间输出数据包括编码操作和压缩操作；

在所述无线移动信息装置和所述选定的无线输出设备之间建立无线连接；以及

在所述无线连接上将所述中间输出数据从所述无线移动信息装置传送到所述选定的无线输出设备，以供对所述数字内容进行渲染，在所述无线输出设备处渲染所述数字内容包括在与所述无线输出设备相关联的输出控制器处解压缩和解码所述中间输出数据。

2. 一种用于将数字内容从无线移动信息装置渲染到无线输出设备的无线移动数据输出方法，所述无线移动信息装置是与所述无线输出设备不同的设备，并且包括用于进行无线通信的无线通信单元以及用于与用户进行交互的图形用户界面，所述方法包括：

开启在所述无线移动信息装置和所述无线输出设备之间的无线通信信道；

通过在所述无线通信信道上发送一个或多个安全密钥来认证对一个或多个无线输出设备的无线接入，并且依赖于成功的认证，建立从所述无线移动信息装置到所述无线输出设备的安全无线连接；

在所述无线移动信息装置处获得所述数字内容的至少一部分；

在所述无线移动信息装置处将所述数字内容的至少一部分一致化为一个或多个输出图像，并且将所述一个或多个输出图像编码为一个或多个图像层，至少一个图像层包括以压缩操作进行编码的数据，并且不同的图像层包括不同的压缩技术；

在所述无线移动信息装置处生成包括所述一个或多个输出图像的中间输出数据，将所述中间输出数据至少部分地一致化为预先定义的或标准的格式、语言或者压缩方法，并且在所述无线移动信息装置处生成所述中间输出数据包括压缩操作和编码操作；以及

通过安全的无线连接将所述中间输出数据传递到所述无线输出设备，用于对所述数字内容进行渲染，在所述无线输出设备处渲染所述数字内容包括在与所述无线输出设备相关联的输出控制器处解压缩和解码所述中间输出数据。

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3. 一种用于将数字内容从无线移动信息装置渲染到无线输出设备的无线移动数据输出方法，其中，所述无线移动信息装置包括用于进行无线通信的至少一个无线通信单元以及用于与用户进行交互的图形用户界面，所述无线移动信息装置是与所述无线输出设备不同的设备，所述方法包括：

开启用于搜索可用的一个或多个无线设备的无线通信信道；

在所述无线通信信道上搜索可用的一个或多个无线设备；

在所述无线通信信道上发现能够用于无线连接的一个或多个无线设备；

在所述无线通信信道上接收与每个发现的无线设备相对应的属性，所述属性独立地或者组合地包括名称、标识、设备类型、地址以及支持的输出设备配置文件的指示中的至少一个；

至少部分地基于在所述无线通信信道上接收到的属性，从一个或多个发现的无线设备之中选择无线输出设备；

在所述无线移动信息装置处获得安全密钥，所述安全密钥用于使得能够将无线数据传输到选定的无线输出设备；

在所述无线通信信道上发送所述安全密钥的至少一部分，以用于在所述选定的无线输出设备处进行认证，并且请求所述选定的无线输出设备开启用于数据传输的安全的无线连接；

在所述无线通信信道上接收与认证相关的响应；并且如果所接收到的响应是肯定的，则在所述无线移动信息装置和所述选定的无线输出设备之间建立安全无线连接；

在所述无线移动信息装置处获得所述数字内容的至少一部分；

在所述无线移动信息装置处将所述数字内容的至少一部分一致化为以格式或者语言来编码的输出数据，用于传送到所述选定的输出设备，在所述无线移动信息装置处一致化中间输出数据包括压缩操作和编码操作；以及

通过所述安全的无线连接将所述输出数据从所述无线移动信息装置传送到所述选定的无线输出设备，用于渲染所述数字内容。

4. 一种用于将数字内容从无线移动信息装置渲染到无线输出设备的无线移动数据输出方法，所述数字内容至少部分地可由所述无线移动信息装置访问，所述无线移动信息装置是与所述无线输出设备不同的设备，并且包括用于进行无线通信的无线通信单元以及用于与用户进行交互的触敏屏幕，所述方法包括：

开启直接在所述无线移动信息装置和所述无线输出设备之间的无线通信信道；

在所述无线通信信道上接收至少与一个或多个无线输出设备相关联的与设备相关的属性，所述与设备相关的属性独立地或者以任何组合包括名称、标识、设备类型、地址和支持的输出设备配置文件的指示中的至少一个；

在所述触敏屏幕上至少部分地基于所接收到的与设备相关的属性来选择无线输出设备；

在所述无线移动信息装置处获得所述数字内容的至少一部分；

在所述无线移动信息装置处将所述数字内容的至少一部分一致化为一个或多个输出图像；

在所述无线移动信息装置处生成与设备相关的中间输出数据，所述与设备相关的中间

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输出数据包括所述一个或多个输出图像，所生成的与设备相关的中间输出数据至少部分地与在所述无线通信信道上从所述一个或多个无线输出设备接收到的所述与设备相关的属性有关系，并且在所述无线移动信息装置处生成与设备相关的中间输出数据包括压缩操作和编码操作；以及

在所述无线通信信道上传送所述与设备相关的中间输出数据，用于渲染所述数字内容。

5. 根据权利要求 4 所述的方法，进一步包括：通过在所述无线通信信道上发送一个或多个安全密钥来认证对一个或多个无线输出设备的无线接入。

6. 根据权利要求 4 所述的方法，进一步包括：在所述无线移动信息装置处无线地搜索可用于无线通信的无线输出设备；以及用于发现一个或多个无线输出设备的装置。

7. 根据权利要求 4 所述的方法，进一步包括：通过所述无线连接将作为在所述选定的无线输出设备处对所述数字内容进行渲染的支付的支付信息从所述无线移动信息装置传送到所述选定的无线输出设备。

8. 根据权利要求 4 所述的方法，其中，在所述无线移动信息装置处将所述数字内容的至少一部分一致化为一个或多个输出图像包括：将所述一个或多个输出图像编码为一个或多个图像层，并且至少一个图像层包括以压缩操作编码的数据。

9. 根据权利要求 8 所述的方法，其中，所述至少一个图像层包括两个或多个图像层，并且每个图像层包括以不同的分辨率来编码的数据。

10. 一种在无线输入设备处访问用于进行渲染的数字内容的无线移动信息装置，所述无线移动信息装置是与所述无线输出设备不同的设备，并且包括用于进行无线通信的无线通信单元以及用于与用户进行交互的图形用户界面，所述无线输出设备具有包括在内部或附接在外部的用于解码和解压缩中间输出数据的输出控制器，所述无线移动信息装置包括：

用于在所述无线移动信息装置处获得数字内容的至少一部分并且在所述图形用户界面上向所述用户显示所述数字内容的至少一部分的装置；

用于在所述无线移动信息装置处开启无线通信信道的装置；

用于在所述无线移动信息装置处经由所述无线通信单元并且在所述无线通信信道上接收至少与无线输出设备相关的指示的装置；

用于在所述无线移动信息装置处选择至少部分地基于所接收到的指示来选定的无线输出设备的装置；

用于在所述无线移动信息装置处将所述数字内容的至少一部分一致化为一个或多个输出图像的装置，所述一个或多个输出图像以包括压缩的一个或多个图像层来进行编码；

用于在所述无线移动信息装置处生成所述中间输出数据的装置，所述中间输出数据包括所述一个或多个输出图像、包括以压缩进行编码的数据的至少一个图像层，并且将所述中间输出数据一致化为预先定义的或标准的格式、语言或者压缩，并且在所述无线移动信息装置处生成所述中间输出数据包括编码操作和压缩操作；

用于在所述无线移动信息装置和所述选定的无线输出设备之间建立无线连接的装置；以及

用于在所述无线连接上将所述中间输出数据从所述无线移动信息装置传送到所述选

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定的无线输出设备，以渲染所述数字内容的装置，在无线输出设备处渲染所述数字内容包括在与所述无线输出设备相关联的输出控制器处解压缩和解码所述中间输出数据。

11. 根据权利要求 10 所述的装置，进一步包括：用于在所述无线移动信息装置处无线地搜索可用于无线通信的无线输出设备的装置，以及用于发现一个或多个无线输出设备的装置。

12. 根据权利要求 10 所述的装置，其中，所述用于建立与所述选定的无线输出设备的无线连接的装置进一步包括：用于认证对所述输出设备的无线访问的装置，所述认证对所述输出设备的无线访问包括在所述无线通信信道上独立地或者以任何组合来发送所述无线移动信息装置的标识、用户名、密码、ID 号、签名、物理或者数字安全密钥、生物特征、指纹以及声音中的一个或多个。

13. 根据权利要求 10 所述的装置，进一步包括：用于在所述无线移动信息装置的所述图形用户界面上获得用户喜好的装置，所述用户喜好是与在所述选定的无线输出设备处渲染所述数字内容相关的参数。

14. 根据权利要求 10 所述的装置，进一步包括：用于在所述无线连接上将作为在所述选定的无线输出设备处对所述数字内容进行渲染的支付的支付信息从所述无线移动信息装置传送到所述选定的无线输出设备的装置。

15. 根据权利要求 10 所述的装置，其中，以一个或多个图像层来编码所述一个或多个输出图像包括：以不同的分辨率来编码每个图像层。

16. 根据权利要求 10 所述的装置，其中，所述无线移动信息装置独立地或者以任何组合是膝上型计算机、移动电话、智能电话、因特网 PAD、因特网设备、数字相机以及 PDA 中的一个。

17. 一种访问用于在无线输出设备处进行渲染的数字内容的至少一部分的无线移动信息装置，所述无线移动信息装置是与所述无线输出设备不同的设备，并且包括用于进行无线通信的无线通信单元以及用于与用户进行交互的图形用户界面，所述无线移动信息装置包括：

用于开启在所述无线移动信息装置和所述无线输出设备之间的无线通信信道的装置；

用于通过在所述无线通信信道上发送一个或多个安全密钥来认证对一个或多个无线输出设备的无线接入并且依赖于成功的认证来建立从所述无线移动信息装置到所述无线输出设备的安全无线连接的装置；

用于在所述无线移动信息装置处获得所述数字内容的至少一部分的装置；

用于在所述无线移动信息装置处将所述数字内容的至少一部分一致化为一个或多个输出图像并且将所述一个或多个输出图像编码为一个或多个图像层的装置，至少一个图像层包括以压缩操作编码的数据，并且不同的图像层包括不同的压缩技术；

用于在所述无线移动信息装置处生成包括所述一个或多个输出图像的中间输出数据的装置，所述中间输出数据至少部分地一致化为预先定义的或标准的格式、语言或者压缩方法，并且在所述无线移动信息装置处生成所述中间输出数据包括压缩操作和编码操作；以及

用于在所述安全的无线连接上将所述中间输出数据传递到所述无线输出设备用于渲

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染所述数字内容的装置，在所述无线输出设备处渲染所述数字内容包括在与所述无线输出设备相关联的输出控制器处解压缩和解码所述中间输出数据。

18. 根据权利要求 17 所述的装置，进一步包括：用于在所述无线移动信息装置处无线地搜索可用于无线通信的无线输出设备的装置；用于发现一个或多个无线输出设备的装置；以及用于至少部分地基于在所述无线通信信道上从所述无线输出设备接收到的指示来选择在所述搜索中找到的无线输出设备的装置。

19. 根据权利要求 17 所述的装置，进一步包括：用于在所述无线移动信息装置的所述图形用户界面上获得用户喜好的装置，所述喜好与在所述无线输出设备处对所述数字内容进行渲染的参数有关。

20. 根据权利要求 17 所述的装置，进一步包括：用于在所述安全无线连接上传送作为在所述无线输出设备处对所述数字内容进行渲染的支付的支付信息的装置。

21. 根据权利要求 17 所述的装置，其中，所述安全密钥独立地或者以任何组合包括所述无线移动信息装置的标识、用户名、密码、ID 号、签名、物理或数字安全密钥、生物特征、指纹以及声音中的一个或多个。

22. 根据权利要求 17 所述的装置，其中，将所述一个或多个输出图像编码为一个或多个图像层包括以不同的分辨率来编码每个图像层。

23. 根据权利要求 17 所述的装置，其中，所述用于在所述无线移动信息装置处将所述数字内容的至少一部分一致化为一个或多个输出图像的装置独立地或者以任何组合包括光栅化操作、缩放操作、内插操作、解码操作、编码操作、彩色校正操作、色空间变换、色彩匹配操作、半色调操作、图像处理操作、图像增强、分割、数字水印、转换操作、平滑化操作、抗混叠操作以及压缩操作中的至少一个。

24. 一种访问用于在无线输出设备处进行渲染的数字内容的至少一部分的移动无线移动信息装置，其中，所述无线移动信息装置包括用于进行无线通信的至少一个无线通信单元以及用于与用户进行交互的图形用户界面，所述无线移动信息装置是与所述无线输出设备不同的设备，所述无线移动信息装置包括：

用于开启无线通信信道的装置，所述无线通信信道用于搜索可用的一个或多个无线设备；

用于在所述无线通信信道上搜索可用的一个或多个无线设备的装置；

用于在所述无线通信信道上发现可用于无线连接的一个或多个无线设备的装置；

用于在所述无线通信信道上接收与每个发现的无线设备相对应的属性的装置，所述属性独立地或者组合地包括名称、标识、设备类型、地址和支持的输出设备配置文件的指示中的至少一个；

用于至少部分地基于在所述无线通信信道上接收到的属性从一个或多个发现的无线设备之中选择无线输出设备的装置；

用于在所述无线移动信息装置处获得安全密钥的装置，所述安全密钥用于使得能够将无线数据传输到选定的无线输出设备；

用于在所述无线通信信道上发送所述安全密钥的至少一部分以用于在所述选定的无线输出设备处进行认证，并且请求所述选定的无线输出设备开启用于数据传输的安全的无线连接的装置；

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用于在所述无线通信信道上从所述无线输出设备接收与认证相关的响应、并且如果所接收到的响应是肯定的、则在所述无线移动信息装置和所述选定的无线输出设备之间建立安全无线连接的装置；

用于在所述无线移动信息装置处获得所述数字内容的至少一部分的装置；

用于在所述无线移动信息装置处将所述数字内容的至少一部分一致化为以格式或语言编码的输出数据用于传送到所述选定的输出设备的装置，在所述无线移动信息装置处一致化中间输出数据包括压缩操作和编码操作；以及

用于在所述安全的无线连接上将所述输出数据从所述无线移动信息装置传送到所述选定的无线输出设备以渲染所述数字内容的装置。

25. 根据权利要求 24 所述的装置，其中，所述无线移动信息装置独立地或者以任何组合地是膝上型计算机、移动电话、智能电话、因特网 PAD、因特网设备、数字相机以及 PDA 中的一个。

26. 根据权利要求 24 所述的装置，其中，所述安全密钥独立地或者以任何组合包括所述无线移动信息装置的标识、用户名、密码、ID 号、签名、物理或数字安全密钥、生物特征、指纹和声音中的至少一个。

27. 根据权利要求 24 所述的装置，其中，所述输出数据包括压缩的数据，并且所述压缩的数据独立地或者以任何组合包括音频数据、视频数据和图像数据中的一个或多个。

28. 根据权利要求 24 所述的装置，其中，用于在所述无线移动信息装置处将所述数字内容的至少一部分一致化为输出数据的装置包括：将所述数字内容的至少一部分一致化为与设备相关的输出数据，所述与设备相关的输出数据至少部分地与在所述无线通信信道上接收到并且从所述选定的无线输出设备接收到的属性相关。

29. 根据权利要求 24 所述的装置，其中，在所述无线移动信息装置处将所述数字内容的至少一部分一致化为输出数据包括：将所述数字内容的至少一部分一致化为与设备无关的输出数据，所述与设备无关的输出数据至少部分地与预先定义的或标准的格式或者语言相关。

30. 一种访问用于在无线输出设备处进行渲染的数字内容至少一部分的无线移动信息装置，所述数字内容至少部分地可由所述无线移动信息装置访问，所述无线移动信息装置是与所述无线输出设备不同的设备，并且包括用于进行无线通信的无线通信单元以及用于与用户进行交互的触敏屏幕，所述无线移动信息装置包括：

用于开启直接地在所述无线移动信息装置和所述无线输出设备之间的无线通信信道的装置；

用于在所述无线通信信道上从一个或多个无线输出设备至少接收与一个或多个无线输出设备相关联的与设备相关的属性的装置，所述与设备相关的属性独立地或者以任何组合包括名称、标识、设备类型、地址以及支持的输出设备配置文件的指示中的至少一个；

用于在所述触敏屏幕上至少部分地基于所接收到的与设备相关的属性来选择无线输出设备的装置；

用于在所述无线移动信息装置处获得所述数字内容的至少一部分的装置；

用于在所述无线移动信息装置处将所述数字内容的至少一部分一致化为一个或多个输出图像的装置；

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用于在所述无线移动信息装置处生成与设备相关的中间输出数据的装置，所述与设备相关的中间输出数据包括所述一个或多个输出图像，所生成的与设备相关的中间输出数据至少部分地与在所述无线通信信道上从所述一个或多个无线输出设备接收到的所述与设备相关的属性相关，并且在所述无线移动信息装置处生成与设备相关的中间输出数据包括压缩操作和编码操作；以及

用于在所述无线通信信道上传送所述与设备相关的中间输出数据用于渲染所述数字内容的装置。

31. 根据权利要求 30 所述的装置，进一步包括：用于通过在所述无线通信信道上发送一个或多个安全密钥来认证对一个或多个无线输出设备的无线接入的装置。

32. 根据权利要求 30 所述的装置，进一步包括：用于在所述无线移动信息装置处无线地搜索可用于无线通信的无线输出设备的装置；以及用于发现一个或多个无线输出设备的装置。

33. 根据权利要求 30 所述的装置，进一步包括：用于在所述无线连接上将作为在所选定的无线输出设备处对所述数字内容进行渲染的支付的支付信息从所述无线移动信息装置传送到所述选定的无线输出设备的装置。

34. 根据权利要求 30 所述的装置，其中，所述用于在所述无线移动信息装置处将所述数字内容的至少一部分一致化为一个或多个输出图像的装置包括：将所述一个或多个输出图像编码为一个或多个图像层，并且所述至少一个图像层包括以压缩操作编码的数据。

35. 根据权利要求 34 所述的装置，其中，所述至少一个图像层包括两个或多个图像层，并且每个图像层包括以不同的分辨率编码的数据。

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从移动信息装置无线输出数字内容

[0001] 本申请是2003年9月19日进入中国国家阶段、申请日为2002年1月21日、申请号为02806907.2(PCT/US02/19901)，发明名称为"通用数据输出系统"的专利申请的分案申请。

[0002] 相关申请的交叉索引

[0003] 本申请要求2001年1月19日提交的临时申请No.60/262,764的优先权，其整个内容在此合并作为参考。

[0004] 技术领域

[0005] 本发明涉及向输出提供内容，特别地，涉及提供信息装置能普遍地向输出设备输出内容而不需要为每个输出设备安装专用的设备相关驱动程序或应用程序的通用输出。

[0006] 背景技术

[0007] 本发明涉及通用数据输出，以及特别地，涉及提供用于信息装置和输出设备的新数据输出方法和新光栅图象处理。

[0008] 如在此所述，信息装置通常指计算设备，其包括固定计算机和移动计算设备（普遍设备）。这些信息装置的例子包括，但不限于，台式计算机、膝上型计算机、网络计算机、掌上计算机（手持计算机）、个人数字助理(PDAs)、Internet激活移动电话、智能电话、寻呼机、数字俘获设备（例如，数字照相机和摄像机）、Internet设备、e-books、信息板(pad)以及数字或web板（例如，电视、监视器和投影仪），以及音频输出设备。

[0009] 为简单和方便起见，在下文中，下述描述将输出设备称为打印机以及将输出过程称为打印。然而，应当理解到，用在描述本发明中的术语打印机和打印涉及用作特定例子的一个实施例以便简化本发明的描述。在此使用索引打印机和打印是为了应用于或延伸到输出设备的更大的范围和定义并且不应当视为限制本发明的范围和原理。

[0010] 受日益增加的带宽、处理功率、无线移动设备以及无线软件应用程序的推动，数百万的用户使用他们的普遍或移动计算设备正或将创建、下载和传送内容和信息。因此，需要允许用户方便地从他们的普遍计算设备，将内容和信息输出给任何输出设备。例如，人们需要直接和方便地从他们的普遍信息装置输出，而不依赖于与用于打印的固定计算机（台式个人计算机）同步。

[0011] 为示例说明，用他的手持计算机接收e-mail的机场的移动工作人员可希望希望走近附近的打印机或传真机来打印他的e-mail。另外，移动工作人员也希望从他的移动设备打印他的工作清单、约定簿、名片和他的航行时刻表。如另一个例子，使用他的移动设备访问电子商务站点的用户可希望打印出事务确认。如另一例子，用数字照相机照相的用户可希望轻易地将其打印到附近的打印机。在上述任何一种情况下，移动用户可希望仅仅走到打印机，并方便地打印存储在移动装置上的或从网络（例如，Internet、企业通信网）下载的文件（字处理文档、PDF、HTML等等）。

[0012] 通常，将输出设备（例如，打印机）经有线连接，诸如电缆线连接到信息装置。通过使用，例如，无线通信或红外通信，无线连接也是可能的。不管是有线还是无线连接，用户必须首先在信息装置中安装对应于特定输出设备型号和品牌的输出设备驱动程序（在输出

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设备是打印机的情况下，安装打印机驱动程序）。使用设备相关或特定的驱动程序，信息装置可将输出内容或数字文档处理为特定的输出设备的输入要求（例如，打印机输入要求）。输出设备的输入要求对应于输出设备（例如，打印机）得知的输入类型。例如，打印机的输入要求可包括打印机特定的输入格式（例如，一个或多个图象、图形或文本格式或语言）。因此，输出数据（或在输出设备是打印机的情况下的打印数据）在此是指对输入相关输出设备可接受的数据。输入要求的例子可包括，但不限于，音频格式、视频格式、文件格式、数据格式、编码、语言（例如，页面描述语言、标记语言等等）、指令、协议或特定输出设备品牌或型号能理解或使用的数据。

[0013] 输入要求可是基于属性或公开标准或两者的结合。因此，总的来说，输出设备的输入要求是设备相关。根据最佳操作的规格，不同的输出设备型号可具有由输出设备制造商（例如，打印机制造商）指定、设计或采用的它们自己的输入要求。因此，不同的输出设备通常要求使用特定的输出设备驱动程序（例如，打印机驱动程序），用于准确的输出（例如，打印）。有时，代替使用设备驱动程序（例如，打印机驱动程序），设备驱动特征可包含为应用程序软件的一部分。

[0014] 安装设备驱动程序（例如，打印机驱动程序）或应用程序可由例如，使用由打印机制造商提供的 CD 或软盘的人工安装来实现。或者，用户能从网络下载具体的驱动程序或应用程序。对家庭或办公用户来说，根据驱动程序的类型以及用户使用计算设备和网络的技术水平，该安装过程可花费大概从几分钟到几个小时。即使通过即插即用安装，对每个打印机或输出设备来说，仍然要求用户执行多个步骤的过程。

[0015] 该安装和配置过程对否则将他们的时间花费在做其他创新的或有趣的工作的终端用户来说增加了复杂度和工作。此外，可阻碍许多单纯的用户将新的外围设备（例如，打印机、扫描仪等等）增加到他们的家用计算机或网络上以避免安装和配置的不方便。因此，期望信息装置能输出到不至一个输出设备，而没有安装多个专用设备相关驱动程序的不便。

[0016] 另外，传统的输出或打印方法对移动设备用户比对家用或办公用 户来说提出了相当高的挑战和困难。对预先安装设备相关驱动程序的需求减小了移动（普遍）计算和输出的好处和原理。例如，移动用户可希望在机场、加油站、便利商店、公用电话亭、旅馆、会议室、办公室、家里等等打印可输出 e-mail、PowerPoint ®演示文档、web 页或其他文档。用户将在这些位置的任何一个找出与用户的基站相同品牌或型号的打印机是非常不可能的。因此，在传统的打印方法下，每次在打印前，在每个这样的远程位置，用户不得不安装和配置打印机驱动程序。通常，对正在使用的上百、或甚至上千打印机型号，以及信息装置的有限存储容量、存储空间以及处理能力，不是可行的选项。

[0017] 此外，用户可不希望由于查找驱动程序或下载它以及安装它，仅是为在机场打印出或显示出 email 的一页而被打扰。对促进普遍或移动计算来说，这肯定是不期望和令人气馁的过程。因此，需要更方便的打印方法来支持用户能仅仅走到输出设备（例如，打印机或显示设备）并容易输出数字文档，而不必安装或预先安装特定的输出设备驱动程序（例如，打印机驱动程序）的普遍计算范例。

[0018] 对移动用户来说，另一个挑战是许多移动信息装置具有有限的存储空间、处理容量和能力。这些限制对小和低成本的移动设备，包括例如，PDAs、移动电话、屏幕电话、寻呼

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机、e-bok、Internet Pads、Internet 设备等等更明显。有限存储空间在安装和运行大的或复杂的打印机或装置驱动程序方面产生困难，更不必说对多种打印机和输出设备的多个驱动程序。慢的处理速度和有限电源产生了驱动输出设备的困难。例如，通过小移动信息装置处理或转换数字文档为输出数据非常慢以致其不适合于生产输出。集中处理也会耗尽或消耗电源或电池资源。因此，需要一种方法以便具有有限处理能力的小移动设备仍然能合理地将内容输出到各种输出设备。

[0019] 为将内容（例如，数字文档）输出或渲染（render）到输出设备上，通常要求在内容上进行光栅图象处理（raster image processing）(RIP) 操作。RIP 操作可是计算集中并且包括 (1) 光栅化 (rasterization) 操作，(2) 色空间转换，以及 (3) 半色调 (halftoning) 操作。RIP 也可包括其他操作，诸如缩放、分段、颜色匹配、颜色校正、GCR（灰色成分替换）、黑色生成、图象增强压缩 / 解压缩、编码 / 解码、加密 / 解密 GCR、其他中的图象增强。

[0020] RIP 中的光栅操作涉及将包含在内容在的对象和描述（例如，图形、文本等等）转换成适合于输出的图象形式。光栅可包括另外的操作，诸如缩放和内插操作，用于匹配特定的输出大小和分辨率。RIP 中的色空间转换包括将输入色空间描述转换成用于在输出设备渲染所需的适当的色空间（例如，RGB 至 CMYK 转换）。使用较低的亮度和色度级，数字半色调是用于渲染连续的色调图象 (tone image) 的成象技术。半色调操作诸如误差扩散可是计算集中并且当输出设备的色深 (bitdepth)（例如，每个象素位）小于输入光栅图象色深时包括。

[0021] 通常，RIP 操作包含在信息，或作为输出设备或输出系统（例如，打印机控制器中）的一部分中。图 1 示例说明传统的数据输出方法 102 的流程图，其中在信息装置中实现 RIP110。不包括执行复杂的 RIP 操作的打印机控制器的输出设备，诸如，低成本、低速喷墨打印机，通常采用数据输出方法 102。在数据输出方法 102 中，信息装置在步骤 100 获得内容（例如，数字文档），用于在输出设备处渲染和输出。信息装置可包括应用程序（例如，设备驱动程序），其实现 RIP 操作 110。信息装置在步骤 120 生成输出数据并在步骤 130，将所输出的数据传送到输出设备，用于渲染。与内容有关的输出数据是以包含在输出设备中的输出引擎（例如，显示引擎、打印机引擎等等）可接受的形式（例如，以适当的输出大小和分辨率）。传统输出方法 102 中的输出数据通常是设备相关。

[0022] 图 1A 的数据输出方法 102 的一个缺点在于要不是输出需要整个光栅图象处理生成 110 的话，信息装置执行大部分操作。RIP 操作可要求 集中计算。许多信息装置，诸如移动信息设备可具有不足的计算能力和 / 或存储器来以可接受的速度执行在输出过程中需要的 RIP 生成 110。

[0023] 图 1A 的传统数据输出方法 102 的另一个缺点在于所生成的输出数据是设备相关，因此，通常对其他输出设备来说非常不便携。因此，信息装置需要安装用于多个输出设备的多个应用程序或设备驱动程序，其可进一步对用在具有有限存储器、存储和处理能力的信息装置中的可行性变得复杂。

[0024] 图 1B 示例说明另一种传统的数据输出方法 104 的流程图，其中在输出设备中实现 RIP。实现过程 104 的输出设备的一个例子是高速激光打印机，其包括用于执行 RIP 操作的打印机控制以及用于渲染内容的输出引擎（例如，打印机引擎）。打印机控制器可内部安装到或外部连接到输出设备（在该例子中为打印机）上。在数据输出方法 104 中，信息装置

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在步骤 100 获得用于输出的内容，并在步骤 160 生成用于在步骤 170 传送给输出设备的输出数据或打印数据。打印数据包括与内容有关的信息并通常用页面描述语言（PDL），诸如 PostScript 和 PCL 等等编码。在步骤 180 中，打印机接收输出数据或打印数据（在 PDL 中），在步骤 190 中，包含在打印机中的打印机控制器解释 PDL、执行 RIP 操作，并生成对打印机引擎来说可接受的形式（例如，以适当的输出大小、色深、色空间和分辨率的光栅图象）的打印机引擎打印数据。在步骤 150 中，打印机引擎用打印机引擎打印数据渲染该内容。

[0025] 将理解到，索引包括语言，诸如 PDL 的打印数据或输出数据应当解释为使用那种语言编码打印数据或输出数据的含义。相应地，索引生成语言，诸如 PDL 的数据输出过程应当解释为使用那种语言编码数据输出过程的含义。

[0026] 在图 1B 所示的传统数据输出方法 104 中有许多缺陷。这些缺陷对具有有限处理能力和存储器的移动计算设备来说尤其明显。一种这样 的缺陷是包括页面描述语言（PDL），诸如 PostScript 或 PCL 的输出数据或打印数据非常复杂。生成复杂的 PDL 可增加信息装置的存储器和处理要求。此外，解释、解码，然后光栅图象处理复杂的 PDL 能增加教育处、减小打印速度，以及增加输出设备或其打印机控制器的成本。

[0027] 另一缺点在于包括 PDL 的输出数据可产生非常大的文件大小，这将增加信息装置、输出设备和 / 或打印机控制器等等的存储器和存储要求。大的文件大小也可增加在信息装置和输出设备间的通信链接中所需的带宽。

[0028] 最后，对输出设备中的光栅文本来说，打印机控制器可需要包括多个字体。当在打印机控制器不包括或缺少特定字体或国际字符时，渲染或输出可能会变得不准确或不相容。

发明内容

[0029] 因此，本发明提供方便的通用数据方法，其中信息装置和输出设备或系统共享光栅图象处理操作。此外，新数据输出方法消除了在信息装置中安装多个设备相关专用驱动程序或应用程序以便输出到多个输出设备的需要。

[0030] 根据本发明，普遍或通用输出的电子系统和方法信息装置方便地将内容输出到实际的任何输出设备。信息装置可中央处理单元、输入 / 输出控制单元、储存单元、存储单元以及有线或无线通信单元或适配器。信息装置最好包括可实现为软件应用程序、助手应用程序、或设备驱动程序（在打印机的情况下为打印机驱动程序）的客户机应用程序。客户机应用程序可包括通过硬件和软件部件，例如，包括驻留在其主信息装置上的一个或多个通信芯片组管理和控制性能。

[0031] 信息装置中的客户机应用程序能与具有本发明的输出控制器的输出设备通信、管理和使数据或软件部件与其同步。

[0032] 渲染输出设备中的内容指的是在打印设备的情况下，将内容的图象打印到基片上；在显示设备的情况下，显示内容的图象；以及在语音或声音输出设备或系统中播放所述内容的音频表示。

[0033] 输出控制器可是驻留在输出设备中的电路板、卡或软件部分。另外，输出控制器可外部连接到输出设备上作为外部部件或“盒”。可尤其用嵌入处理器、软件、固件、ASIC、DSP、FPGA、芯片上系统、专用芯片组实现输出控制器。在另一实施例中，输出控制器的功能性可

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由运行在外部连接到输出设备的 PC、工作站或服务器上的应用程序提供。

[0034] 在如参考图 1A 所述的传统的数据输出方法 102 中，信息装置将输出数据传送给输出设备，用于渲染。输出数据对应于意欲输出的内容并且大部分光栅图象处理过 (RIPed)，因此是设备相关的，因为光栅图象处理是典型的设备相关操作。可用一种或多种压缩或编码技术编码或压缩输出数据。在本发明中，信息装置产生用于输出到输出设备的中间输出数据。中间输出数据包括对应于该内容的光栅化图象。然而，还没有执行 RIP（例如，色彩匹配和半色调）的设备相关图象处理操作。因此，中间输出数据比由参考图 1A 的输出方法生成的输出数据更设备独立和更便携。

[0035] 在本发明的一种实现中，中间输出数据包括 MRC（混合光栅内容）格式、编码和压缩技术，与传统的图象编码和压缩技术相比，其进一步提供提高的图象质量和压缩比。

[0036] 在本发明的光栅图象过程和数据输出方法的例子中，将诸如打印机驱动程序的客户机应用程序包括在信息装置中并在内容上执行部分光栅图象处理操作，诸如光栅化。信息装置生成包括对应于内容的输出图象的中间输出数据并将该中间输出数据发送给输出设备或输出系 统，用于渲染。包括在输出设备或输出系统中的输出控制器应用程序或部件实现光栅图象处理操作的剩余部分，尤其诸如数字半色调、色彩校正。

[0037] 象传统的光栅图象处理方法，该发明提供信息装置和输出设备或输出系统间光栅图象处理计算负载的更平衡分布。可在输出设备或输出系统中实现诸如数字半色调和色空间变换的计算密集图象处理操作。因此，当与参考图 1A 所述的、整个光栅图象处理在信息装置中实现的传统的数据输出方法相比时，该新的光栅图象处理方法降低了信息装置的处理和存储要求。另外，在该发明中，包括在执行部分光栅图象处理操作的信息装置中的客户机应用程序或设备驱动程序与包括在执行光栅图象处理操作的信息装置中的传统输出应用程序相比，能具有更小的大小。

[0038] 在另一实现中，本发明提供具有更普遍地由多个输出设备接受的输出性能的信息装置。包括客户机应用程序的信息装置生成可包括设备独立属性的中间输出数据。输出控制器包括解释和处理该中间输出数据的部件。信息装置能将内容输出给包括输出控制器的不同输出设备或输出系统，即使当这些输出设备属于不同商标、品牌、型号并具有不同输出引擎和输入数据要求时。不象传统的输出方法，用户不需要预先在信息装置中安装用于每个输出设备的多个专用设备相关驱动程序或应用程序。

[0039] 小型客户机应用程序、信息装置中降低计算要求以及在多个输出设备渲染的更通用数据输出方法的组合使得移动设备具有更小的存储空间和处理能力来实现数据输出功能，相反，用传统的输出方法是很难实现的。

[0040] 另外，与包括页面描述语言 (PDL) 打印机控制器的传统的输出方法 104 相比，本发明能降低输出设备或输出系统的成本。在本发明 中，信息装置产生中间输出数据并将其发送给输出设备或系统。在一个优选实施例中的中间输出数据包括对应于意欲输出的内容的光栅化输出图象。与过程 104 中所述的传统的方法相比，包括在输出设备或输出系统中的输出控制器解码和处理中间输出数据用于输出，而不执行复杂的解释和光栅化。相比起来，传统的数据输出方法 104 生成复杂的 PDL 并将该 PDL 从信息装置发送到包括打印机控制器（尤其例如，PostScript 控制器或 PCLS 控制器）的输出设备。与解码和处理包括光栅化输出图象的本发明的中间输出数据相比，PDL 的解释和光栅图象处理具有更高的计算要求。当

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与使用包括在本发明的数据输出方法中的输出控制器相比时，实现具有例如，PDL 的传统的打印机控制器增加了部件成本（例如，存储器、储存器、ICs、软件和处理器等等）。

[0041] 另外，与包括光栅化输出图象的中间输出数据相比，包括 PDL 的输出数据能产生大的文件大小。用于本发明的数据输出方法相当地将更小的输出数据从信息装置传送到输出设备。更小的输出数据大小能加速传输、更低通信带宽以及降低存储要求。最后，本发明能提供传统的方法来在具有或不与静态网络的连接的输出设备上渲染内容。在传统的网络打印中，信息装置和输出设备必须连接到静态网络。在本发明中，通过信息装置和输出设备间的局部通信和同步，安装硬件和软件来保持静态网络连接性对启动输出设备渲染内容是不必要的。

[0042] 根据本发明的几个方面，提供在附加独立权利要求中定义的主题。

[0043] 本发明的另外的目的和优点根据参考附图进行的优选实施例的详细描述，将是显而易见的。

附图说明

[0044] 图 1A 是根据现有技术的传统数据输出方法及其相应的光栅图象处理的流程图。

[0045] 图 1B 是根据现有技术，用于包括传统的打印机控制器的输出设备 的第二传统数据输出方法及其相应的光栅图象处理的流程图。

[0046] 图 2A 和 2B 是示例说明能实现本发明的过程和装置的操作环境的部件的框图。

[0047] 图 3A 是示例说明根据本发明的信息装置实现的硬件 / 软件部件的示意性框图。该信息装置包括操作系统。

[0048] 图 3B 是示例说明根据本发明的信息装置实现的硬件 / 软件部件的第二示意框图；

[0049] 图 4A 是具有传统打印机控制器的传统打印系统或打印机的框图。

[0050] 图 4B 是第二传统输出系统或输出设备的框图。

[0051] 图 5A 是根据本发明，具有传统打印机控制器和输出控制器的打印系统或打印机的示意框图。

[0052] 图 5B 是根据本发明，包括输出控制器的第二输出系统或输出设备的示意性框图。

[0053] 图 6A 是示例说明根据本发明的输出控制器的硬件 / 软件部件的示意性框图。输出控制器包括操作系统。

[0054] 图 6B 是示例说明根据本发明的输出控制器的硬件 / 软件部件的第二示意性框图。输出控制器不包括操作系统。

[0055] 图 6C 是示例说明根据本发明的输出控制器的硬件 / 软件部件的第三示意性框图。输出控制器结合本发明的打印机控制器和输出器的功能性。

[0056] 图 7A-7F 示例说明相对于输出设备，诸如打印机的输出控制器的各种配置和实现。

[0057] 图 8A 是示例说明无线通信单元的硬件 / 软件部件的示例性实现的框图；

[0058] 图 8B 是示例说明无线通信单元的硬件 / 软件部件的第二示例性实现的框图。

[0059] 图 9 是本发明的通用数据输出方法及其相应的光栅成象过程的流程图。

[0060] 图 10 是相对于参考图 2 所述的部件、系统和装置的本发明的通用数据输出方法的

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框图。

[0061] 图 11 是示例说明实现可选地包括在图 10 的输出过程中发现过程的一种方法的流程图。

[0062] 图 12A 和 12B 是包括在图 10 的输出过程中的示例性客户机应用程序过程的流程图。

[0063] 图 13A 和 13B 是包括在图 10 的输出过程中的示例性输出设备和输出系统过程的流程图。

具体实施方式

[0064] 以下阐述的是用在描述本发明的实现方式中的术语的定义。提供这些定义以便于理解和示例说明本发明的实现方式并且决不应当视为将本发明的范围限制到具体的例子、类和种类。

[0065] 输出设备配置文件（或对象）

[0066] 输出设备配置文件（或对象）包括软件和数据实体，其在其自身内封装描述输出设备的数据和属性以及用于操作数据和属性的指令。输出设备配置文件可驻留在不同硬件环境或平台或应用程序中，以及可以文件、消息、其他形式和技术中的软件对象或部件传送。为简化讨论，配置文件或对象也可包括。例如，可具有由一个类、类的合成，或整个应用程序组成的变化粒度的软件部分的原理。

[0067] 在此使用的术语配置文件或对象并不限制软件或数据作为其媒介。以计算机可读形式的包含信息、描述、属性、数据、指令等等的任何实体或媒介，诸如硬件、软件、基于或包括声音、文本、图形、图象或视频信号、以模拟或数字形式的电子信号等等均是配置文件和对象定义的有效形式。

[0068] 配置文件或对象也可在其一个字段或属性中包含对另一配置文件或对象的索引或指针，或对数据和 / 或内容的索引或指针。对配置文件或对象的索引可包括指针、标识符、名称、路径、地址或与能找到对象、配置文件、数据或内容的位置有关的任何描述的一个或多个，或 组合。

[0069] 输出设备配置文件可包含可识别和描述，例如，特定输出设备诸如打印机的能力和功能性的一个或多个属性。输出设备配置文件可存储在输出设备、信息装置的存储器部件或网络节点中。网络节点包括连接到网络上的任何装置、服务器或存储单元。如下文更详细的描述，请求输出服务的信息装置可与输出设备连接。在这种局部服务谈判期间，可将部分输出设备配置文件从输出设备加载到信息装置上。通过获得输出设备配置文件（或在打印机的情况下，打印机配置文件），信息装置可了解由输出设备提供的能力、兼容性、标识和服务。

[0070] 例如，输出设备配置文件可包含下述字段和 / 或属性描述的一个或多个。每个下述字段是可选的，此外，每个下述字段或属性可或不可存在于特定的实现方式中（例如，可为空或 NULL）：

[0071] 输出设备的标识（例如，商标、型号、注册、IP 地址等等）

[0072] 由输出设备提供的服务和特征设置（例如，色彩或灰度级输出、激光器或喷墨、双向、输出质量、每页的价格、服务质量等等）

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[0073] ●输出设备支持的输入语言的类型、格式、输出数据和/或输入要求（例如，PostScript、PCL、XML、RTL 等等）

[0074] ●设备特定的或从属参数和信息（例如，通信协议、色空间、色彩管理方法和渲染意图、分辨率、半色调方法、dpi（点每英寸）、色深、页面大小、打印速度、独立颜色通道或墨水量等等）

[0075] ●用于图象处理的数据和表，诸如颜色表、半色调表、比例因子、编码/解码参数和方法、压缩和解压缩参数和方法等等。

[0076] ●包含有关输出设备及其服务的参数和信息的另一配置文件（例如，色彩配置文件、半色调配置文件、通信配置文件、光栅配置文件、服务质量等等）。

[0077] ●有关由输出设备提供的多个服务的支付信息。

[0078] ●输出设备支持的信息或安全要求以及认证类型。

[0079] ●输出设备配置文件的日期和类型、其改进和更新的历史

[0080] ●包含算术或指令或数据的软件部分，其可加载以便在信息装置内运行。例如，图形用户界面（GUI）软件部分可加载到信息装置上。软件部分可通过本发明的客户机应用程序包含到或装入信息装置中以便俘获用户首选项（例如，打印质量、页面布局、复制量、每页的名片数等等）。在另一例子中，软件部分可包括用于其它中的压缩/解压缩、编码/解码、色彩匹配或校正、分段、缩放、半色调、加密/解密的方法、指令或可执行程序。

[0081] ●对一个或多个输出设备参数的指针或索引，包括上述输出设备配置文件或对象字段或属性描述的一个或多个。例如，有时，可将输出设备参数的快到期或原始版本存储在网络节点（连接到网络上的任何设备、服务器或存储单元）中，或可由客户机应用程序获得的信息装置内。任何输出设备配置文件可包括对这些输出设备参数的指针或多个指针。

[0082] 内容（或数据内容、数字内容、输出内容）

[0083] 内容（或数据内容、数字内容、输出内容）是用于输出，可包括其他内容类型中的文本、图形、图象、表格、视频、音频的数据。内容可包括数据本身或对那个数据的索引。内容可以任何格式、语言、编码或组合，并且可是以部分或全部专有的格式、语言或编码。数字文档是可包括描述数字文档本身和/或对数字文档的索引的属性和字段的内容的例子。数字文档的例子可是文件类型：HTML、VHTML、PostScript、PCL、XML、PDF、MS Word、PowerPoint、JPEG、MPEG、GIF、PNG、WML、VWML、CHTML、HDML、ASCII、2 字节国际编码字符等等的任何一个或组合。在本发明的描述中，可与术语数据内容、输出内容或数字内容互换使用内容。

[0084] 中间输出数据

[0085] 输出数据（或在打印机的情况下为打印数据）是从信息装置发送到输出设备的电子数据。输出数据与用于输出并以各种格式和语言（例如，POSTSCRIPT、PCL、XML）编码的内容有关，其可包括压缩或加密数据。一些输出设备制造商可也将专用或非专用语言、格式、编码、压缩、加密等等的组合包括在输出数据（或打印数据）中。

[0086] 中间输出数据是本发明的输出数据，并且其包括由信息装置生成的输出文件或数据、或客户机应用程序或包括信息中的设备驱动程序的更宽定义。中间输出数据可包括文本、向量图形、图象、视频、音频、符号、表格或组合，以及除此之外，可用一种或多种页面描述语言、标记语言、图形格式、成象格式、元文件编码。除此之处，中间输出数据也可包含指令（例如，输出首选项）和描述（例如，数据布局）。可压缩、加密或标记部分或所有中间输

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出数据。

[0087] 在本发明的优选实施例中，中间输出数据包含光栅图象数据。例如，能在信息装置中光栅化包含在内容中不是以图象形式的向量图形和文本信息或对象或将其一致成为图象数据并包括在中间输出数据中。RIP 的设备相关图象处理操作诸如，数字半色调和色空间转换能在输出设备或输出系统实现。

[0088] 中间输出数据可是设备相关或设备独立。在一种实现中，如果所使用的光栅参数，诸如分辨率、比例因子、色深、输出大小和 / 或色空间是设备相关，光栅化输出图象是设备相关。在本发明的另一种实现中，如果所使用的光栅参数是设备独立的，那么光栅化图象可是设备独立的。当那些参数包括基于标准或规格的一组预定或预先定义的光栅参数，光栅参数可变为设备独立。通过预先定义或设备独立的光栅参数，本发明的客户机应用程序能光栅化至少一部分内容并生成包含在中间输出数据中的设备独立图象。通过这样做，中间输出数据可变为设备独立，因此，成为用已经预先构造成接受中间输出数据的输出设备通用可接受的。

[0089] 在信息装置将光栅化或将文本和图形信息转换成图象数据的一个优点在于输出设备或打印机控制器不再需要执行复杂的光栅操作而且 它们不必包括多种字体。因此，采用在此描述的中间输出数据和数据输出方法能潜在地降低输出控制器、打印机控制器和 / 或输出设备的成本和复杂性。

[0090] 图象数据编码的一种形式称为混合光栅内容或MRC。通常，存储在 MRC 中的图象包括不至一个图象或位图层。在 MRC 中，基于分段标准，尤其诸如背景和前景、亮度和色度，在不同层中分段图象。例如，MR 包括具有背景层、前景层和切换或选择器层的三层。这三层是同延的并且可包括不同分辨率、编码和压缩。前景和背景层根据尤其基于分段标准、色彩型号的部分或通道、图象编码表示 (HLS、RGB、CMYK、YCC、LAB 等等) 分段图象的各个部分的方式，每个包含附加层。对每个点来说，切换层可指定前景或背景层是否有效。MRC 中的每个层可具有不同色深、分辨率、色空间，其允许例如，与背景层独立的压缩前景层。先前使用图象数据的 MRC 形式来最小化存储要求。另外，已经提出了用彩色图象传真传送中的 MRC 格式。

[0091] 在本发明的一个实施例中，中间输出数据包括采用 MRC 格式、编码和 / 或相关压缩方法的一个或多个光栅化输出图象。在该实现中，输出图象中的不同层可具有不同的分辨率并且可包括不同压缩技术。可用不同的压缩或编码技术分段和压缩原始内容 (例如，数字文档) 中的不同信息，诸如色度和亮度和 / 或前景和背景信息。也可将原始内容中的分段元素或对象信息存储在不同图象层中并具有不同分辨率。因此，与其他传统图象编码和压缩技术相比，通过 MRC，有机会降低输出数据文件大小、保留更多的图象信息、增加压缩比并提高图象质量。下面将更详细地描述本发明中的光栅化的实现、光栅图象处理以及包括 MRC 编码的中间输出数据。

[0092] 光栅化

[0093] 光栅化是将数字文档中的图形和文本转换成图象数据的操作。对包括在数字文档中的图象数据来说，光栅化可包括缩放和内插。光栅 化操作具有包括，尤其是色深和分辨率的光栅化操作的特征。指定的光栅化操作可具有好几个光栅化参数，包括输出大小、色空间，色彩通道等等。在光栅化操作中使用的一个或多个光栅化参数值可按缺省指定，可将一

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个或多个光栅化参数值提供给信息装置作为光栅化向量的分量。在指定的应用程序中，光栅化向量可指定仅一个光栅化参数的值，在光栅化操作中使用的其他光栅化参数采用默认值。在另一种应用中，光栅化向量可指定不至一个，但小于全部的光栅化参数值，在光栅化操作中使用的至少一个其他光栅化参数值采用默认值。并且在另一应用中，光栅化向量可指定用在光栅化操作中的所有光栅化参数值。

[0094] 图 2A 和 2B 是示例说明能实现本发明的过程和装置的操作环境的部件的框图。图 2A 表示包括信息装置 200 和输出设备 220 的电子系统。输出设备 200 包括输出控制器 230。图 2B 示例包括信息装置 200 和输出系统 250 的电子系统的第二种实现方式。输出系统 250 包括输出设备 220 和可外部连接到，或者与输出系统 250 中的输出设备 220 关联的输出控制器 230。

[0095] 信息装置 200 是具有处理能力的计算设备。在一个实施例中，信息装置 200 可是移动计算设备，诸如掌上型计算机、手持设备、膝上型计算机、个人数字助理 (PDA)、智能电话、屏幕电话、e-book、Internet 垫片、通信垫片、Internet 设备、寻呼机、数字照相机等等。信息装置 200 也可包括静态计算设备，诸如台式计算机、工作站、服务器等等是可能的。

[0096] 图 3A 和 3B 是示例说明包括在本发明的信息装置 200 中的硬件 / 软件部件的例子的框图。

[0097] 信息装置 200 可包含部件，诸如处理单元 380、存储单元 370、可选存储单元 360 和输入 / 输出控制单元（例如，通信管理器 330）。信 息装置 200 可包括接口（未示出），用于与用户交互作用。可用软件或硬件或组合来实现接口。这种接口的例子包括，但不限于鼠标、键盘、触触或非触敏屏、按钮、软键、记录笔、扬声器、麦克风等等的一个或多个。

[0098] 信息装置 200 通常包含与其他电子设备，诸如网络节点（未示出）、输出设备 220 和输出系统 230 (250？）连接的一个或多个网络通信单元 350。网络通信单元可用硬件（例如，硅芯片集、天线）、软件（例如，协议堆栈、应用程序）或组合来实现。

[0099] 在本发明的一个实施例中，信息装置 200 和输出设备 220 或输出系统 250 间的通信接口 240 是无线通信接口，诸如短程无线接口，包括根据蓝牙或 IEEE802.11 标准实现的那些接口。也可用无线通信的其他标准和 / 或装置实现通信接口，尤其包括无线电、红外、蜂窝、超声波、水听器，用于访问一个或多个网络节点和 / 或设备。也可包括有线连接，尤其诸如串行或并行接口、USB 接口和火线 (IEEE1394) 接口。到局域网，尤其诸如 Ethernet 或令牌环形网的连接也可在本发明中实现，用于信息装置 200 和输出设备 220 间的局部通信。可用来实现信息装置 200 和输出设备 220 间的无线接口的通信单元 350 的硬件 / 软件部分的例子将在下面参考图 8A 和 8B 更详细地描述。

[0100] 为简化起见，图 3 示例说明信息装置 200 包括一个通信单元 350 的一种实现方式。然而，应注意到，信息装置 200 可包含不至一个通信单元 350 以便支持具有不同设备和 / 或网络节点的各种接口、协议和 / 或通信标准。例如，信息装置 200 可通过蓝牙标准接口或通过 IEEE802.11 标准接口与一个输出设备 220 通信同时通过并行电缆接口，与另一个输出设备 220 通信。信息装置 200 也可连接到有线或无线网络（例如，Internet 或企业通信网）以便发送、接收和 / 或下载信息。

[0101] 信息装置 200 可是具有由制造商预先配置的功能性的专用设备（例如，email 终端、web 终端、数字照相机、e-book、web 垫片、Internet 设备等等）。另外，信息装置 200 可

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允许用户安装另外的硬件部分和 / 或应用软件 205 以便扩展其功能性。

[0102] 信息装置 200 可包含多个应用程序 205 以便实现其特征设置和功能性。例如，可实现文档浏览或编辑应用程序来帮助用户浏览以及可能部分或整个编辑用某种格式或语言（例如，页面描述语言、标记语言等等）编写的数字文档。数字文档可本地存储在信息装置 2000 中或网络节点（例如，内容服务器）中。文档浏览应用程序的例子是 Internet 浏览器，诸如 Internet Explorer、Netscape Navigator 或 WAP 浏览器。这些浏览器可检索和显示用标记语言，尤其诸如 HTML、WML、XML、CHTML、HDML 所写的内容（例如，数字内容）。信息装置 200 中的软件应用程序的其他例子可包括文档编辑软件，诸如 MicrosoftWord™，其允许用户浏览和 / 或编辑具有各种文件扩展名（例如，doc、rtf、html、xml 等等）的数字文档，不管是本地存储在信息装置 200 中还是网络节点中。同样，软件应用程序 205 的其他例子包括图象采集和编辑软件。

[0103] 如在前参考图 1 所述，在向具有有限存储器和处理能力的信息装置 200 提供输出能力方面存在许多困难。为解决这些难题，信息装置 200 包括客户机应用程序 210，帮助提供本发明的通用数据输出能力。客户机应用程序 210 可包括能由信息装置 200 的处理单元 380 执行的软件和数据。客户机应用程序 210 可实现为独立的软件应用程序或作为另一软件应用程序的一部分或特征，或以设备驱动程序的形式，其可由信息装置 200 中的其他应用程序软件 205 调用、共享和使用。客户机应用程序 210 也可包括调用其他应用程序（例如，文档浏览应用程序、编辑应用程序、数据和 / 或图象采集应用程序、通信管理器、输出管理器等等）205 的部分以便提供某些特征设置，如下面所述。图 3 示例说明客户机应用程序 210 是与其他应用程序 205 分开的应用程序的结构，诸如在客户机应用程序是设备驱动程序的情况下；然而，应 当注意，客户机应用程序 210 可是在图 3 中未示出的其他应用程序的组合或一部分。客户机应用程序 210 可在信息装置 200 中不同地实现，以及可在不同的操作系统或平台上运行。客户机应用程序 210 也可在没有操作系统的环境中运行。例如，图 3A 示例说明包括操作系统 240A 的信息装置 200A 的实现方式，而图 3B 示例说明信息装置 200B 不包括操作系统的实现方式。

[0104] 客户机应用程序 210 包括光栅化部件 310，以便根据一个或多个光栅化参数，使内容一致为一个或多个光栅输出图象、中间输出数据生成器部件 320，生成和 / 或编码包括一个或多个输出图象的中间输出数据；以及通信管理器 330，管理与输出设备 220 或系统 250 或输出控制器 230 的通信和交互作用。通信管理能实现为客户机应用程序 210 的一部分（如图产 3 所示）或实现为单独的应用程序（未示出）。客户机应用程序中的部分可用软件、硬件或组合来实现。例如，客户机应用程序 210 可包括或利用下述的一个或多个：

[0105] ● 获得用于输出的内容的部件或操作（例如，数字文档）。客户机应用程序 210 可从其他应用程序 205（例如，文档浏览应用程序、内容创建和编辑应用程序等等）获得数字文档，或客户机应用程序 210 可为用户提供其自己的能力来浏览、编辑和 / 或选择数字文档。

[0106] ● 光栅化内容的部件或操作，根据一组光栅化参数，诸如比例因子、输出大小、色深、色空间和分辨率，将除对象或元素外的文本、图形和图象包括到一个或多个光栅图象中。可用各种方式，例如，从输出设备 220 下载的、或本地存储在信息装置 200 中的，或由用户手工输入的输出设备配置文件获得光栅化参数。另外，光栅化参数可是基于作为一组缺

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省、或硬编码在客户机 210 中的存储在信息装置 200 中的预缩放准或规格，或在与输出设备 220、输出控制器 230 和 / 或用户通信后由客户机应用程序 210 计算的。

[0107] ●生成包括对应于该内容（例如，数字文档）的至少一个光栅化输出图象的中间输出数据的部件或操作。该过程可进一步包括尤其是压缩、编码、加密和颜色校正的一个或组合。该中间输出数据可包括尤其例如，图象、指令、文档和 / 或格式描述、色彩配置文件。

[0108] ●通过有线或无线通信链路 240，将中间输出数据传送给输出设备 220 或系统 250 的部件或操作。

[0109] 客户机应用程序 210 也可选地包括或利用下述部件或操作的一个或多个：

[0110] ●与至少一个或多个输出设备 220 通信以便加载输出设备配置文件的部件或操作。

[0111] ●直接或间接（诸如通过操作系统或部件或对象模型、消息、文件传送等等）与驻留在相同的信息装置 200 中的其他应用程序 205 以便获得所需，或与本发明的普遍输出过程相关的对象、数据、和 / 或内容（例如，获得用于打印的数字文档）的部件或操作。

[0112] ●直接或间接管理和利用由驻留在其主信息装置 200 中的硬件部件（例如，通信单元 350）提供的功能性的部件或操作。

[0113] ●在主信息装置中提供图形用户界面以便与用户交互作用的部件或操作。

[0114] ●获得用户首选项的部件或操作。例如，用户可通过 GUI 直接输入他或她的首选项。也可采用一组默认值。可预置或根据与输出设备 220 或输出控制器 230 通信和谈判的结果，通过信息装置 200 获得默认值。

[0115] 参考图 12，在客户机应用过程中进一步详细地描述本发明的客户机应用程序 210 的上述功能性和过程。

[0116] 输出设备 220 是能输出数字内容的电子系统，而与输出介质是基片（例如，纸）、显示、投影还是声音独立。输出设备 220 的典型的例子是打印机，其将包含文本、图形、图象或任何组合的数字文档输出到基片上。输出设备 220 也可是能显示静止图象或视频的显示设备，诸如但不限于，电视、监视器和投影仪。输出设备 220 也可是能输出声音的设备。任何能以音频（例如音乐）或数据（例如，文本或文档）格式播放或读取数字内容的设备也是可能的输出设备 220。

[0117] 在此频繁地将打印机称为输出设备的例子以便简化讨论，或作为具体实施中的主输出设备 220。然而，应当认识到，本发明也可应用于其他输出设备 220，尤其诸如传真机、数字复印机、显示屏、监视器、电视、投影仪、声音输出设备。

[0118] 用输出设备 220 渲染内容是指将内容输出到特定的输出介质（例如，纸、显示屏等等）上。例如，用打印机渲染内容在基片上生成图象，用显示设备渲染内容在屏幕上生成图象，以及用音频输出设备渲染内容生成声音。

[0119] 传统的打印系统一般包括光栅图象处理器以及打印机引擎。打印机引擎除其他部件外，包括存储缓冲器、标记引擎。光栅图象处理器将内容转换适合于打印的图象形式。存储缓冲器保存准备打印的光栅化图象；以及标记引擎将着色剂传送给基片（例如，纸）。

[0120] 光栅图象处理器也可位于输出设备（例如，包括在打印机控制器 410 中）或外部实现（在信息装置 200、外部控制器、服务器等等中）。光栅图象处理器可实现为硬件、软件或组合（未示出）。例如，可在信息装置 200 中的软件应用程序或设备驱动程序内实现光栅

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图象处理器。光栅图象处理操作的例子包括图象和图形解释、缩放、分段、色空间变换、图象增强、色校正、半色调、压缩等等。

[0121] 图 4A 示例说明包括打印机控制器 410 和打印机引擎 420A 的一个传统打印机系统或打印机 400A 的框图。打印机控制器 410 包括解释器 402 和光栅图象处理器 406，以及打印机引擎 420 包括存储缓冲器 424A 和标记引擎 426A。

[0122] 标记引擎可使用多种不同技术的任何一种来将光栅图象传送给纸 或其他介质，或换句话说，将着色剂传送给基片。可使用的不同标记或打印技术包括击打式打印或非击打式打印。击打式打印的例子包括点阵、电传打印机、菊花轮等等。非击打式打印技术可包括喷墨、激光、静电、热、染料升华等等。

[0123] 打印机的标记引擎 426 和存储缓冲器 424 形成其打印机引擎 420，其也可包括另外的电路和部件，诸如固件、硬件或芯片或芯片组，用于解码和信号转换等等。到打印机引擎 420 的输入通常是由光栅图象处理器 406 生成的最终光栅化打印机引擎打印数据。这种输入通常是设备相关，以及打印机或打印机引擎特定的。打印机引擎 420 可采用该设备相关输入并生成或渲染输出页（例如，在基片上用墨水）。

[0124] 当光栅图象处理器位于输出设备 220 内时，其通常包括在打印机控制器 410 中（如图 4A 所示）。打印机控制器 410 可解释、光栅化、以及将以页面描述语言（例如，PostScript，PCL）、标记语言（例如，XML、HTML）或其他特定的文档格式或语言（例如，PDF、EMF）的形式的输入打印数据转换成打印机引擎 420A 能理解的最终格式、语言或指令的打印机引擎打印数据。

[0125] 发送给具有打印机控制器 410 的打印机的打印数据通常是以要求进一步解释、处理或转换的形式（例如，附录）。打印机控制器 410 接收打印数据、解释、处理并将打印数据转换成能由打印机引擎 420A 理解的形式。与打印数据的类型独立，通常，用户在他或她的信息装置 200 中需要设备特定的驱动程序以便输出能由特定的打印机或输出设备 220 接受的适当的语言、格式或文件。

[0126] 图 4B 示例说明另外的传统输出设备 400B。输出设备 400B 可是打印设备、显示设备、投影设备、或声音设备。在输出设备是打印设备或打印机的情况下，参考图 4B 的打印机不包括打印机控制器 410。例如，打印机 400B 可是低成本打印机，诸如台式喷墨打印机。在该例子 中的 RIP 操作可以包含在信息装置 200 中的软件应用程序或以设备驱动程序来实现。信息装置 200 通过光栅化和转换数字文档为能由输出引擎（或在打印机的情况下的打印机引擎）420B 理解的输出数据（例如，转换成具有每个象素一个或多个位的压缩 CMKY 数据）。

[0127] 与类型或技巧水平独立，不同输出设备 220 通常需要信息装置 200 中的不同的打印机驱动程序或输出管理应用程序以便提供输出能力。具有有限存储器和处理能力的一些移动设备可具有存储多个设备驱动程序或执行计算集中的 RIP 操作的困难。每次需要打印到新打印机上，安装新设备相关或特定的打印机驱动程序是不可行的。为克服这些困难，本发明对输出设备 220 或输出系统 250 提供了几种改进，如下面的详细描述。

[0128] 在本发明中，输出设备 220 可包括输出控制器 230 以便帮助管理与信息装置 200 的通信和谈判过程以及处理输出数据。输出控制器 230 可包括用于至少一个输出设备 220 的专用的硬件或软件或两者的组合。输出控制器 230 可是内部安装，或外部连接到一个或

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多个输出设备 220 上。输出控制器 230 有时称为打印服务器或输出服务器。

[0129] 图 5A 和 5B 示例说明本发明的输出控制器 230 的两个示例性内部实现方式。图 5A 示例说明在参考图 4A 的传统打印机内实现输出控制器 230，其包括传统的打印机控制器 410(5A)。输出控制器 230(5A) 包括解释器 510A 部件，用于解码本发明的中间输出数据，以及转换器部件 530A，用于将一个或多个解码的输出图象转换成适合于输入到打印机控制器 410(5A) 的打印机控制器打印数据。可选图象处理部件 520A 包括在输出控制器 230(5A) 中。

[0130] 图 5B 示例说明包括在参考图 4B、不包括打印机控制器的传统输出设备 220 中的输出控制器 230 的实现方式。输出控制器 230(5B) 包括解释器 510B 部件，用于解码本发明的中间输出数据；图象处理器 520B 部件，用于执行一个或多个图象处理操作，诸如色空间转换、色彩匹配和数字半色调；以及可选编码器 530B 部件，如果图象处理的结果还不是适合于输出引擎 420B 的所需形式，将所处理过的输出图象一致化为适合于输出给输出引擎 420B 的输出引擎输出数据。

[0131] 在一种实现中，输出设备 220 可包括通信单元 550 或适配器以便与信息装置 220 连接。输出设备 20 有时可包括不至一个通信单元 550 以便支持不同设备的不同接口、协议或通信标准。例如，输出设备 220 可通过蓝牙接口与第一信息装置 200 通信，同时通过并行接口与第二信息装置 200 通信。无线通信单元的硬件部件的例子将在下面参考图 8A 和 8B 更详细地描述。

[0132] 在一个实施例中，输出控制器 230 不包括通信单元，而宁可利用或管理驻留在相关输出设备 220，诸如图 5 中所示中的通信单元。在另一个实施例中，输出控制器 230 可包括或提供通信单元给输出设备 220，如图 6 所示。例如，具有无线通信单元的输出控制器 230 可内部安装或外部连接到传统打印机以便为其提供先前缺乏的无线通信能力。

[0133] 图 6 包括示例说明在三种不同实现中输出控制器 230 的硬件 / 软件部件的三个功能框图。输出控制器 230 的每个部件可包括软件、硬件或组合。例如，输出控制器 230 可包括使用专用集成电路 (ASIC)、数字信号处理器 (DSP)、现场可编程门阵列 (FPGA)、固件、芯片上系统以及各种通信芯片组中的一个或多个或组合。输出控制器 230 还包含具有软件部分的嵌入处理器 670A 或嵌入应用程序软件以便实现其特征设置和功能性。

[0134] 输出控制器 230 可包含嵌入操作系统 680。通过操作系统，可由操作系统管理的应用程序软件提供输出控制器 230 的一些或所有功能性和特征设置。可将另外的应用程序软件安装或升级到更新的版本以便例如，提供另外的功能性或故障补丁。图 6A 和 6C 示例说明具有操作系统 680 的实现的例子，而图 6B 示例说明没有操作系统 680 或可选嵌入处理器 670 的例子。

[0135] 输出控制器 230 通常包括存储单元 640、或可与例如，打印机控制器 410 共享存储器单元。存储器单元和存储单元，尤其诸如 ROM、RAM、闪速存储器和盘驱动器可提供永久或易失存储。存储器单元或存储单元可存储实现输出控制器 230 的功能性的输出设备配置文件、对象、编码、指令或数据（统称为软件部分）。在数据输出操作期间或之前，可将部分软件部分（例如，输出设备配置文件）加载到信息装置 200 上。

[0136] 输出控制器 230 可包括处理器部件 670A 和 670C、存储器部件 650、可选存储部件 640、以及可选操作系统部件 680。图 6 表示如果存在的话，存储器 650、储存器 640、处理器

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670 和操作系统 680 部件能共享或由输出控制器 230 中的其他操作部分，诸如解释器 610 和图象处理器 650 的一种体系结构或实现方式。图 6 表示包括在输出控制器 230 中的两个通信单元 660A 和 660B，然而，本发明的输出控制器 230 可包括多个通信单元 660。输出控制器不包含任何通信单元而宁可利用输出设备的通信单元也可能的。

[0137] 输出控制器 230 可外部地连接到输出设备 220 或内部集成到输出设备 220 中。图 5A 和 5B 示例说明在输出设备 220 内的输出控制器 230 的实现。然而，输出控制器 230 也可实现为有线或无线地连接到输出设备 220 的外部盒或站。实现为到输出设备 220 的外部盒或站的输出控制器 230 可包含其自己的用户接口。这种实现的一个例子是连接到输出系统 250 中的输出设备 220 的打印服务器。另一种结构和实现是如果输出设备 220 为打印机，与现有的打印机控制器 410 集成或组合输出控制器 230 的功能性（称为"组合控制器），如参考图 7C 至 7F 所示。组合控制器也可内部集成或外部连接到输出设备 220，并包括打印机控制器 410 以及本发明的输出控制器 230 的功能性（例如，输入 解释和 / 或光栅图象处理）。这种配置的一个优点在于输出控制器 230 和打印机控制器 410 的功能性或部件可共享的资源，诸如处理、存储器单元等等。图 6C 示例说明打印机控制器 410、解释器 610C 和转换器 630C 共享使用由操作系统 680C 管理的处理器 670C、存储器 650C 和储存器 640C 的组合控制器实现或输出控制器 230 的例子。参考图 7，更进一步示例说明相对于输出设备 220 或输出系统 250，输出控制器 230 的各种示例性实现和结构。

[0138] 输出控制器 230 的其他可能的实现方式包括例如，传统的个人计算机 (PC)、工作站、以及输出服务顺或打印机。在这些情况下，输出控制器 230 的功能性可使用安装在计算机（例如，PC、服务器或工作站）中的应用程序软件来实现，同时该计算机有线或无线连接到输出设备 220。使用 PC、服务器、工作站或其他计算机来实现具有应用程序软件的输出控制器 230 的特征设置正好是输出控制器 230 的另一可能实施例并且绝不脱离本发明的精神、范围和过程。

[0139] 应当注意输出控制器 230 和打印机控制器 410 间的差别。打印机控制器 410 和输出控制器 230 均是控制器并且是用于至少一个输出设备 220 的专用硬件和 / 或软件。输出控制器 230 是指具有本发明的特征设置、能力和功能性的控制器。打印机控制器 410 可包含尤其诸如解释输入页面描述语言、光栅图象处理以及查询的功能。输出控制器 230 可包括除本发明的特征设置、功能性、能力和过程外的打印机控制器 410 的部分或全部特征。

[0140] 用于提供通用数据输出的输出控制器 230 的功能性和部件可包括或利用：

[0141] ●从多个信息装置 200 接收输出数据的部件和操作；输出数据可包括包含至少一个与意欲输出的数据内容有关的光栅化图象的中间输出数据。

[0142] ●解释和 / 或解码中间输出数据的部件和操作。

[0143] ●处理中间输出数据的部件和操作。这些部件和操作可包括图象处理功能，尤其诸如缩放、分段、色彩校正、色彩管理、GCR、图象增强、解压缩、解密、和 / 或半色调。

[0144] ●生成输出引擎输出数据的部件和操作，输出引擎输出数据以用于输入到输出引擎可接受的输出数据格式。

[0145] ●将输出引擎输出数据发送给输出引擎的部件和操作。

[0146] 当与包括打印机控制器 410 的输出设备 220 关联时，本发明的输出控制器可进一步包括或利用：

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[0147] ●将中间输出数据转换成打印机控制器打印数据（例如，PDL，诸如PostScript和PCL）的部件和操作，打印机控制器打印数据以打印机控制器可接受的格式。

[0148] ●将打印机控制器打印数据发送给一个或多个打印机控制器的部件和操作。

[0149] 除上述部件和功能性外，输出控制器230可进一步包括下述的一个或多个：

[0150] ●通过有线或无线接口，与一个或多个信息装置200通信的部件和操作。

[0151] ●通信和/或管理包括在输出控制器230或输出设备220中的通信单元的部件和操作。

[0152] ●将至少部分输出设备配置文件（在打印机的情况下为打印机配置文件）存储在存储部件中的部件和操作。

[0153] ●通过将至少部分输出设备配置文件传送给请求服务的信息装置，响应来自信息装置200的服务请求的部件和操作。输出控制器230可在一个或多个会话中传送输出设备配置文件或对象。

[0154] ●将由主输出设备220提供的服务广播或通告给请求该服务的一个或多个信息装置200的部件和操作。

[0155] ●通过例如，根据所请求或渲染给客户机（信息装置200）的服务，计算和处理支付来实现支付处理和管理功能的部件和操作。

[0156] ●提供用户接口，诸如显示屏、触摸按钮、软键等等的部件和 操作。

[0157] ●实现作业管理功能，尤其诸如查询和假脱机的部件和操作。

[0158] ●实现安全或验证过程的部件和操作。例如，输出控制器230可在其存储部件（或共享存储部件）中存储访问控制列表，其指定什么设备或用户可从其主（或连接的）输出设备220获得服务。因此，授权信息装置200可在符合控制列表后，获得访问。

[0159] 当输出控制器230实现为固件、或嵌入应用程序时，输出控制器230的功能性的配置和管理可通过例如，使用主计算机中的控制器管理软件来任意实现。主计算机可是台式个人计算机（PC）、工作站或服务器。主计算机可局部或通过网络连接到输出设备220或控制器230。可通过有线或无线通信来实现主计算机和输出控制器230间的通信。在主计算机中的管理应用程序软件能管理输出控制器230的设置、配置和特征设置。此外，主计算机的配置应用程序可下载和/或安装应用程序软件、软件部分和/或数据到输出控制器230，用于升级、更新和/或修改输出控制器230的特征和能力。

[0160] 在一种实现中的输出设备220包括或连接到如上所述的输出控制器230。由输出控制器230提供的功能性和特征自动包括在输出设备220的功能性中。然而，输出设备220可实现或包括至少部分提供输出控制器230的特征和功能性的其他控制器和/或应用程序。

[0161] 因此，输出设备220可包括下述功能性的一些或全部：

[0162] ●从多个信息装置200接收多个服务请求或查询（例如，服务请求、数据查询、对象或部分查询等等）并且通过返回可包含数据、软件、指令和/或对象的部分来适当地响应它们折部件和操作。

[0163] ●从多个信息装置200接收输出数据的部件和操作，输出数据可包括包含与意欲输出的内容有关的一个或多个光栅化图象的中间输出数据。

[0164] ●解释和/或解码中间输出数据的部件和操作。

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[0165] ●处理和/或中间输出数据为适合于在与输出设备有关的输出引擎渲染的形式（例如，输出引擎打印数据）的部件和操作。

[0166] ●将与内容有关的表示或图象渲染到输出介质（例如，基片或显示屏）上的部件和操作。

[0167] 输出设备 220 可进一步包括下述功能性的任何一个或多个：

[0168] ●用于建立和管理与请求服务的信息装置 200 的通信链路的部件和操作。通信链路可包括有线或无线通信的部件和操作。

[0169] ●用于将至少一部分输出设备配置文件（例如，打印机配置文件）存储在存储元件中的部件和操作。

[0170] ●将至少一部分输出设备配置文件（例如，在打印机的情况下的打印机配置文件）提供给请求服务的一个或多个信息装置 200 的部件和操作。输出设备 220 可在一个或多个会话中传送输出设备配置文件。

[0171] ●将所提供的或可用的服务通告或广播给一个或多个信息装置 200 的部件和操作。

[0172] ●通过例如，根据由客户机所请求的或渲染给客户机（信息装置 200）的服务，计算和处理支付来实现支付处理和管理功能的部件和操作。

[0173] ●实现作业管理功能性。尤其诸如查询和假脱机的部件和操作。

[0174] ●提供用户接口，诸如显示屏触摸按钮、软键、开关等等的部件和操作。

[0175] ●实现安全性或验证过程的部件和操作。例如，输出设备 220 可在其存储部件（或共享存储部件）内存储访问控制列表，其指定什么设备或用户可从其获得服务。因此，授权信息装置 200 在符合控制列表后获得访问。

[0176] 图 7A-7F 示例说明相对于输出设备 230（220？）的输出控制器 230 的各种另外的配置和实现方式。有时将打印机用作示例性的输出设备 230 以便论证各种配置。然而，应当注意，本发明的输出设备 230（220？）并不限于打印机。

[0177] 如参考图 4 所述，打印机可以或可不包含打印机控制器 410。包括打印机控制器 410 的打印机 400A 通常比不包括打印机控制器 410 的打印机 400B 具有更高的速度以及更昂贵。

[0178] 图 7A 表示输出控制器 230 可外部级联到一个或多个打印机（仅示出一个）。信息装置 200 与输出控制器 230A 连接，然后，输出控制器 230A 与输出设备 220，诸如打印机 220 连接。输出控制器 230A 与打印机 220A 间的通信链路可是有线链路或无线链路，如前所述。图 6A 和 6B 示例说明输出控制器的功能部件设计的两个例子，能实现如图 7A 所示的配置。在该实现方式中的图象处理器 620 是可选的。

[0179] 图 7B 表示将输出控制器 230B 安装为打印机 220B 内部的一个或多个电路板或卡的另一种实现方式。输出控制器 230B 可与打印机控制器 410 和打印机 220B 的其他部件共存。这种实现的一个例子是将输出控制器 230 顺序地与打印机控制器 310 连接。图 5A 表示为实现的一个例子。

[0180] 图 7C 表示输出控制器 230 和打印机控制器 410 的功能性组合为单个控制器（称为“组合控制器”）230C 的另一种实现。在该实施例中，当与实现如图 7B 所示的两个单独的控制器相比，可降低材料的成本。例如，组合控制器 230C 可共享相同的处理器、存储器、和

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储存器来运行两种类型的控制器的应用程序和功能性，因此，当与提供两个单独的控制器相比时，可具有较低的部件成本。图 6C 示例说明组合控制器功能部件实现的例子。

[0181] 一些打印机不包括光栅图象处理器或打印机控制器 410，如图 4B 所示。这种类型的打印机的例子是更低成本的台式喷墨打印机。到喷墨打印机的输入可由每个象素输入一个或多个位的压缩 CMYK 数据（专用或公开）组成。为输出给不包括打印机控制器的打印机，通常在信息装置 200 中要求设备特定的软件应用程序或打印机驱动程序以便执行光栅图象处理操作。因此，输出控制器 230 能实现成包括不具有打印机控制器的打印机的各种输出设备 220 和 / 或输出系统 250，用于执行光栅图象处理操作。

[0182] 图 7D 和图 7E 示例说明在输出设备 220 或系统 250 中的输出控制器 230 的两种实现。输出设备 230 或系统 250 可包括显示设备、投影设备、音频输出设备或打印设备。在当输出设备 220D 或 220E 是打印机时的情况下，其不包括打印机控制器。图 7D 示例说明安装为输出设备 220D 的外部部件或“盒”的输出控制器 230D 的实现。例如，输出控制器 230 可实现为打印服务器中的应用程序，或独立的盒或站。在这种配置中，可在输出控制器 230D 中实现一些或全部光栅图象处理操作。输出控制器 230D 从信息装置 220 接收中间输出数据并生成包括在输出设备 220D 中的输出引擎可接受的输出引擎输出数据。输出控制器 230D 可将输出数据经有线或无线通信链路或连接发送给输出设备 220D。图 6A 和 6B 示例说明能实现用于图 7D 和 7E 的配置的输出控制器的功能部件设计的两个例子。

[0183] 图 7E 表示输出控制器 230E 的第五实现，其中输出控制器 230E 包含在输出设备 220E 中作为一个或多个电路板或卡，并可包含在嵌入处理器上运行的软件和应用程序。相对于输出设备 220D（图 7D），输出设备 220E 不包括打印机控制器 410。因此，输出控制器 230E 实现包括部分或全部光栅成象处理操作的本发明的功能性和能力。

[0184] 图 7F 表示第六种实现，将打印机控制器 310 和输出控制器的功能性集成为单独外部组合控制器部件或“盒”230F 的外部组合控制器 230F。两个控制器功能可共享公用处理器以及公用存储空间以便运行两种类型的控制器的应用程序。在该配置下，信息装置 200 或组合控制器 230F 能执行或共享至少一部分光栅图象处理功能性。图 6C 表示 组合控制器 230F 的功能部件的例子。

[0185] 如 7 图 F 所示的组合控制器 230F 的另一实现是使用运行包括输出控制器 230 和打印机控制器 410 的功能性的一个或多个应用程序的外部计算设备（PC、工作站或服务器）。

[0186] 上述是输出控制器 230 的不同实现和结构的例子。其他实现方式也是可能的。例如，可在外部盒或站内实现部分输出控制器 230 的功能性而剩余的功能性可驻留在输出设备 220 内作为单独的板或与打印机控制器 410 集成。如另一个例子，输出控制器 230 的功能性可实现为连接到相同输出设备 220 的多个外部盒或站。如另一个例子，相同的输出控制器 230 可连接到多个输出设备 220。

[0187] 图 8A 和 8B 是示例说明无线通信单元的硬件 / 软件部件的两种可能结构的框图。这些无线通信单元可在信息装置 200、输出控制器 230 和输出设备 220 中实现或包括在其中。参考图 8A，可实现无线适配器 230 以便通过无线链路启动设备（例如，信息装置 200 和输出设备 220）中的数据 / 语音传输。使用与天线 816 耦合的 RF 收发机 814 来接收和传送无线射频信号。RF 收发机 814 还将无线电信号转换成电信号以及将电信号转换成无线电信号。RF 收发机 814 通过接口 812 连接到 RF 链路控制器 810。接口 812 可执行诸如模数转

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换、数模转换、调制、解调、压缩、解压缩、编码、解码、以及其他数据或格式转换功能的功能。

[0188] RF链路控制器810实现使得主机（例如，信息装置200、输出控制器230、输出设备220等等）在无线电链路上通信的实时低层（例如，物理层）协议处理。由链路控制器810执行的功能可包括，但不限于错误检测/校正、功率控制、数据包处理、数据加密/解密和其他数据处理功能。

[0189] 可利用各种无线电链路。特别关注在2.4Ghz未许可的频带中操作 的一组竞争技术。该组目前包括蓝牙、家用射频（Home RF）以及基于IEEE802.11标准的实现。这些技术的每一种具有不同的协议设置并且它们均提供用于无线局域网（LANs）的解决方案。这些技术中的干扰会限制同时采纳这些协议。期望出现新局域网技术以及汇合现有的技术。不然，可在本发明中实现所有这些现有的和未来的无线技术，而没有限制，因此，决不脱离本发明的范围。

[0190] 在当前可用的无线技术中，蓝牙很有利，因为它要求相对低的功耗和蓝牙使能的设备在piconet中操作，其中在点对多点系统中连接几个设备。参考图8B，可实现一个或多个红外（IR）适配器820以便通过红外传输，在设备中启动数据传输。根据红外数据协会（IrDA）标准和规格，容易实现IR适配器820。通常，使用IrDA标准来提供用于通常使用用于连接的电缆的设备的无线连接技术。IrDA标准是点对点（对蓝牙中的点对多点）、窄角(narrow angle)、特定的数据传输标准。

[0191] 根据数据传送的所需速率，改变红外适配器820的结构。图8B示例说明红外适配器820的一个实施例。收发机826接收/发射IR信号并将IR信号转换成电信号/将电信号转换成IR信号。UART（通用异步接收/发射机）822执行串行化/去串行化的功能，将串行数据流转换成数据字节/将数据字节转换成串行数据流。UART822通过编码器/解码器(ENDEC)824连接到IR收发机826。该结构通常适合于以相对低的速率传送数据。需要其他部件（例如，包成帧器、锁相环）用于更高数据传输率。

[0192] 图8A和8B示例说明无线通信单元的示例性硬件结构。可将这些硬件部件包括在设备（例如，信息装置200、输出控制器230、输出设备220等等）中以便支持各种无线通信标准。然后，有线链路，诸如并行接口、USA、固件接口、Ethernet和令牌环网络也可在本发明中，通过使用适当的适配器和结构来实现。

[0193] 图9是能实现本发明的通用输出方法的示例性光栅成象过程（RIP）902的逻辑流程图。可由在信息装置200中运行的应用程序获得和/或生成内容（例如，数字文档）900。例如，文档浏览应用程序可允许用户下载和/或打开本地存储或在网络节点中的数字文档900。如另一例子，文档创建或编辑应用程序可允许用户在他/她的信息装置200中创建和编辑数字文档。

[0194] 信息装置中的客户机应用程序210可以由驻留在信息装置200中的其他应用程序调用的设备驱动程序的形式以便提供输出服务。另外，本发明的客户机应用程序可是包括除其他功能性，诸如内容采集、预览、浏览和/或编辑等等以外的数据输出和管理部分的应用程序。例如，信息装置200中的客户机应用程序210本身包括除在此描述的输出管理功能外的允许用户下载、浏览和/或编辑数字文档900的部分和功能。

[0195] 光栅图象处理方法902允许信息装置200诸如移动设备普遍和方便地将内容（例如，数字文档）输出给包括输出控制器230的输出设备220或系统250。信息装置200中

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的客户机应用程序 210 可执行部分光栅图象处理操作（例如，光栅化操作）。光栅图象处理的其他操作，诸如半色调可由输出设备 220 或由输出控制器 230 完成。在传统的数据输出方法中，光栅图象处理可完全在信息装置（例如，参考图 1A 不包括打印机控制器的打印机）或输出设备（例如，参考图 1B 包括打印机控制器的打印机）中实现。本发明提供在信息装置 200 和输出设备 220 或系统 250 间共享光栅图象过程操作的更平衡的方法。例如，在发送给输出引擎或打印机引擎，用于步骤 960 中的最终输出前，由从客户机应用程序 210 至输出控制器 230 的不同部分或整个输出系统的一部分来处理内容 600（例如，所处理的光栅图象）。因为光栅图象处理操作不是完全在信息装置 200 中袜，对信息装置 200 有很少的处理需求。因此，本 RIP 过程可允许具有极少的存储器和处理能力的另外的移动设备以便具有数据输出能力。

[0196] 在步骤 910，光栅化操作中，根据一个或多个光栅化参数，诸如输出大小、色深、色空间、分辨率、色彩通道的数量等等，可使包括文本、图形和图象对象的内容（例如，数字文档）一致或光栅化为图形形式。在光栅化操作期间，根据指定的光栅化参数设置，将内容中的文本和向量图形信号光栅化或转换成图形或位图信息。可调整和 / 或内插内容或数字文档中的图象信息以便适合特定的输出大小、分辨率和色深等等。光栅化参数通常是设备相关，因此，可根据输出设备 220 及其输出引擎的不同需求和属性改变。有许多方法来获得设备相关光栅化参数，如下面参考图 12A 更详细地描述。在一个例子中，设备相关光栅化参数可从存储在信息装置 200、输出设备 220 或输出控制器 230 中的输出设备配置文件获得。

[0197] 在另一种实现中，可按标准或规格预定光栅化参数。在该实现中，在步骤 910 中，光栅化内容 900 以便适合或匹配其预先定义的或标准的光栅化参数。因此，光栅化输出图象变为设备独立。设备独立的一个优点是用这些标准或规格的知识实现或创建的控制器、设备和 / 或输出设备可接受光栅化输出图象。具有预定或标准属性的光栅化图象通常更便携。例如，基于预缩放准和 / 或规格，可预先编程客户机应用程序 210 和输出设备 220 或其输出控制器 230 以便接收、和 / 或输出光栅图象。

[0198] 有时，用于光栅化参数的预缩放准或规格需要改变或更新。用于提供容易更新或升级的一种可能的实现是将信息和相关的光栅化参数存储在文件或配置文件中代替将这些参数硬编码到程序、部件或应用程序中。客户机应用程序 210、输出控制器 230 和 / 或输出设备 220 能读取文件或配置文件以便获得与光栅化参数有关的信息。为升级或更新标准的规格或缺省要求，仅替换或编辑文件或配置文件代替更换软件应用程序或部件，诸如客户机应用程序 210。

[0199] 在步骤 920 中，将以图象形式的光栅化图象编码到中间输出数据中。描述输出内容的中间输出数据可包括图象信息、指令、描述和数据（例如，色彩配置文件）。光栅化输出图象可进一步要求在存储为中间输出数据间，处理尤其包括压缩、编码、加密、平滑、图象增强、分段、色彩校正的一个或多个。中间输出数据中的输出图象可以任何图象格式和用任何压缩技术诸如 JPEG、BMP、TIFF、JBIG 等等编码。在一个实施例中，使用混合光栅内容 (MRC) 格式及其相关的编码和 / 或压缩方法来生成输出图象。优先于其他图象格式和技术使用 MRC 的好处可尤其包括例如，更好的压缩比、更好的数据信息保留、更小的文件大小和 / 或相对更好的图象质量。

[0200] 在步骤 930 中，为进一步处理和最终输出，将中间输出数据传送到输出设备 220 或

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输出系统 250。通过信息装置 200 和输出设备 200 间的无线或有线通信链路可实现以及能通过一个或多个会话来实现中间输出数据的传输。

[0201] 在步骤 940 中，输出设备 220 或输出系统 250 接收所传送的中间输出数据。输出设备 220 或输出系统 250 可包括输出控制器 230 以便协助与信息装置 200 通信和 / 或处理中间输出数据。输出控制器 230 相对于如图 7A-7F 所示的输出设备 220，可具有各种配置和实现方式。除其他操作外，解释过程 940 可包括解析、解码、解压缩、解密、图象空间转换。如果所接收的中间输出数据要求这些处理的话。从中间输出数据解码或检索输出图象并可暂时存储在包括在输出设备 / 输出系统 (220/250) 或输出控制器 230 中的缓冲器或存储器中，用于进一步处理。

[0202] 如果中间输出数据包括具有 MRC 格式或编码技术的部分，其可包含用来增强图象质量的另外的分段信息（例如，前景和背景）。例如，尤其在缩放、色彩校正、色彩匹配、图象增强、图形保真和 / 或数字半色调中的不同技术或算法可应用于图象信息的不同段或层上以便改进 输出质量或最大化图象信息的保留或恢复。稍后，可将多层组合或映射到单层中。这些图象处理和转换部件和 / 或操作可包括在本发明的输出控制器 230 中。

[0203] 在步骤 950 中，来自中间输出数据的解码或检索输出图象需要进一步处理或转换。这可尤其包括缩放、分段、内插、色彩校正、GCR、黑色生成、色彩匹配、色空间变换、图形保真、图象增强、图象平滑和 / 或数字半色调操作中的一个或多个。

[0204] 在输出设备 220 不包括打印机控制器的实施例中，输出控制器 230 或包括输出控制器的输出设备 220 在执行输出图象上的 RIP 操作的剩余部分（例如，色空间转换或半色调）后，可在步骤 950 中，进一步将输出数据转换成对输入到用于渲染的打印机引擎可接受的形式。

[0205] 在输出设备 220 或输出系统 250 包括传统的打印机控制器的另外的实施例中，输出控制器可简单地解码和 / 或将中间输出数据（在该例子中的打印数据）转换成打印机控制器可接受的格式或语言。例如，打印机控制器可要求输入页面描述语言（例如，PostScript、PCL、PDF 等等）、标记语言 (HTML、XML 等等）或其他图形或文档格式。在这种情况下，输出控制器 230 可解释、解压缩和将中间打印数据转换成具有与打印机控制器输入要求有关的最佳输出分辨率、色深、色空间和输出大小的输出图象。然后，将输出图象编码或嵌入到打印机控制器打印数据（例如，页面描述语言）并将其发送给打印机控制器。打印机控制器打印数据是用于输入到打印机控制器可接受或兼容的打印数据。在打印机控制器接收打印机控制器打印数据后，打印机控制器可进一步在输出图象上执行诸如解析、光栅化、缩放、色彩校正、图象增强、半色调等等的操作并生成适合于输入到打印机引擎的适当的打印机引擎输入数据。

[0206] 在步骤 960 中，将由输出控制器 230 或打印机控制器在步骤 950 中生成的输出引擎输出数据或打印机引擎打印数据发送给输出设备的输出引擎或打印机引擎，用于最终输出。

[0207] 图 10 示例说明本发明的通用数据输出过程的流程图，包括参考图 9 示例说明的光栅图象处理。通用数据输出过程允许信息装置 200 将内容或数字文档普遍地输出给输出设备。数据输出过程可包括或利用：

[0208] ●用户接口部件和操作，其中用户初始化输出过程并提供用于输出的选定输出内

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容（例如，数字文档）的标识。

[0209] ●处理指示用于输出的内容，并生成中间输出数据的客户机应用程序或操作。中间输出数据可包括与该内容有关的至少部分光栅输出图象描述的客户机应用程序或操作。

[0210] ●将中间输出数据传送给一个或多个选定输出设备200的信息装置部件或操作。

[0211] ●解释中间输出数据并可进一步处理或转换输出数据为用于渲染该内容的输出引擎更可接受的形式的输出设备部件（例如，输出控制器）或操作。

[0212] 参考图10，在步骤1000中，用户可初始化通用输出方法或过程1002。通常，用户通过调用在他/她的信息装置200中的客户机应用程序210，初始化输出过程。可将客户机应用程序210运行为独立的应用程序或由其他应用程序205（诸如由文档浏览、创建或编辑应用程序）运行或作为驻留在相同的信息装置200中的另一应用程序205的一部分或部件或特征。当由其他应用程序205运行，诸如，在当客户机应用程序是设备驱动程序或助手应用程序时的情况，客户机应用程序210可从其他应用程序205获得信息，诸如内容（例如，数字文档）。这可例如，由一个消息或其组合，或通过操作系统或特定对象或部件模型等等便于实现。

[0213] 在输出过程1002中，用户可需要选择一个或多个输出设备220，用于输出服务。可实现任选的发现过程步骤1020来帮助用户选择输出 设备220。在发现过程步骤1020期间，用户信息装置200可（1）查找可用输出设备220；(2) 为用户提供可用输出设备220的清单；以及（3）为用户提供选择一个或多个输出设备220来承担输出作业的装置。下面将参考图11来更详细地描述发现过程1020的例子。

[0214] 可选发现过程1020有时是不必要的。例如，用户可忽略发现过程1020，如果他或她已经知道指向输出的输出装置（例如，打印机）220的话。在这种情况下，用户可通过有线连接或直接指向在其附近的那个输出装置220，诸如在红外连接的情况下，简单地将信息装置200连接到那个输出装置220。如另一个例子，用户可预先选择或设置频繁地用作最佳缺省的输出设备220。因此，如果发现缺省输出设备220或打印机可用的话，可部分或完全忽略发现过程1020。

[0215] 在阶段1030中，客户机应用程序可与输出设备220、用户和/或驻留在的信息装置200中的其他应用程序交互作用以便（1）获得必要的输出设备配置文件和/或用户首选项，(2) 执行功能或部分光栅图象处理操作，诸如光栅化、缩放和色彩校正，和/或（3）至少部分将光栅化内容（例如，数字文档）转换或编码成中间输出数据。中间输出数据的处理和生成可部分反映所获得的输出设备配置文件和/或用户首选项的关系，如果有的话。然后，通过有线或无线局部通信链路240，将由客户机应用程序210生成的中间输出数据传送到包括或与选定的输出设备220或输出系统250有关的输出控制器230。参考图12更详细地描述示例性客户机应用程序过程。

[0216] 在步骤1040中，本发明的输出控制器230接收中间输出数据。在所选定的输出设备230不包括打印机控制器的情况下，本发明的输出控制器230可进一步执行功能，尤其诸如地解析、解释、解压缩、解码、色彩校正、图象增强、GCR、黑色生成和半色调。另外，输出控制器230可进一步将中间输出数据转换或一致为适合于输出引擎（例如，在打印机的情况下为打印机引擎）的形式或格式。因此，从输出 控制器生成的输出引擎输出数据通常是设备相关且通过包括在选定的输出设备220或输出系统250中的输出引擎（或在打印机的情

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况下为打印机引擎）可接受，用于最终输出。

[0217] 在所选定的输出设备 220 是打印机的情况下，以及当打印机包括或连接到打印机控制器时，输出控制器 230 可生成与打印机控制器连接所需的适当的语言或输入格式（称为打印机控制器打印数据）。打印机控制器可例如，要求特定的输入，诸如页面描述语言(PDL)、标记语言，或特定的图象或图形格式。在这些情况下，在步骤 1040 中的输出控制器 230 可解释和解码中间输出数据，然后将中间输出数据转换成所需的打印机控制器打印数据（例如，PDL，诸如 PostScript 或 PCL）。然后，将由输出控制器生成的打印机控制器打印数据发送到打印机控制器，用于进一步处理。打印机控制器可执行除其他操作外的解释和光栅图象处理操作。在处理后，打印机控制器生成适合于在打印机引擎渲染的打印机引擎打印数据。

[0218] 在任何一种情况下，输出控制器 230 或打印机控制器生成适合于发送给包括在输出设备中的输出引擎或打印机引擎或与其连接的用于渲染的输出引擎输出数据。输出数据可暂时缓存在输出设备 220 的部件中。参考图 13，更详细地描述输出设备过程 1040 的实现。

[0219] 当用户请求输出服务时，包括在通用普遍输出过程 1002 中的步骤可自动进行。另外，在每个和每一步骤中可向用户提供进行、取消或输入信息的选项。例如，用户通过例如，指出取消信号或命令或通过中止客户机应用程序 210，或通过关闭信息装置 200 等等，在任何时间取消输出服务。

[0220] 图 11 是发现过程 720 的例子的流程图，其可是可选步骤以便帮助用户定位用于输出作业的一个或多个输出设备 220。然而，可部分或全部忽略发现过程 1020。发现过程 1020 的实现可要求驻留在信息装置 200 和输出设备 220 中的兼容硬件和软件部件。信息装置 200 可在该过程中利用客户机应用程序 210 或其他应用程序 205。发现过程 1020 可包括：

[0221] ●信息装置 200 与可用输出设备 220 通信以便获得与输出设备 220 有关的信息和属性和 / 或其服务，诸如输出设备性能、特征设置、服务可用性、服务质量、条件。

[0222] ●信息装置 200 将用户信息提供到每个可用和 / 或兼容输出设备 220 上。

[0223] ●用户选择或客户机应用程序 210（自动或不自动）选择一个或多个输出设备 220，用于来自可用或兼容输出设备 220 的输出服务。

[0224] 在发现过程 1020 期间可使用各种协议和 / 或标准。无线通信协议是最佳的。另一方面，也可实现有线通信。应用协议或标准的例子可包括，但不限于，尤其蓝牙、HAVi、Jini、Salutation、Service LocationProtocol、以及 Universal Plug-and-Play。可在发现过程 1020 中实现标准和专用协议或组合。然而，这些不同协议、标准或组合将不脱离本发明的精神和范围。

[0225] 在一个实施例中，驻留在信息装置 200 中的应用程序（为讨论简单起见，在此称为“通信管理器”，未示出）帮助与输出设备 220 通信并管理服务请求和发现过程 1020。通信管理器可是客户机应用程序 210 的一部分或特征。另外或组合，通信管理器也可是单独的应用程序。当通信管理器是单独的应用程序时，客户机应用程序 210 可具有通信、管理或访问通信管理器的功能性的能力。

[0226] 当用户通过信息装置 200 请求输出服务时，发现过程 1020 可由用户手动地或由通

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信管理器自动启动。

[0227] 在可选步骤 1100 中，用户可指定查找或匹配标准。例如，用户可查找提供免费服务的彩色打印机和 / 或打印机。用户可手动地每次为发 现过程 1020 指定那个标准。另外或组合，用户可设置能应用到多个发现过程 1020 的缺省首选项。然而，有时，不要求查找标准；信息装置 200 可简单地查找能提供输出服务的所有可用输出设备 220。

[0228] 在步骤 1101 中，信息装置 200 查找可用输出设备 220。查找过程可由例如，信息装置 200（例如，通过通信管理器的帮助）多播或广播或通告其服务请求或等待可用输出设备 220 响应来实现。另外，信息装置 200 可从一个或多个输出设备 220 "收听"服务广播，然后识别所需要或可接受的一个或多个输出设备 220。同时，相同网络（例如，LAN）的多个输出设备向控制点登记（未示出）它们的服务是可能的。控制点是维持有关相同网络内的所有服务设备上的记录的计算系统（例如，服务器）。信息装置 200 可连接控制点并查找可查询所需服务。

[0229] 在步骤 1102 中，如果未找到可用输出设备 220，通信管理器或客户机应用程序 210 可向用户提供备用方案 1104。这种备用方案可包括例如，放弃发现过程 1020、再次尝试发现过程 1020，或当找到可用输出设备 220 时告知。例如，发现过程 1020 可不检测在当前有线 / 无线网络中的任何可用输出设备 220。然后，将特定的查找标准（如果有的话）保存或寄存在通信管理器中。当用户进入具有可用输出设备 220 的新网络时，或当将新兼容输出设备 220 增加到当前网络上时，或当输出设备 220 变为对任何理由可用时，通信管理器可将这种可用性告知用户。

[0230] 在步骤 1106 中，如果发现可用输出设备 220，通信管理器可从每个所发现的输出设备 220 获得一些基本的信息，或部分或全部输出设备配置文件。这些信息的例子包括，但不限于，设备标识、服务费用、预约、服务特征、设备性能、操作指令等等。最好通过信息装置 200 的用户接口（例如，显示屏、扬声器等等），将这些信息提供给用户。

[0231] 在步骤 1108 中，基于所提供的信息，如果有的话，用户可选择一个或多个输出设备 220，以便承担输出作业。如果不满意任何一个可用输出设备 220，用户可拒绝该服务。在这种情况下，可向用户提供备选方案，诸如，通过对查找标准所做的一些改变，再次尝试步骤 1110。用户可选择在任何时间中止服务请求。在步骤 1112，通过选定或确定的一个或多个输出设备 220，可"锁定"信息装置 200 和选定的输出设备 220 间的通信链路。可删去未选定的其他输出设备 220。然后输出过程 1020 可进行到图 10 的步骤 1030 的客户机应用程序过程。

[0232] 图 12A 是参考图 10 的步骤 1030 的示例性客户机应用程序过程的流程图。用于通用输出的客户机应用程序过程 1202 可包括或利用：

[0233] ●获得所需输出的内容（例如，数字文档）的客户机应用程序 210。

[0234] ●获得输出服务参数的客户机应用程序（例如，光栅化参数、输出作业参数）。实现的一个例子是从包括设备从属参数的输出设备配置文件（例如，打印机配置文件）获得输出设备参数。可将这种配置文件存储在输出控制器 230、输出设备 220 或信息装置 200。

[0235] ●通过 (1) 用户输入（自动或手动）或选择或 (2) 基于预定首选项或预定缺省，或 (3) 上述的组合，可选地获得用户首选项的客户机应用程序 210。

[0236] ●根据从上述步骤诸如，通过输出设备配置文件、用户选择、预定用户首选项、预

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定缺省或标准等等获得的一个或多个光栅参数，光栅化意欲输出的至少部分内容的客户机应用程序 210。

[0237] ●生成包含至少部分与意欲输出的内容有关的光栅化图象的中间输出数据的客户机应用程序 210。

[0238] ●将中间输出数据传送给输出设备 220 或输出控制器 230 的客户机应用程序，用于进一步处理和 / 或最终输出。

[0239] 客户机应用程序 210 可以任何方法获得内容（例如，数字文档）900 或对该内容的指针或索引。在优选实施例中，客户机应用程序 210 是以设备驱动程序或独立应用程序的形式，以及可由客户机应用程序 210，从在相同信息装置 200 中的其他应用程序 205 获得内容或其索引。为示例说明例子，用户可通过在他 / 她的信息装置 200 中使用文档浏览、预览和 / 或编辑应用程序 205，首先浏览或下载或创建数字文档，然后通过将客户机应用程序 210 运行为设备驱动程序或助手应用程序来请求输出服务。客户机应用程序 210 与文档浏览或编辑应用程序通信以便获得数字文档或该数字文档的索引。如另一个例子，客户机应用程序 210 是独立的应用程序，以及其运行另一应用程序来帮助定位和获得数字文档，用于输出。在这种情况下，用户可首先运行客户机应用程序 210，然后调用驻留在相同信息装置 200 中的另一应用程序 205（例如，文档编辑和 / 或浏览应用程序）来预览或下载数字文档。然后，客户机应用程序 210 与文档浏览或编辑应用程序通信以便获得用于输出的数字文档。

[0240] 在另一实施例中，客户机应用程序 210 本身提供包括用于用户选择用于输出的内容（例如，数字文档）的能力的多个功能性或特征设置。例如，本发明的客户机应用程序 210 可提供用户能直接输入或选择用户希望输出的数字文档的索引或路径的 GUI。

[0241] 为在内容（例如，数字文档）900 上执行光栅化操作，在步骤 1210 中的客户机应用程序 210 需要获得输出设备 220 的设备从属参数，诸如光栅化参数。设备从属参数可包括在输出设备配置文件中。客户机应用程序 210 可以任何方式获得输出设备配置文件或光栅化参数。例如，可通过下述的一个或组合来获得输出设备配置文件或光栅化参数：

[0242] ●客户机应用程序与输出设备 220 通信以便加载与一个或多个光栅化参数有关的输出设备配置文件或信息。

[0243] ●客户机应用程序 210 从网络节点（例如，服务器）获得输出设备配置文件。

[0244] ●用户选择存储在用户信息装置 200 中的输出设备配置文件。

[0245] ●客户机应用程序 210 自动检索或使用尤其缺省配置文件、预定标准值或默认值。

[0246] ●客户机应用程序 210 通过至少部分基于其从输出设备 220、用户、缺省值和网络节点的一个或组合获得的信息，计算，可包括近似获得输出设备参数。

[0247] 注意到步骤 1210 是可选的步骤是很重要的。在一些实例中，在现有可选发现过程（图 10 中的步骤 1020）期间，通过客户应用程序 210，已经获得部分或全部输出设备配置文件或相关的设备相关信息。在这种情况下，可部分或全部忽略步骤 1210。

[0248] 在一种实现中，客户机应用程序 210 与一个或多个输出设备 220 通信以便加载存储在一个或多个输出设备 220 或它们的相关的一个或多个输出控制器 230 的存储器或存储部件中的输出设备配置文件。在一些实例中，所加载的输出设备配置文件可包含对设备参

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数的部分或全部索引或指针，而不是设备参数本身。可将实际输出设备参数存储在网络节点或信息装置 200 中，使用索引或指针，可由客户机应用程序 210 或通过其他应用程序 205 检索它们。应当注意，多个信息装置 200 可请求从相同的输出设备 220 同时或至少在重叠周期期间获得输出设备配置文件。输出设备 220 或其相关的输出控制器 230 可具有同时或用另外的方法管理多个通信链路和提供输出设备配置文件给多个信息装置 200 的部件或系统。另外，输出设备 220 可提供部件或系统来从不同信息装置查询请求并根据方案，诸如先来先服务、服务质量等等，用顺序的方式为他们提供服务。可通过例如，输出控制器 230 作为可选特征设置，实现具有或不具有查询或假脱机功能的多用户通信和服务管理能力。

[0249] 在另一实现中，可将一个或多个输出设备配置文件本地存储在信息装置 200 中。客户机应用程序 210 可提供用户能从预先存储的配置文件选择配置文件的 GUI。例如，GUI 可向用户提供输出设备名称的清单（例如，品牌和型号），每个对应于本地存储的输出设备配置文件。当用户选择输出设备 220 时，然后，客户机应用程序 210 可检索 对应于由用户选定的名称的输出设备配置文件。

[0250] 在某些情况下，在以前所述的发现或通信过程期间，客户机应用程序 210 用以前描述的各种方法已经获得输出设备 ID、名称或索引或其他信息。在这种情况下，客户机应用程序 210 基于没有用户干预获得的输出设备 ID、名称或索引，可自动地启动或检索存储在信息装置 200 中的输出设备配置文件。

[0251] 在另一实现中，客户机应用程序 210 可使用本地存储在用户信息装置 200 中的一组预定默认值。这些默认值可存储在一个或多个文件或表中。客户机应用程序 210 可访问文件或表来获得这些默认值。客户机应用程序 210 也可基于在上述步骤（例如，在可选发现过程中，基于所获得的部分或不完全的打印机配置文件信息等等）期间获得的信息，创建或计算某些默认值。用户可有或可没有机会来修改或重写一些或所有默认值。

[0252] 最后，如果，为任何原因，没有设备相关信息可用，客户机应用程序 210 可使用标准输出和光栅化参数或预定缺省参数。上述示例说明实现方式的许多例子和变化，在实现中的这些和其他可能的变化不脱离本发明的范围。

[0253] 在步骤 1220 中，客户机应用程序 210 可选地获得用户首选项。在一个示例性实现中，客户机应用程序 210 可用 GUI（图形用户界面）获得用户首选项。为简化起见，可向用户呈现标准 GUI 表格，而与包含在输出过程中的输出设备 220 的品牌和型号无关。通过该界面，用户可指定一些设备独立输出参数，诸如页面范围、每页名片的数量、复制数量等等。另外或组合，客户机应用程序 210 也可将输出设备相关特征和首选项包括到呈现给用户的 GUI 中。可由包含在通过在以前步骤中描述的部件和过程获得的输出设备配置文件中的信息，部分或全部支持 GUI 的设备相关部分。为示例说明，设备相关特征和性能可 尤其包括打印质量、色彩或灰度级、双向或单端、输出页大小。

[0254] 最好，用户首选项的一些或全部部件、属性或字段具有默认值。部件或全部默认值可硬编码到客户机应用程序 210 的软件程序或硬件部件中。另外，客户机应用程序 210 也可访问文件以便获得默认值，或其可基于在上述步骤或部件期间（例如，从输出设备配置文件）获得的信息，计算某些默认值。用户可有或可没有预先配置、或修改或重写一些或全部默认值的能力。客户机应用程序 210 可通过或没有用户干预或知识，获得和使用一些或所有默认值。

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[0255] 在步骤 1230 中，本发明的客户机应用程序 210 执行光栅化操作以便根据在上述步骤获得的光栅化参数，将可包括向量图形、文本和图象的对象和信息的内容（例如，数字文档）一致为一个或多个输出图象。在光栅化过程期间，根据指定的光栅化参数设置，将内容中的文本和向量图形对象或信息光栅化或转换成图象或位图形式。在该内容中的图象信息可要求缩放和内插操作以使一致光栅化参数。光栅化过程可进一步包括操作诸如，缩放、内插、分段等等以便适合或一致一个或多个输出图象为指定的光栅化参数设置，诸如目标输出大小、分辨率、色深、色空间和图象格式等等。

[0256] 在步骤 1240 中，客户机应用程序 210 生成包括光栅化的一个或多个输出图象的中间输出数据。本发明的中间输出数据可包含图象信息、指令、描述以及数据，尤其诸如色彩配置文件。创建和生成中间输出数据可进一步包括生成尤其诸如压缩、编码、加密、平滑、分段、缩放和 / 或色彩校正。可用不同的格式和 / 或压缩方法（例如，JPEG、BMP、TIFF、JBJG 等等或组合）不同地编码和 / 或实现包含在中间输出数据中的图象。一个优选实现方式是用混合光栅内容 (MRC) 描述生成或编码中间输出数据中的输出图象。在本发明的数据输出过程中使用 MRC 提供机会来通过应用不同的压缩技术以便分段内容中的元素来提高压缩比。另外，MRC 提供机会来在输出图象的编码过程期间维持更原始 的内容信息，因此，部分地改进输出质量。

[0257] 在步骤 1250 中，客户机应用程序 210 通过局部通信链路 240，将中间输出数据传送给输出设备 220。通信链路可用有线或无线技术实现，以及传输可包括一个或多个会话。

[0258] 应当意识到图 12A 示例说明在本发明的数据输出方法 1002 中的客户机应用程序 1030 的一个例子。具有更多或更少步骤的其他实现也可可能的，以及在图 12 中未出的几个另外的可选过程也可包括在客户机应用程序过程 1030 中。然而，使用这些不同的变化，不会导致脱离本发明的范围。例如，当选定输出设备 220 将服务提供给受限用户组时，可包括可选验证步骤。当客户机应用程序 210 通过与输出设备或输出控制器通信，获得输出设备配置文件时，可将验证过程增加到步骤 1210 中。如另一个例子，当客户机应用程序将中间输出数据传送给一个或多个输出设备 220 或输出控制器 230 时，也可在步骤 1250 中实现验证过程。可通过例如，将信息装置 200 的标记与存储在输出设备 220 或输出控制器 230 中的标识的认可控制列表进行比较，实现简单的验证。也可使用其他更复杂的验证和加密方案。可单独地或组合地将信息，尤其诸如用户名称、密码、ID 号、签名、安全密钥（物理或数字）、生物特征、指纹、声音用作验证手段。可由用户手动提供或由选定的输出设备 220 或输出控制器 230 自动选择这些标识和 / 或验证信息。通过成功验证，用户有权访问由输出设备 220 提供的所有或部分服务。客户机应用程序 210 获得的输出设备配置文件可根据所请求或确定的服务类型或质量改变。如果验证失败，拒绝用户部分或全部访问服务是可能的。在这种情况下，可向用户提供备选方案，诸如选择另一输出设备 220 或另外的服务。

[0259] 另一可选过程是参考图 12，在输出服务前后，诸如步骤 1210 或 1250，要求用户提供支付或储蓄或契约。支付或储蓄的例子可尤其包括现金、信用卡、银行卡、借记卡、智能卡、电子货币。输出控制器 220(230 ？) 可将支付计算或交易处理提供为本发明的可选特征设置。

[0260] 图 12B 示例说明另一示例性的客户机应用程序输出过程 1030，通过该过程，信息装置 200 可将内容普遍和通用地输出给与本发明的输出控制器 230 有关或具有本发明的输

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出控制器 230 的一个或多个输出设备 220。

[0261] 除忽略获得输出设备配置文件的步骤 1210 外，图 12B 中所示的过程与图 12A 所描述的过程类似。在该实施例中，客户机应用程序 210 利用一组硬编码、包括光栅化参数的标准或预定输出设备参数，通过光栅化参数，客户机应用程序 210 能执行光栅化操作和其他所需的图象处理功能。可向用户提供改变这些参数或输入另外的参数的选项。光栅化参数包括输出大小、输出分辨率、色深、色空间、色彩通道、比例因子等等。这些预定参数通常遵循规格或标准。相同的规格和标准也可定义或至少部分描述中间输出数据。可将预定标准参数存储在信息装置 200、输出控制器 230 和 / 或输出设备 220 中的文件或配置文件中，用于更新或升级。

[0262] 在客户机输出过程 1204 中，由于预定光栅化参数，客户机应用程序 210 可不需要从选定的输出设备 230 更新打印机配置文件。因此，当与在图 12A 所示的过程 1202 相比时，在该过程 1204 中，在信息装置 200 和输出设备 220 间的无双向通信是必要的。客户机应用程序 210 基于标准和 / 或预定参数，执行光栅化操作 1225，并生成具有那些光栅化参数的预定或标准属性的光栅化输出图象。将包括至少一个光栅化输出图象的最终中间输出数据在步骤 1250 中从信息装置 200 传送到输出设备 220，或传送到其相关的输出控制器 230，用于渲染或输出。与在如图 12A 所示的过程 1202 中生成的中间输出数据相比，在过程 1202 中生成的中间输出数据通常是较低设备相关。可预先编程包括或与输出设备 220 相关的输出控制器 230 以便解释包括对应于这些标准或预定参数的性质或属性的光栅输出图象。

[0263] 可将标准或预定光栅化参数硬编码或编程到客户机应用程序 210 和 / 或输出控制器 230 中。然而，代替硬编码这些参数，便于更新或修改的一种技术是将这些标准参数存储在缺省文件或配置文件中。可由信息装置 200 中的应用程序（例如，客户机应用程序 210）和 / 或由输出设备 2220 或输出控制器 230 中的应用程序或部件检索和利用包含在文件或配置文件中的标准或预定参数。用这种方法，可通过替换或修改文件或配置文件，代替修改或更新信息装置 200、输出设备 220 和 / 或输出控制器 230 中的程序、应用程序或部件，很容易实现对那些预定或标准参数的任何必要的更新、升级或所需修改。

[0264] 向信息装置 200 提供通用输出性能的客户机应用程序过程 1204 可包括或利用：

[0265] ●获得意欲输出的内容（例如数字文档）的客户机应用程序 210。

[0266] ●客户机应用程序 210 通过 (1) 用户输入（自动或手动）或选择或 (2) 基于预置首选项或预定默认值，或 (3) 上述的组合，可选地获得用户首选项（在步骤 1220 中）。

[0267] ●根据预定或标准光栅化参数，光栅化内容（在步骤 1230 或 1225 中）的客户机应用程序 210。

[0268] ●生成用于在输出设备 220 渲染或输出的中间输出数据（在步骤 1240 中）的客户机应用程序 210，中间输出数据至少部分包含与意欲输出的内容有关的光栅化图象。

[0269] ●将中间输出数据传送给输出设备 220（在步骤 1250 中），用于进一步处理和最终输出的客户机应用程序 210。

[0270] 与图 12A 所示的过程 1202 相比，图 12B 所示的客户机输出过程 1204 的一个优点在于所生成的中间输出数据通常是低设备相关。设备独立属性允许中间输出数据对具有输出控制器或与输出控制器有关的大多数输出设备来说更便携和更易接受。两个数据输出过程 (1202 和 1204) 允许通用输出；允许用户在信息装置 200 中安装单个客户机应用程序 210

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或部件以便向不至一个输出设备 220 提供输出能力。

[0271] 图 13A 示例说明本发明的输出设备 1302 及其相关的光栅成象方法的一个例子。在该输出设备过程 1302 中，输出设备 220 能从信息装置 200 接收中间输出数据。输出设备过程 1302 及其操作可包括或利用：

[0272] ●接收中间输出数据的输出设备 / 系统或输出控制器（在步骤 1300 中）。中间输出数据至少部分包括光栅输出图象，其描述用于在输出设备 220 或系统 250 渲染的至少部分内容。

[0273] ●解释（在步骤 1310 中）中间输出数据的输出设备 / 系统或输出控制器。在一个优先实施例中，中间输出数据包括利用一个或多个 MRC 格式或部分的输出图象。

[0274] ●在光栅图象上执行图象处理操作（在步骤 1320 中）的输出设备 / 系统或输出控制器。图象处理操作可尤其包括，但不限于图象解压缩、缩放、半色调、色彩匹配。

[0275] ●转换和 / 或生成（在步骤 1330 中）以适合于输入到包括在输出设备 220 中的输出引擎（例如，在打印机的情况下的打印机引擎）的格式或描述的输出引擎输出数据的输出设备 / 系统或输出控制器。

[0276] ●在步骤 1370 中渲染或生成最终输出（例如，输出引擎输出数据）的输出设备 220 中的输出引擎。

[0277] 输出设备 220 或输出系统 250 可内部或外部地包括输出控制器 230 以便帮助输出过程 1302 的管理和操作。如图 7 所示，有许多可能的与输出设备 220 有关的输出控制器 230 的配置和实现。在下文中，将输出控制器 230 看作连接到其上的输出设备的内部部分。此后，可由与其有关的输出控制器部分或全部实现下述输出设备的操作。

[0278] 在步骤 1300 中，由客户机应用程序 210 启动输出设备过程 1302，将中间输出数据传送到输出设备 220 或输出系统 250。在步骤 1310 中，输出设备 220 读取和解释包含与打算输出的内容有关的至少一个光栅输出图象的中间输出数据。在读取和解释过程 1310 期间，输出设备 220 可包括解析中间输出数据并执行尤其诸如解压缩、解码、以及解密操作的部件。可不同地编码输出图象以及其可包括一个或多个压缩方法。

[0279] 在图象编码方法包括 MRC 格式的情况下，那么，在一个示例实现中，在步骤 1310 的解码和映射输出图象期间，可将包括 MRC 的图象中的较低分辨率层和信息映射、缩放或内插到较高分辨率输出图象上以便产生更好的图象质量。因此，在步骤 1310，在中间输出数据包括 MRC 部分的情况下，可解压缩、处理、映射和组合 MRC 图象的每层到单个组合的输出图象层。步骤 1310 也可尤其包括缩放、色空间变换、和 / 或内插。除使用具有不同层的不同缩放和内插比的映射方法的可能性外，使用 MRC 的另一优点在于在步骤 1320 中，可利用包含在 MRC 中的分段信息来将不同的图象处理和增强技术应用于 MRC 图象的不同层的数据上。

[0280] 在步骤 1320，输出设备 220 可进一步在解码输出图象上执行图象处理操作。这些图象处理操作可尤其包括，例如，色彩校正、色彩匹配、图象分段、图象增强、图形矢真、图象平滑、数字水印、缩放、内插和半色调。图象处理操作 1320 可与步骤 1310 结合或同时操作。例如，当解码和 / 或解压缩图象的每行、象素或部分时，应用图象处理操作 1320。在另一实现中，图象处理 1320 可在已经解码或解压缩整个输出图象或大部分图象后发生。

[0281] 如果中间输出数据包括 MRC 部分，那么在步骤 1310 中，有另外的机会来提高图象

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质量。用 MRC 编码的图象包含传统的单层图象格式通常不具有的分段信息。例如，前景可在一层中，以及背景在另一层中。如另一个例子，色度信息可在一层中以及亮度可在另一层中。可使用 MRC 中的该分段信息来将不同或选择性的图象处理方法和算法应用于不同层或段以便提高图象质量或保留或恢复图象信息。不同图象处理技术或算法可包括色彩匹配、色彩校正、黑色生成、半色调、缩放、内插、图形矢真、平滑、数字水印等等。例如，可将色度色彩匹配应用到前景信息以及将感性色彩匹配应用到背景信息，反之亦然。如另一个例子，可将错误扩散半色调应用到前景上以及将随机半色调应用到背景上，反之亦然。如另一个例子，可将双三次插值应用到层上以及将双线性或最小距离内插应用到不同层上。

[0282] 在步骤 1330 中，输出设备 220 或输出控制器 230 可将处理过的图象（例如，半色调）转换成输出设备 220 的输出引擎可接受的。该转换步骤是可选的，由特定输出设备引擎（例如，在打印机的情况下为打印机引擎）的类型、格式和输入要求而定。不同输出引擎可具有不同的输入光栅图象输入要求。例如，不同输出引擎可要求不同输入图象格式，每个象素的位或字节数、压缩或非压缩格式、或不同色空间（例如，诸如，RGB、CMY、CMYK 或 HI-FI 色彩，诸如绿、橙、紫、红等等的组合。每次在行、列、多行、多列、程序块、段或组合中编码输入的光栅，用于将光栅数据发送给输出引擎。在一些情况下，如果步骤 1320 的结果已经是输入设备引擎可接受的形式，可忽略步骤 1330。换句话说，然而，可要求进一步转换和 / 或处理以便满足特定的输出设备引擎的特定输入要求。

[0283] 注意从步骤 1310 至步骤 1330 的上述处理可要求一个或多个存储缓冲器以便暂时存储处理过的结果是很重要的。存储缓冲器可存储或保存在上述任何一个步骤中的输出图象的行、列、部分、或程序块。在其他可能的组合中，可以交替的方式，或以交织或交叉的方式顺序地执行将信息存储到存储缓冲器中以及从存储缓冲器检索信息。可用输出控制器 230 部分或全部实现步骤 1310 至步骤 1330 操作。

[0284] 在步骤 1370 中，包括在输出设备 220 或输出系统 250 中的输出设备引擎接收在步骤 1330 或步骤 1320 中生成的输出引擎输出数据。输出引擎输出数据是以满足输出引擎的输入要求和属性的，诸如色空间、色彩通道、色深、输出大小、分辨率等等。然后，输出引擎采用该输出引擎输出数据并通过其标记引擎或显示引擎输出或渲染该数据内容。

[0285] 包括输出设备过程 1302 的数据输出方法 1002 的一个优点在于相对于参考图 1 的传统过程，它对信息装置 200 具有更少的处理要求，因此，更使得信息装置 200 具有相对更低的处理能力和存储空间以便具有输出能力。

[0286] 例如，一些图象处理功能，诸如半色调（例如，错误扩散）可要求相当大的处理和计算能力。在包括输出设备过程 1302 的数据输出过程 1002 中，通过包括在输出设备 220 或输出系统 250，而不是信息装置 200 中的输出设备部件（例如，输出控制器 230）来在步骤 1320 中执行半色调，因此，代替信息装置 200 的计算要求。数据输出 1302 的另一好处在于中间输出数据比按参考图 1A 的传统输出方法 102 所生成的输出数据具有更小的设备相关。设备独立提供机会允许信息装置 200 中的单个驱动程序或应用程序，将中间输出数据输出给包括输出控制器 230 的多个输出设备 220。

[0287] 一些输出设备 220 可包含打印机控制器 410。这种类型的输出设备或打印机的例子尤其是 PostScript 打印机或 PCL 打印机。图 13B 示例说明具有包括打印机控制器 410 的打印机的输出设备过程 1304 的例子。如图 1 所述，具有打印机控制器的打印机要求输入，

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诸如页面描述语言（例如，PostScript、PCL 等等）、标记语言（HTML、XML 等等）、特定的图象格式、特定的图形格式，或组合，由打印机控制器的类型而定。

[0288] 有许多用于将数据输出能力和过程提供给包括打印机控制器的打印机或打印系统的打印系统配置。在一个例子中，输出设备 220 中的现有的打印机控制器可包括由输出控制器提供的特征设置以便形成“组合控制器”，如前面参考图 7C 和 7F 所述。在另一例子中，本发明的输出控制器 230 可顺序地或级联到现有的打印机控制器。输出控 制器 230 可内部安装（参考图 7B）或外部连接到（参考图 7F）输出设备 220。对包括打印机控制器的输出设备 220 来说，输出控制器 230 可在步骤 1310 中简单地解码中间输出数据，然后，在步骤 1350 中将其转换成用于输入到打印机控制器可接受的形式。

[0289] 用于包括打印机控制器 410 的输出设备过程 1304 和操作可包括或利用：

[0290] ●接收中间打印数据或输出数据（参考步骤 1300）的输出设备 220 或系统 250 中的输出控制器 230 或部件，中间打印数据至少包括至少部分与用于在输出设备 220 渲染的内容有关的光栅图象。

[0291] ●解释中间输出数据（参考步骤 1310）的输出设备 220 或系统 250 中的输出控制器 230 或部件，在一个优选实施例中，中间输出数据包括利用一个或多个 MRC 格式或部件的输出图象。

[0292] ●将中间输出数据转换成打印机控制器打印数据（参考步骤 1350）的输出设备 220 或系统 250 中的输出控制器 230 或部件，打印机控制器打印数据包括对打印机控制器的输入要求来说可接受或兼容的格式或语言（例如，PDL、PDF、HTML、XML 等等）。

[0293] ●接收打印机控制器打印数据的输出设备 220 或系统 250 中的输出控制器 230 或部件，打印机控制器可解析、解释和进一步处理（例如，光栅化、缩放、图象增强、色彩校正、色彩匹配、半色调等等）并将打印机控制器打印数据转换成打印机引擎打印数据（参考步骤 1360），打印机引擎打印数据由对输入到输出设备 220 或输出系统 250 中的打印机引擎来说可接受的格式或描述组成。

[0294] ●通过输入打印机引擎打印数据，渲染或生成最终输出（参考步骤 1370）的输出设备 220 或系统 250 中的打印机引擎或部件。

[0295] 在输出设备过程 1304 中，步骤 1300（接收中间输出数据）和步骤 1310（解释中间输出数据）均与在前面部分中参考图 13A 所述的输出设备过程 1302 中的步骤 1300 和步骤 1310 相同。

[0296] 在步骤 1350 中，输出控制器 230 将中间打印数据转换成以输入到打印机控制器来说兼容或可接受的形式的打印机控制器打印数据。例如，打印机控制器可要求输入特定的页面描述语言（PDL），诸如 PostScript。然后，输出控制器 230 创建 PostScript 文件并将在步骤 1310 中生成或检索的输出图象嵌入 PostScript 文件中。输出控制器 230 还能创建和将来自步骤 1310 的输出图象嵌入其他打印机控制器打印数据格式、指令或语言。

[0297] 在步骤 1360 中，打印机控制器接收在步骤 1350 中生成的、包括打印机控制器可接受的输入语言或格式的打印机控制器打印数据。打印机控制器可解析、解释并解码输入打印机控制器打印数据。打印机控制器可进一步在输出图象上执行光栅图象处理操作，尤其诸如光栅化、色彩校正、黑色生成、OCR、图形矢真、缩放、图象增强，以及半色调。然后，打印机控制器可生成适合于输入到打印机引擎的打印机引擎打印数据。根据特定的打印机引擎

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的要求，可改变打印机引擎打印数据的类型和 / 或格式。

[0298] 注意，从步骤 1310 到步骤 1360 的上述过程可要求一个或多个存储缓冲器来暂时存储处理过的结果是很重要的。存储缓冲器能在任何一个上述步骤中存储或保留输出图象的行、列、部分、或程序块。在其他可能的组合中，可顺序地、交替地、以交织或交叉的方式将令牌存储到存储缓冲器和从存储缓冲器检索信息。能输出控制器 230 实现步骤 1310 至步骤 1360 的过程和操作。

[0299] 在步骤 1370 中，包括在输出设备 220 或输出系统 250 中的打印机引擎基于在步骤 1360 中生成的打印机引擎打印数据，生成或渲染最终输出。例如，打印机引擎打印数据可以 CMY、CMYK 以及 RGB 等等的形式工，以及这可以每个象素一个或多个位的格式，满足打印机引擎的大小和分辨率要求。包括输出设备 220 的打印机引擎可采用该打印数据并通过其标记引擎生成或渲染输出页。

[0300] 已经参考所示的实施例，描述和示例说明了本发明的原理，将意识到在排列和细节方面可修改所示例的实施例而不脱离这些原理。鉴于可应用本发明的原理的许多可能的实施例，应认识到详细的实施例仅是示例目的，而不应当视为限制本发明的范围。相反，我要求本发明的所有这些实施例均落入由下述权利要求书及其等效的范围内。

[0301] 除非上下文指出，否则，权利要求中对元件的实例的数目的引用，不管其引用一个实例还是不至一个实例，至少要求元件的所述实例数，但不是为了使权利要求的范围排除具有比所述的元件的多的实例的结构或方法。特别地，但不限于，权利要求中对一个或多个输出市长国系统、图象或一个图象，光栅化参数或一个光栅化参数的引用不是为了使权利要求的范围排除具有、包括、采用或提供两个或以上输出设备或系统、图象或光栅化参数的结构或方法。

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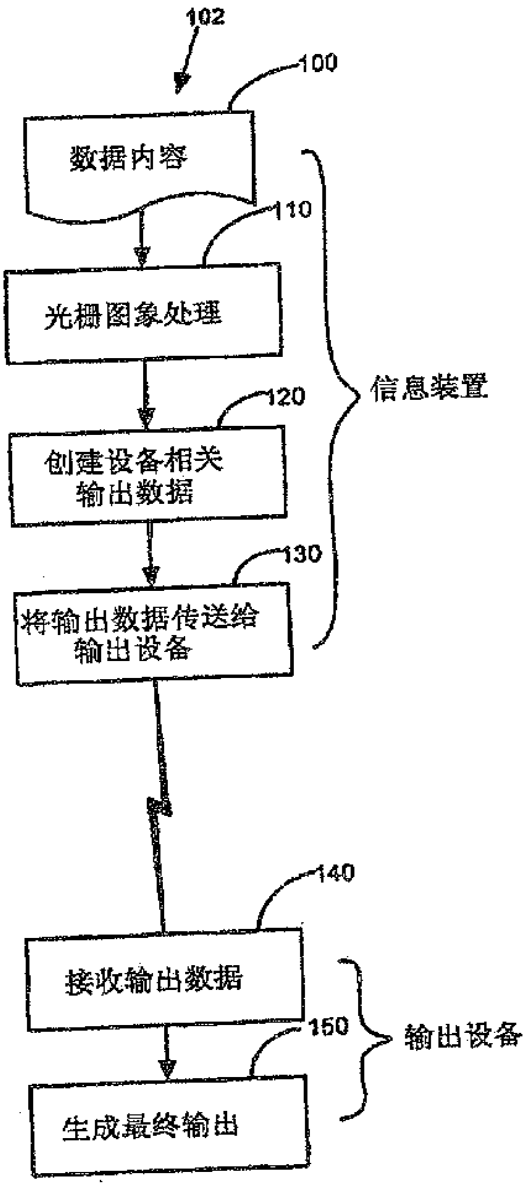


图 1A

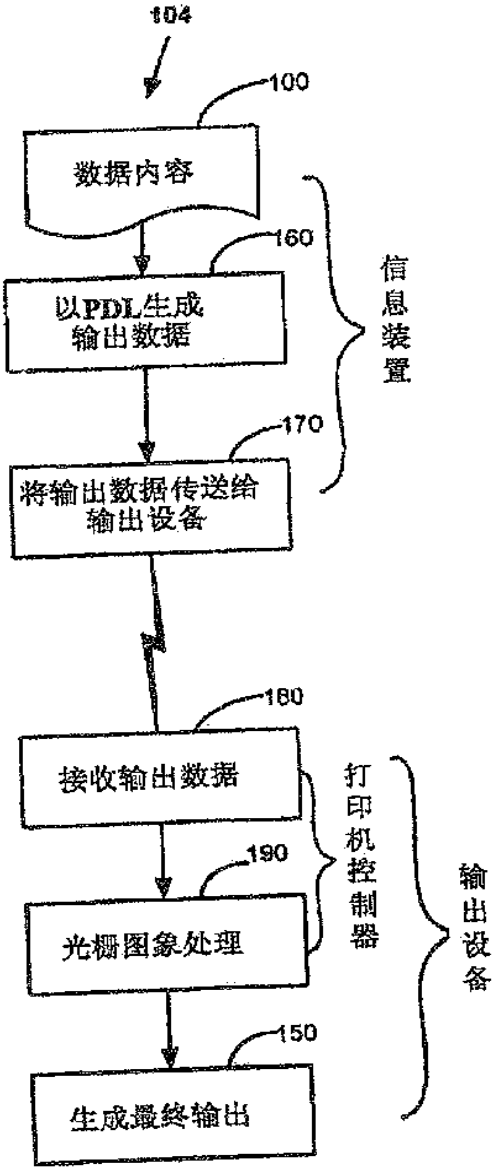


图 1B

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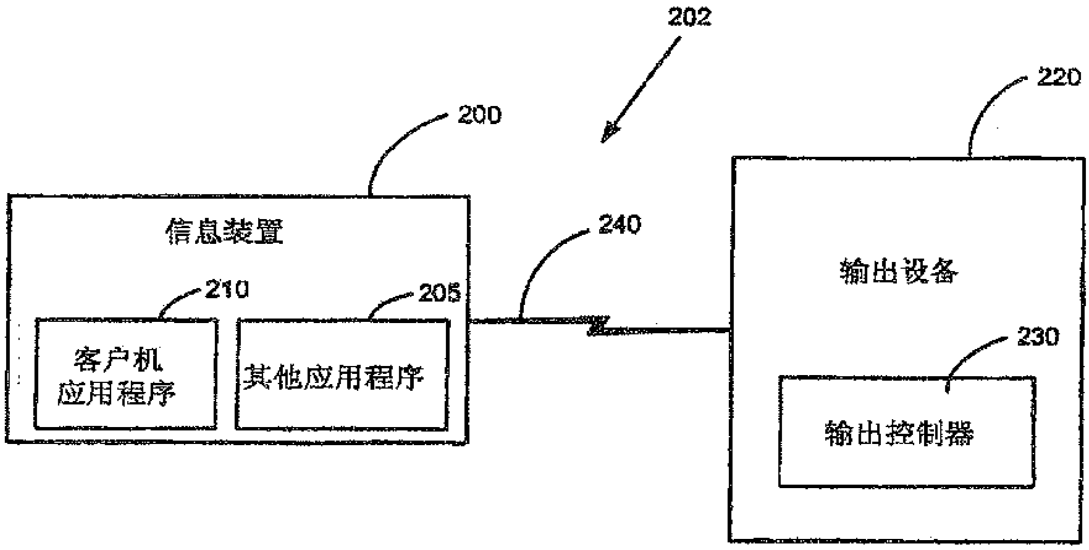


图 2A

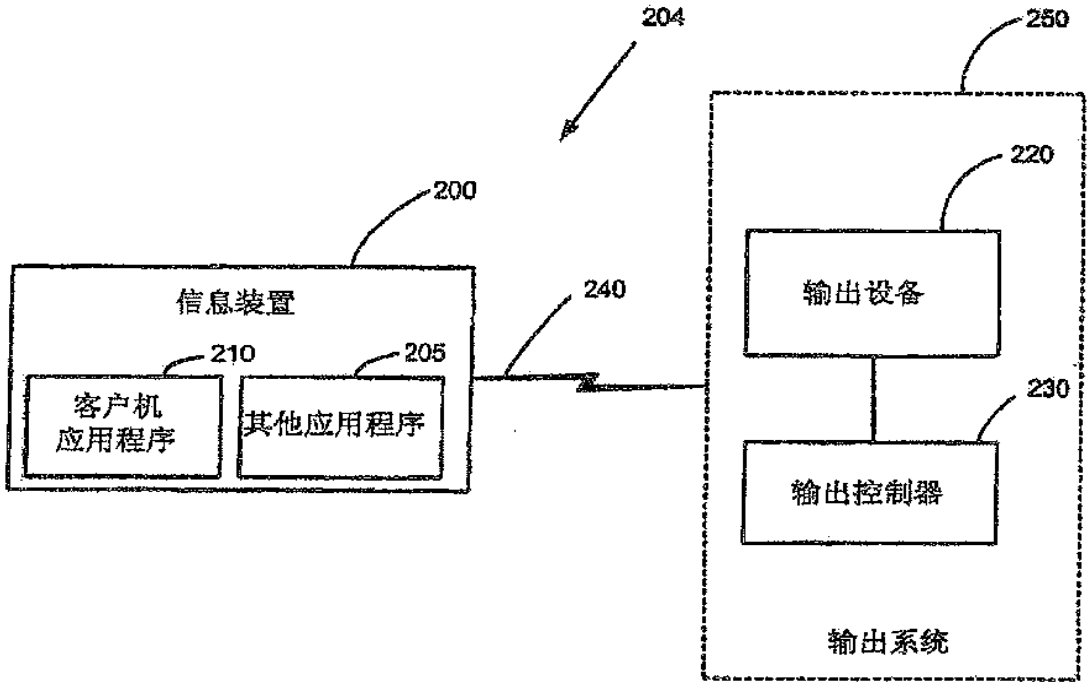


图 2B

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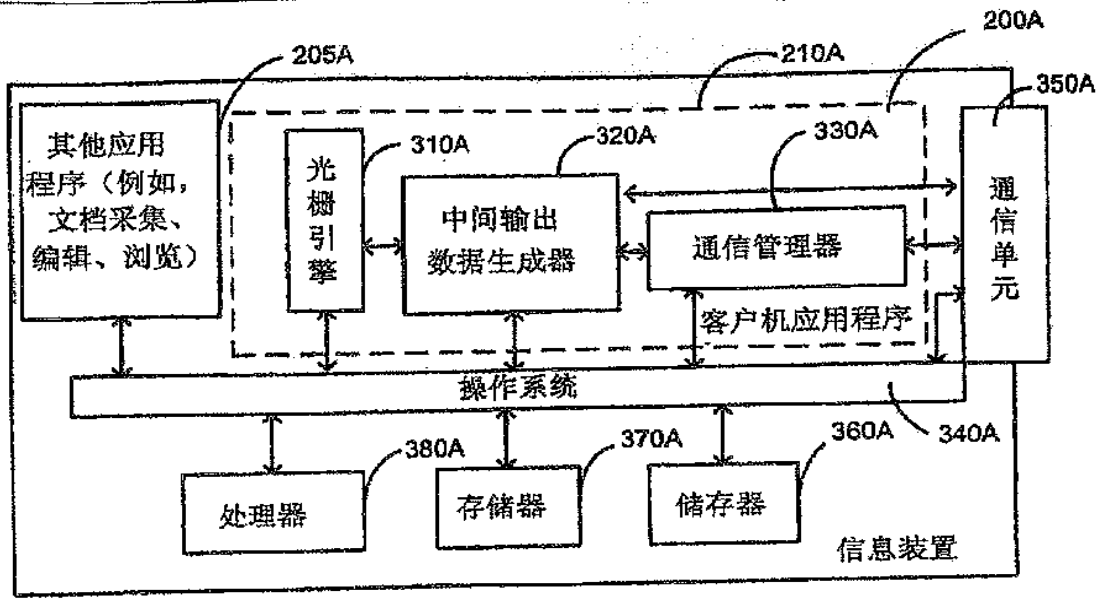


图 3A

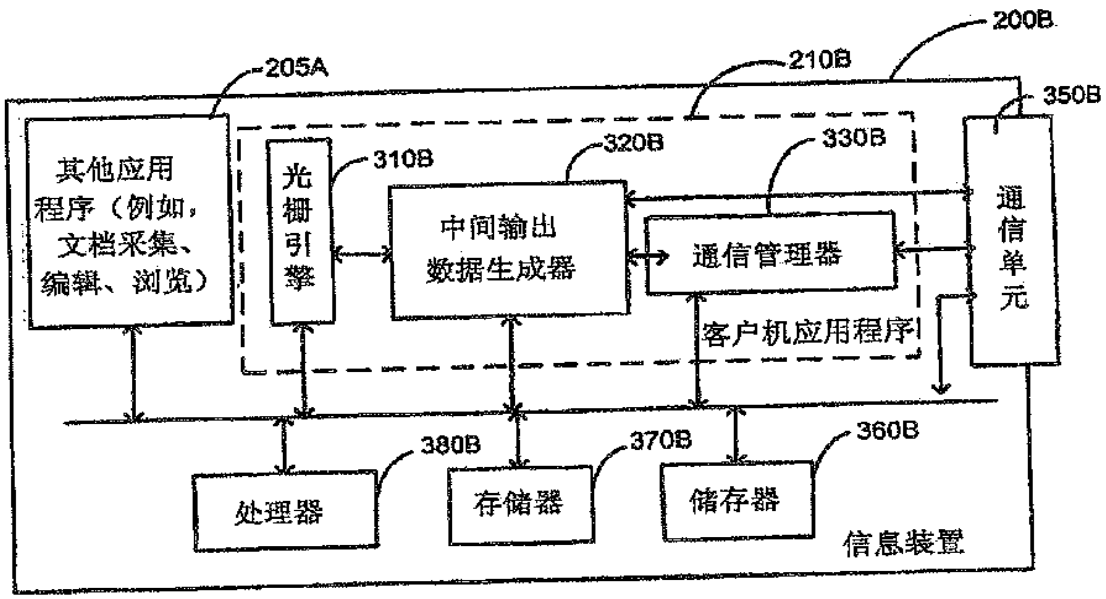


图 3B

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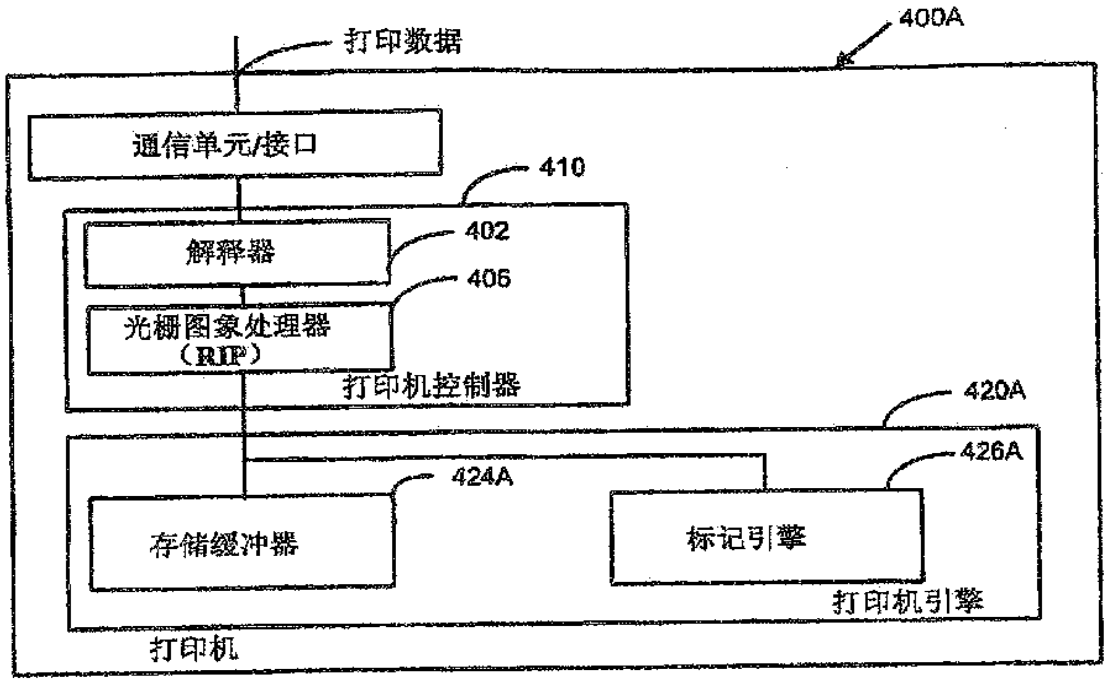


图 4A

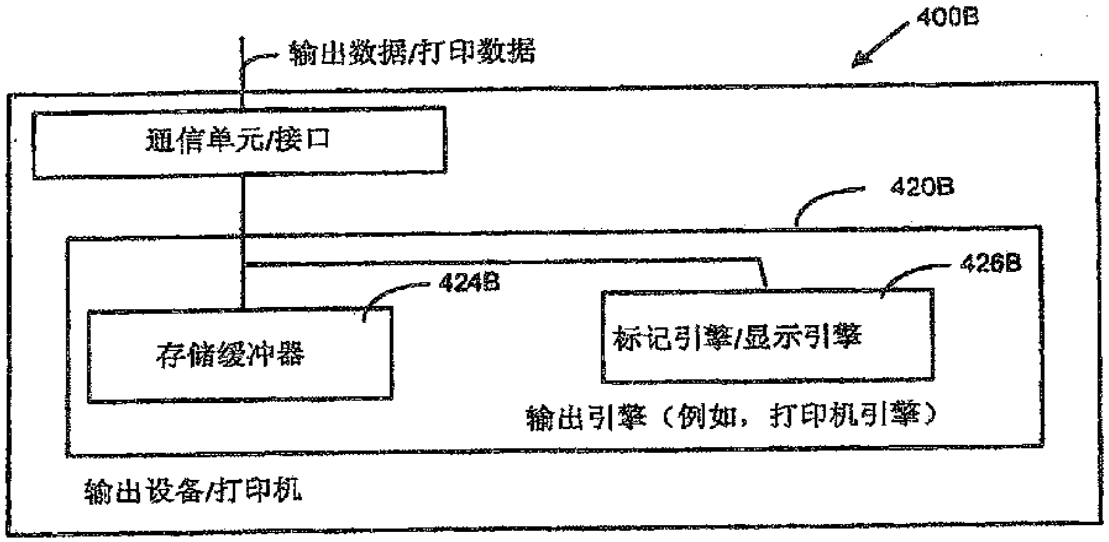


图 4B

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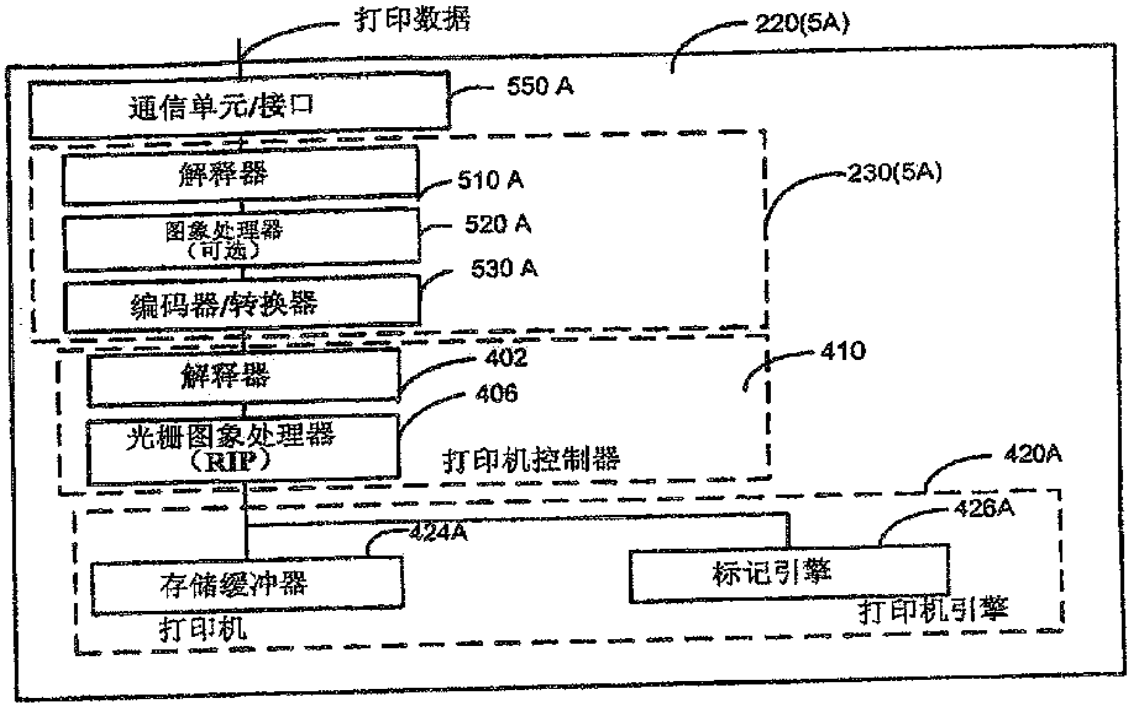


图 5A

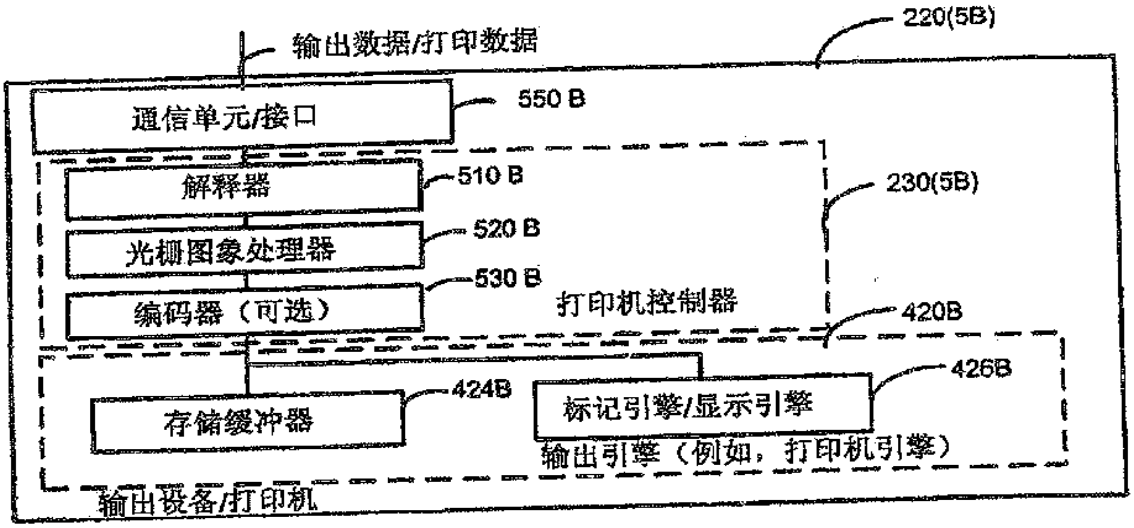


图 5B

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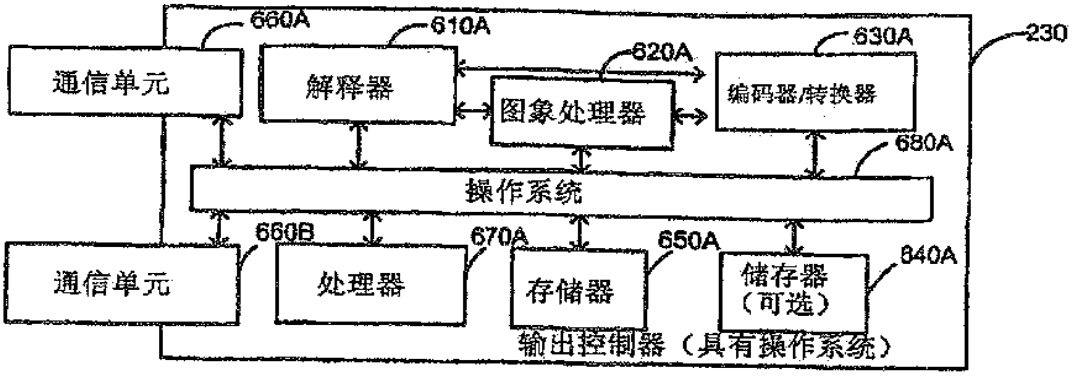


图 6A

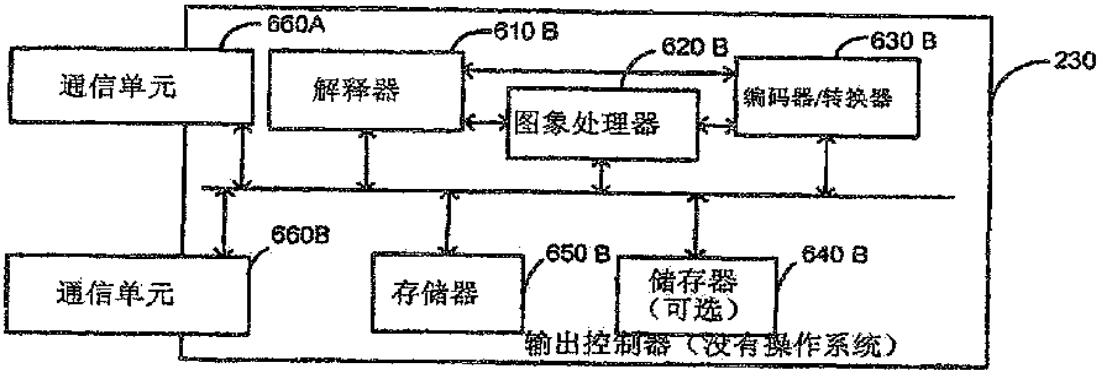


图 6B

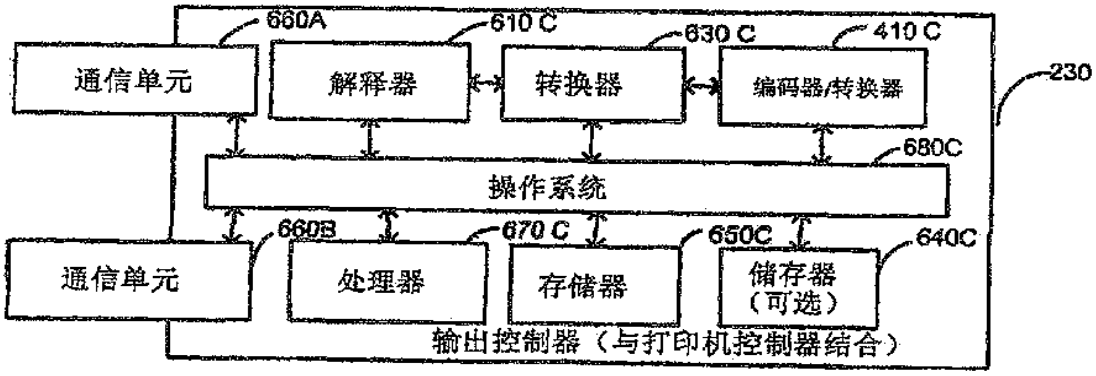


图 6C

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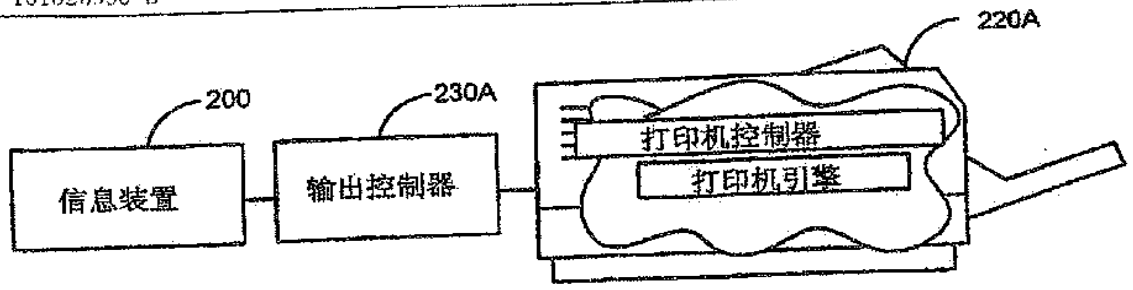


图 7A

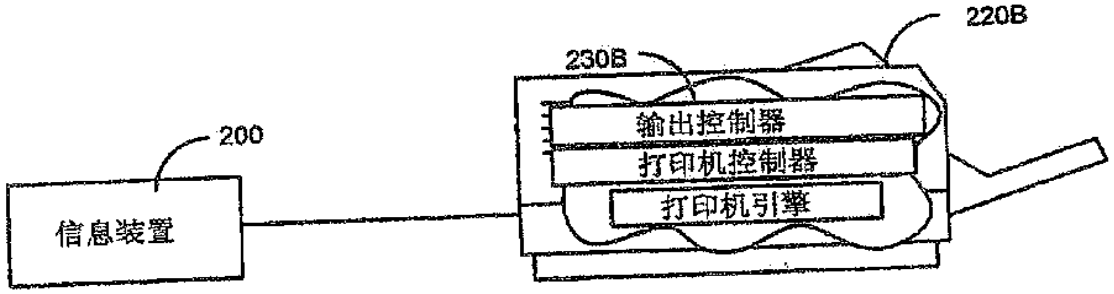


图 7B

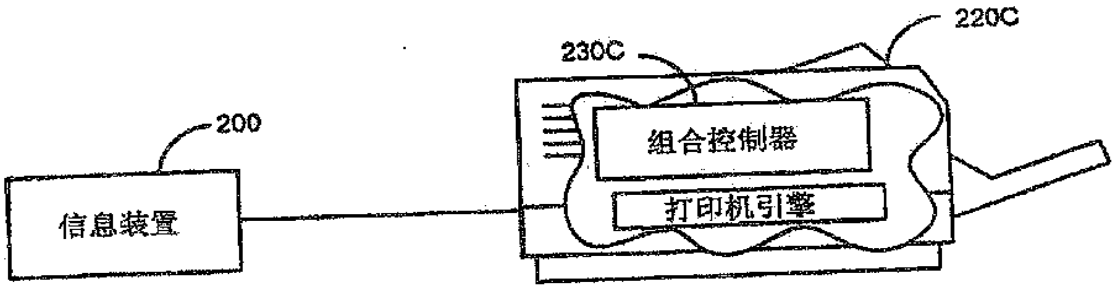


图 7C

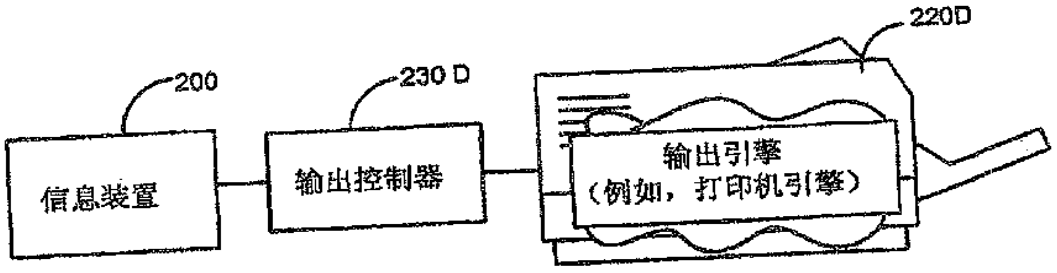


图 7D

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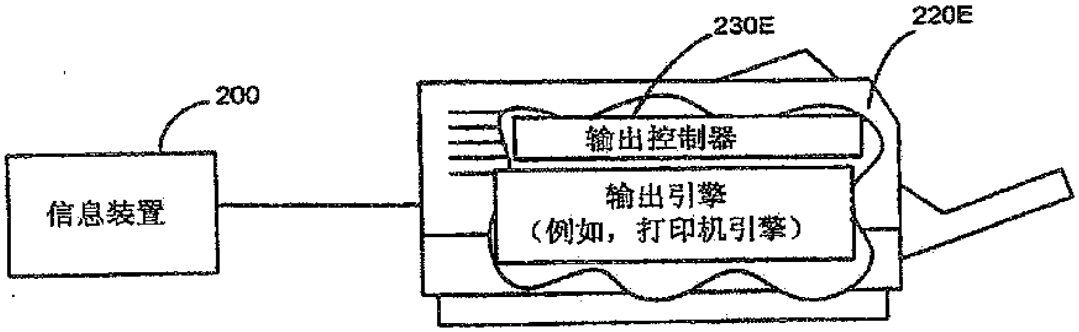


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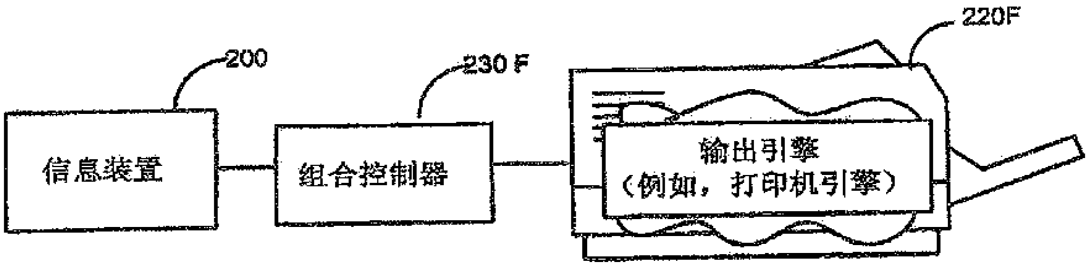


图 7F

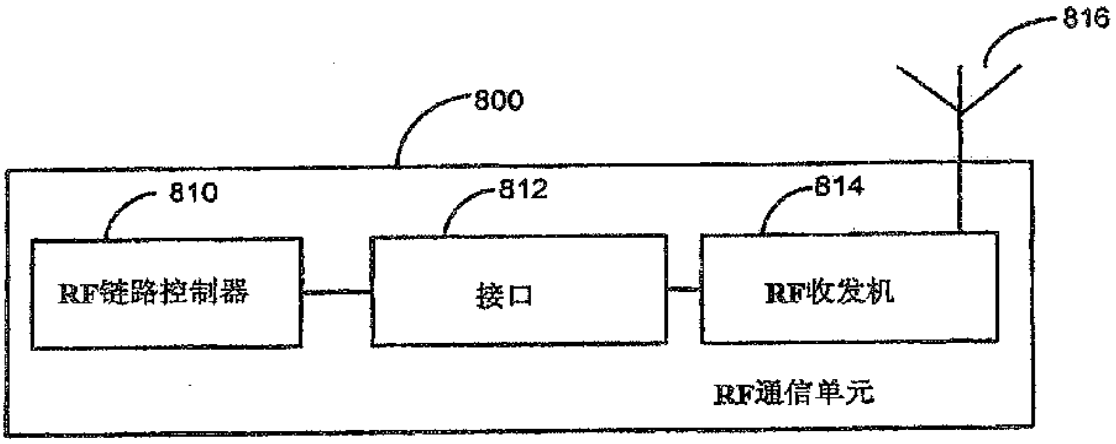


图 8A

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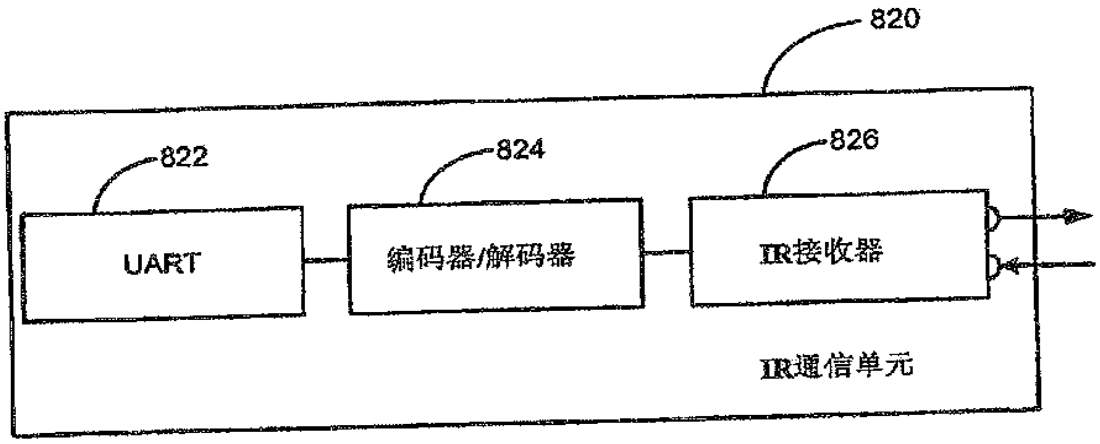


图 8B

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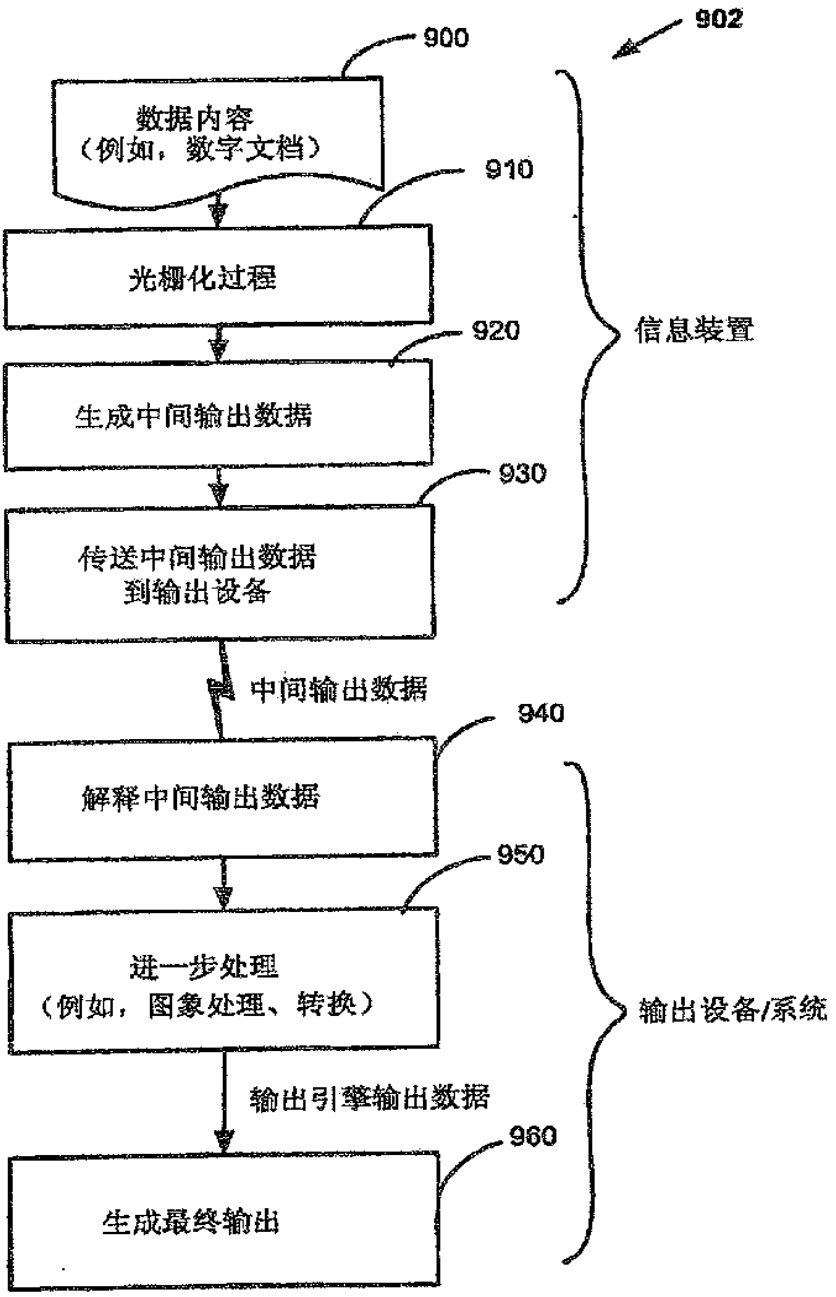


图 9

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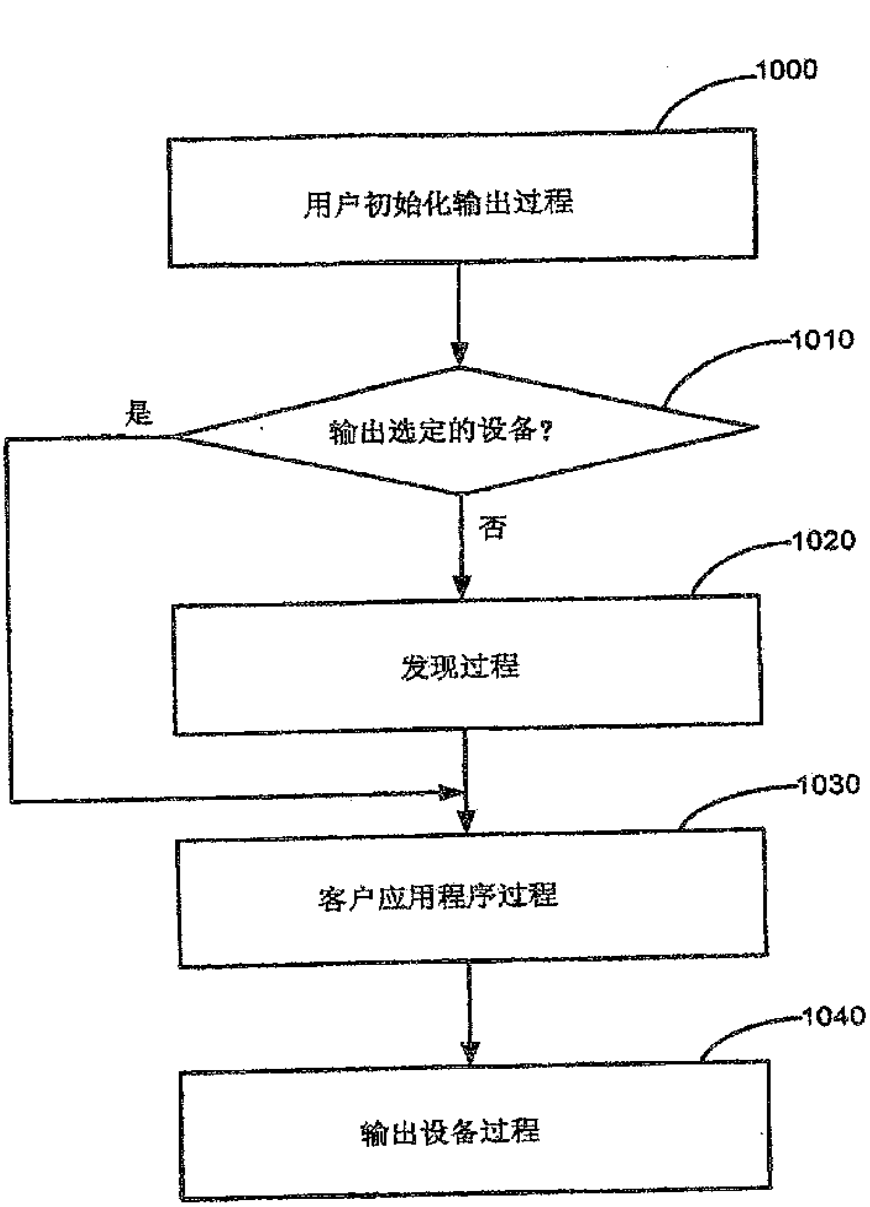


图 10

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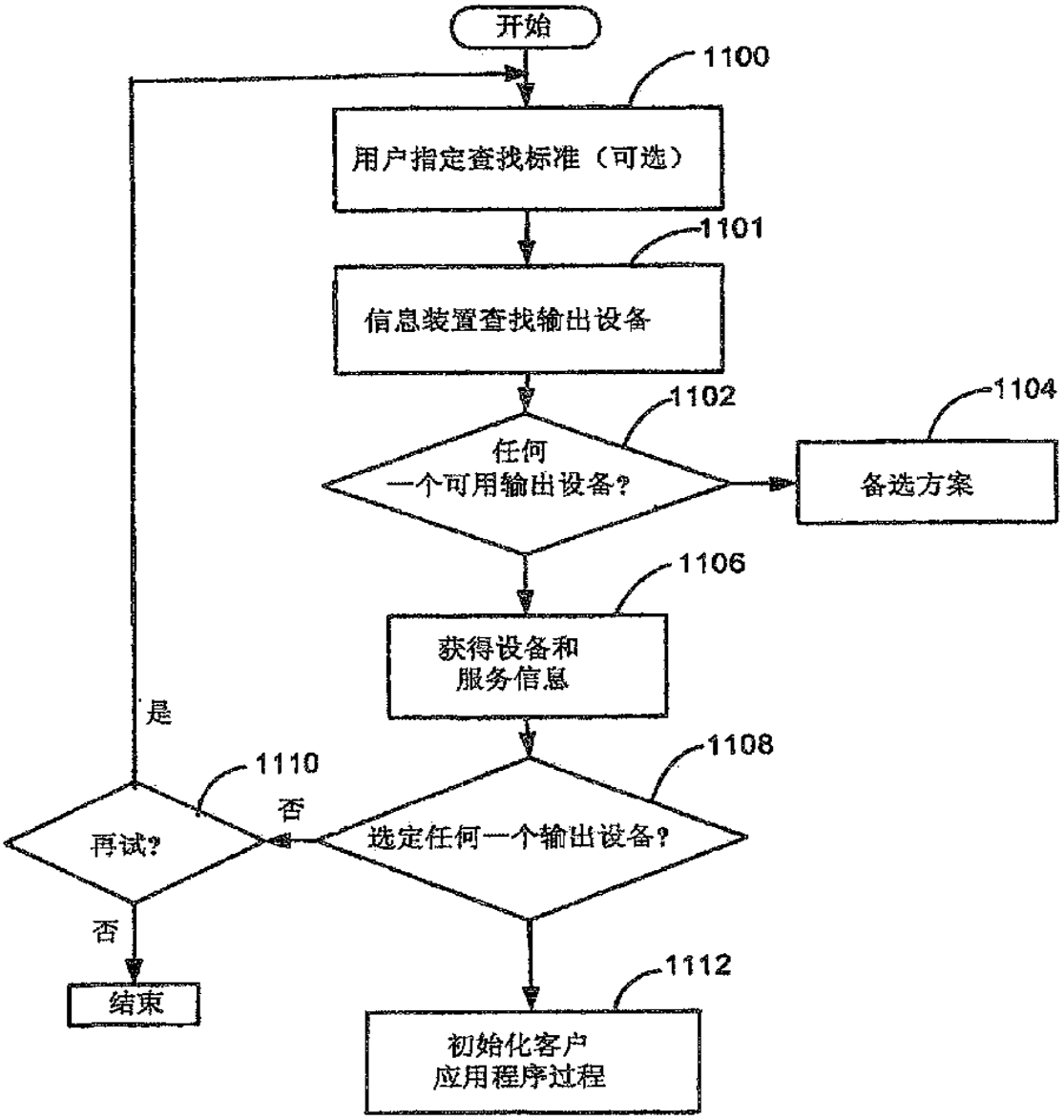


图 11

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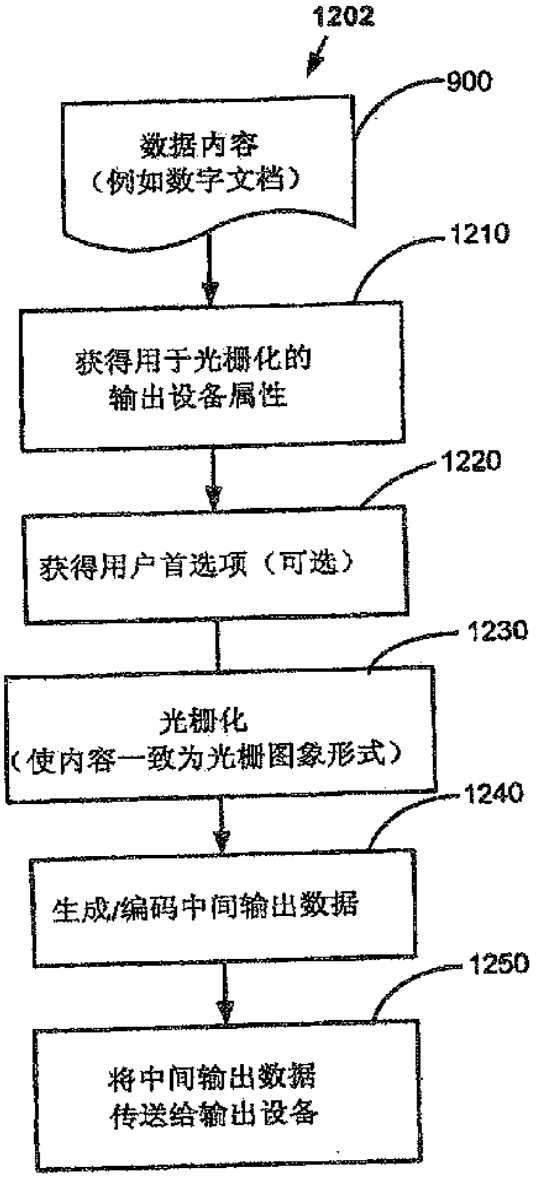


图 12A

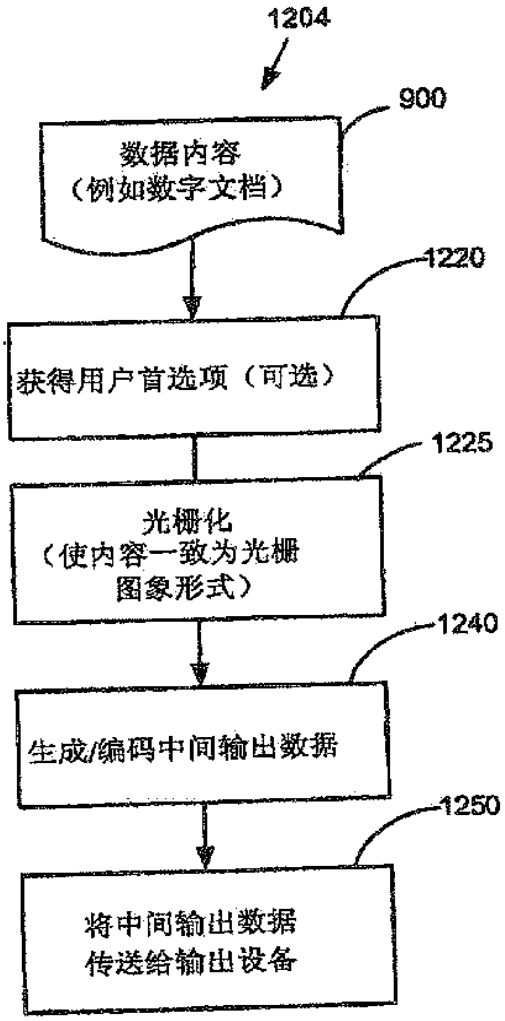


图 12B

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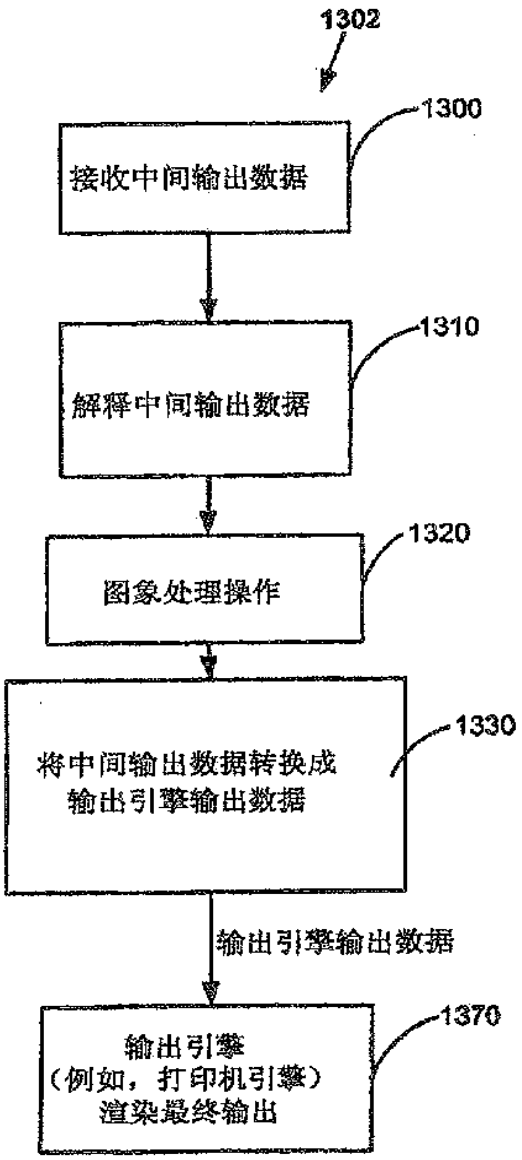


图 13A

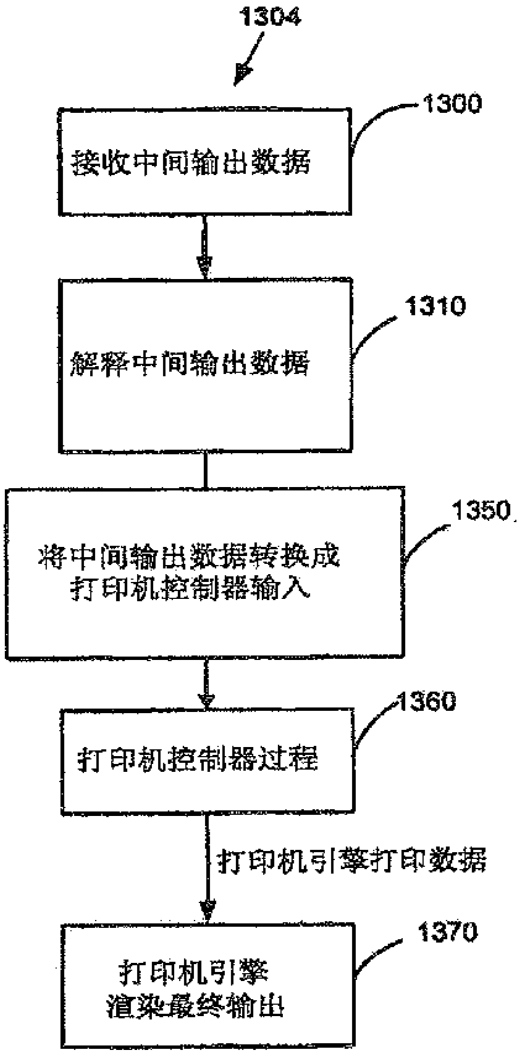


图 13B

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(54) Title: SYSTEM FOR UNIVERSAL DATA OUTPUT

(57) Abstract: An information apparatus that is on a local area rasterizes a digital document on the information apparatus to generate image data and creates an intermediate output data from the image data. The intermediate output data is transmitted to an output device that is on the local area network and includes an output engine that outputs images with a device-specific output size and resolution. The image data is recovered from the intermediate output data and is converted to instructions compatible with the output engine, based at least in part on the device-specific output size and resolution of the output engine. The method further includes providing the instructions to the output engine and operating the output engine in response to the instructions and thereby outputting an image of the digital document.

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SYSTEM FOR UNIVERSAL DATA OUTPUT

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims benefit of Provisional Application No. 60/262,764 filed January 19, 2001, the entire disclosure of which is hereby incorporated by reference herein for all purposes.

TECHNICAL FIELD OF THE INVENTION

[0002] Present invention relates to providing content to an output device and, in particular, to providing universal output in which an information apparatus can pervasively output content to an output device without the need to install a dedicated device dependent driver or applications for each output device.

BACKGROUND OF THE INVENTION

[0003] The present invention relates to universal data output and, in particular, to providing a new data output method and a new raster image process for information apparatuses and output devices.

[0004] As described herein, information apparatuses refer generally to computing devices, which include both stationary computers and mobile computing devices (pervasive devices). Examples of such information apparatuses include, without limitation, desktop computers, laptop computers, networked computers, palmtop computers (hand-held computers), personal digital assistants (PDAs), Internet enabled mobile phones, smart phones, pagers, digital capturing devices (e.g., digital cameras and video cameras), Internet appliances, e-books, information pads, and digital or web pads. Output devices may include, without limitation, fax machines, printers, copiers, image and/or video display devices (e.g., televisions, monitors and projectors), and audio output devices.

[0005] For simplicity and convenience, hereafter, the following descriptions may refer to an output device as a printer and an output process as printing. However, it should be understood that the term printer and printing used in the discussion of present invention refer to one embodiment used as a specific example to simplify the description of the invention. The references to printer and printing used here are intended to be applied or extended to the larger scope and definition of output devices and

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should not be construed as restricting the scope and practice of present invention.

[0006] Fueled by an ever-increasing bandwidth, processing power, wireless mobile devices, and wireless software applications, millions of users are or will be creating, downloading, and transmitting content and information using their pervasive or mobile computing devices. As a result, there is a need to allow users to conveniently output content and information from their pervasive computing devices to any output device. As an example, people need to directly and conveniently output from their pervasive information apparatus, without depending on synchronizing with a stationary computer (e.g., desktop personal computer) for printing.

[0007] To illustrate, a mobile worker at an airport receiving e-mail in his hand-held computer may want to walk up to a nearby printer or fax machine to have his e-mail printed. In addition, the mobile worker may also want to print a copy of his to-do list, appointment book, business card, and his flight schedule from his mobile device. As another example, a user visiting an e-commerce site using his mobile device may want to print out transaction confirmation. In still another example, a user who takes a picture with a digital camera may want to easily print it out to a nearby printer. In any of the above cases, the mobile user may want to simply walk up to a printer and conveniently print a file (word processing document, PDF, HTML etc) that is stored on the mobile device or downloaded from a network (e.g., Internet, corporate network).

[0008] Conventionally, an output device (e.g., a printer) is connected to an information apparatus via a wired connection such as a cable line. A wireless connection is also possible by using, for example, radio communication or infrared communication. Regardless of wired or wireless connection, a user must first install in the information apparatus an output device driver (e.g., printer driver in the case the output device is a printer) corresponding to a particular output device model and make. Using a device-dependent or specific driver, the information apparatus may process output content or digital document into a specific output device's input requirements (e.g., printer input requirements). The output device's input requirements correspond to the type of input that the output device (e.g., a printer) understands. For example, a printer's input requirement may include printer specific input format (e.g., one or more of an image,

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graphics or text format or language). Therefore, an output data (or print data in the case the output device is a printer) herein refers to data that is acceptable for input to an associated output device. Examples of input requirements may include, without limitation, audio format, video format, file format, data format, encoding, language (e.g., page description language, markup language etc), instructions, protocols or data that can be understood or used by a particular output device make and model.

[0009] Input requirements may be based on proprietary or published standards or a combination of the two. An output device's input requirements are, therefore, in general, device dependent. Different output device models may have their own input requirements specified, designed or adopted by the output device manufacturer (e.g., the printer manufacturer) according to a specification for optimal operation. Consequently, different output devices usually require use of specific output device drivers (e.g., printer drivers) for accurate output (e.g., printing). Sometimes, instead of using a device driver (e.g., printer driver), the device driving feature may be included as part of an application software.

[0010] Installation of a device driver (e.g., printer driver) or application may be accomplished by, for example, manual installation using a CD or floppy disk supplied by the printer manufacturer. Or alternatively, a user may be able to download a particular driver or application from a network. For a home or office user, this installation process may take anywhere from several minutes to several hours depending on the type of driver and user's sophistication level with computing devices and networks. Even with plug-and-play driver installation, the user is still required to execute a multi-step process for each printer or output device.

[0011] This installation and configuration process adds a degree of complexity and work to end-users who may otherwise spend their time doing other productive or enjoyable work. Moreover, many unsophisticated users may be discouraged from adding new peripherals (e.g., printers, scanners, etc.) to their home computers or networks to avoid the inconvenience of installation and configuration. It is therefore desirable that an information apparatus can output to more than one output device without the inconvenience of installing multiple dedicated device dependent drivers.

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[0012] In addition, conventional output or printing methods may pose significantly higher challenges and difficulties for mobile device users than for home and office users. The requirement for pre-installation of a device-dependent driver diminishes the benefit and concept of mobile (pervasive) computing and output. For example, a mobile user may want to print or output e-mail, PowerPoint® presentation documents, web pages, or other documents at an airport, gas station, convenience store, kiosk, hotel, conference room, office, home, etc. It is highly unlikely that the user would find at any of these locations a printer of the same make and model as is at the user's base station. As a consequence, under the conventional printing method, the user would have to install and configure a printer driver each time at each such remote location before printing. It is usually not a viable option given the hundreds, or even thousands of printer models in use, and the limited storage, memory space, and processing power of the information apparatus.

[0013] Moreover, the user may not want to be bothered with looking for a driver or downloading it and installing it just to print out or display one page of email at the airport. This is certainly an undesirable and discouraging process to promote pervasive or mobile computing. Therefore, a more convenient printing method is needed in support of the pervasive computing paradigm where a user can simply walk up to an output device (e.g., printer or display device) and easily output a digital document without having to install or pre-install a particular output device driver (e.g., printer driver).

[0014] Another challenge for mobile users is that many mobile information apparatuses have limited memory space, processing capacity and power. These limitations are more apparent for small and low-cost mobile devices including, for example, PDAs, mobile phones, screen phones, pagers, e-books, Internet Pads, Internet appliances etc. Limited memory space poses difficulties in installing and running large or complex printer or device drivers, not to mention multiple drivers for a variety of printers and output devices. Slow processing speed and limited power supply create difficulties driving an output device. For example, processing or converting a digital document into output data by a small mobile information apparatus may be so slow that it is not suitable for productive output. Intensive processing may also drain or consume power or battery resources. Therefore, a method is needed so that a small mobile device, with limited processing

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capabilities, can still reasonably output content to various output devices.

[0015] To output or render content (e.g. digital document) to an output device, a raster image processing (RIP) operation on the content is usually required. RIP operation can be computationally intensive and may include (1) a rasterization operation, (2) a color space conversion, and (3) a halftoning operation. RIP may also include other operations such as scaling, segmentation, color matching, color correction, GCR (Grey component replacement), Black generation, image enhancement compression/decompression, encoding/decoding, encryption/decryption GCR, image enhancement among others.

[0016] Rasterization operation in RIP involves converting objects and descriptions (e.g. graphics, text etc) included in the content into an image form suitable for output. Rasterization may include additional operations such as scaling and interpolation operations for matching a specific output size and resolution. Color space conversion in RIP includes converting an input color space description into a suitable color space required for rendering at an output device (e.g. RGB to CMYK conversion). Digital halftoning is an imaging technique for rendering continuous tone images using fewer luminance and chrominance levels. Halftoning operations such as error diffusion can be computationally intensive and are included when the output device's bit depth (e.g. bits per pixel) is smaller than the input raster image bit depth.

[0017] Conventionally, RIP operations are included either in an information apparatus, or as part of an output device or output system (e.g. in a printer controller). Fig. 1A illustrates a flow diagram of a conventional data output method 102 in which RIP 110 is implemented in the information apparatus. Output devices that do not include a printer controller to perform complex RIP operations, such as a lower-cost, lower speed inkjet printer, normally employ data output method 102. In data output method 102, an information apparatus obtains content (e.g. a digital document) in step 100 for rendering or output at an output device. The information apparatus may includes an application (e.g. device driver), which implements RIP operation 110. The information apparatus generates an output data in step 120 and transmits the output data to the output device in step 130 for rendering. The output data relating to the content is in an acceptable form (e.g. in an appropriate output size and resolution) to the output engine (e.g. display engine, printer

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engine etc.) included in the output device. The output data in a conventional output method 102 is usually device dependent.

[0018] One drawback for the data output method 102 of Fig. 1A is that the information apparatus performs most if not the entire raster image processing operations 110 required for output. The RIP operations may require intensive computation. Many information apparatus such as mobile information device might have insufficient computing power and/or memory to carry out at an acceptable speed the RIP operations 110 required in an output process.

[0019] Another drawback for the conventional data output method 102 of Fig. 1A is that the generated output data is device dependent and therefore is typically not very portable to other output devices. As a result, the information apparatus may need to install multiple applications or device drivers for multiple output devices, which may further complicate its feasibility for use in information apparatuses with limited memory, storage and processing power.

[0020] Fig. 1B illustrates a flow diagram of another conventional data output method 104 in which the RIP is implemented in an output device. An example of an output device that implements process 104 is a high-speed laser printer which includes a printer controller for performing RIP operations and an output engine (e.g. printer engine) for rendering content. Printer controller may be internally installed or externally connected to an output device (printer in this example). In data output method 104, an information apparatus obtains content for output in step 100 and generates in step 160 an output data or print data for transmitting to the output device in step 170. Print data includes information related to the content and is usually encoded in a page description language (PDL) such as PostScript and PCL etc. In step 180, the printer receives the output data or print data (in a PDL). In step 190, a printer controller included in the printer interprets the PDL, performs RIP operations, and generates a printer-engine print data that is in a form acceptable to the printer engine (e.g. a raster image in an appropriate output size, bit depth, color space and resolution). In step 150 the printer engine renders the content with the printer-engine print data.

[0021] It will be understood that a reference to print data or output data including a language, such as PDL, should be interpreted as meaning that the print data or output data is encoded using that language. Correspondingly, a reference to a data output process generating a language, such as PDL, should be

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interpreted as meaning that the data output process encodes data using that language.

[0022] There are many drawbacks in the conventional data output method 104 shown in Fig 1B. These drawbacks are especially apparent for mobile computing devices with limited processing power and memory. One such drawback is that the output data or print data, which include a page description language (PDL) such as PostScript or PCL, can be very complex. Generating complex PDL may increase memory and processing requirements for an information apparatus. Furthermore, interpreting, decoding and then raster image processing complex PDL can increase computation, decrease printing speed, and increase the cost of the output device or its printer controller.

[0023] Another drawback is that the output data that includes PDL can creates a very large file size that would increase memory and storage requirements for the information apparatus, the output device and/or the printer controller etc. Large file size may also increase the bandwidth required in the communication link between the information apparatus and the output device.

[0024] Finally, to rasterize text in an output device, a printer controller may need to include multiple fonts. When a special font or international characters is not included or missing in the printer controller, the rendering or output can potentially become inaccurate or inconsistent.

SUMMARY OF THE INVENTION

[0025] Accordingly, this invention provides a convenient universal data output method in which an information apparatus and an output device or system share the raster image processing operations. Moreover, the new data output method eliminates the need to install a plurality of device-dependent dedicated drivers or applications in the information apparatus in order to output to a plurality of output devices.

[0026] In accordance with present invention, an electronic system and method of pervasive and universal output allow an information apparatus to output content conveniently to virtually any output device. The information apparatus may be equipped with a central processing unit, input/output control unit, storage unit, memory unit, and wired or wireless communication unit or adapters. The information apparatus preferably includes a client application that may be implemented as a software application, a helper application, or a device driver (a printer driver in case of a

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printer). The client application may include management and control capabilities with hardware and software components including, for example, one or more communication chipsets residing in its host information apparatus.

[0027] The client application in the information apparatus may be capable of communicating with, managing and synchronizing data or software components with an output device equipped with an output controller of present invention.

[0028] Rendering content in an output device refers to printing an image of the content onto an substrate in the case of a printing device; displaying an image of the content in the case of a displaying device; playing an audio representation of the content in a voice or sound output device or system.

[0029] An output controller may be a circuit board, card or software components residing in an output device. Alternatively, the output controller may be connected externally to an output device as an external component or "box." The output controller may be implemented with one or more combinations of embedded processor, software, firmware, ASIC, DSP, FPGA, system on a chip, special chipsets, among others. In another embodiment, the functionality of the output controller may be provided by application software running on a PC, workstation or server connected externally to an output device.

[0030] In conventional data output method 102 as described with reference to Fig. 1A, an information apparatus transmits output data to an output device for rendering. Output data corresponds to content intended for output and is mostly raster image processed (RIPed) and therefore is device dependent because raster image processing is a typical device dependent operation. Output data may be encoded or compressed with one or more compression or encoding techniques. In present invention, an information apparatus generates an intermediate output data for transmitting to an output device. The intermediate output data includes a rasterized image corresponding to the content; however, device dependent image processing operations of a RIP (e.g. color matching and halftoning) have not been performed. As a result, an intermediate output data is more device independent and is more portable than the output data generated by output method with reference to Fig 1A.

[0031] In one implementation of this invention, the intermediate output data includes MRC (Mixed raster content) format, encoding and compression techniques, which further provides

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improved image quality and compression ratio compared to conventional image encoding and compression techniques.

[0032] In an example of raster image process and data output method of the present invention, a client application such as a printer driver is included in an information apparatus and performs part of raster image processing operation such as rasterization on the content. The information apparatus generates an intermediate output data that includes an output image corresponding to the content and sends the intermediate output data to an output device or an output system for rendering. An output controller application or component included in the output device or output system implements the remaining part of the raster image processing operations such as digital halftoning, color correction among others.

[0033] Like conventional raster image processing methods, this invention provides a more balanced distribution of the raster image processing computational load between the Information apparatus and the output device or the output system. Computational intensive image processing operations such as digital halftoning and color space conversions can be implemented in the output device or output system. Consequently, this new raster image processing method reduces the processing and memory requirements for the information apparatus when compared to conventional data output methods described with reference to Fig 1A in which the entire raster image process is implemented in the information apparatus. Additionally, in this invention, a client application or device driver included in the information apparatus, which performs part of the raster image processing operation, can have a smaller size compared to a conventional output application included in the information apparatus, which performs raster image processing operation.

[0034] In another implementation, the present invention provides an information apparatus with output capability that is more universally accepted by a plurality of output devices. The information apparatus, which includes a client application, generates an intermediate output data that may include device independent attributes. An output controller includes components to interpret and process the intermediate output data. The information apparatus can output content to different output devices or output systems that include the output controller even when those output devices are of different brand, make, model and with different output engine and input data requirements. Unlike conventional output methods, a user does not need to preinstall in

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the information apparatus multiple dedicated device dependent drivers or applications for each output device.

[0035] The combination of a smaller-sized client application, a reduced computational requirement in the information apparatus, and a more universal data output method acceptable for rendering at a plurality of output devices enable mobile devices with less memory space and processing capabilities to implement data output functions which otherwise would be difficulty to implement with conventional output methods.

[0036] In addition, this invention can reduce the cost of an output device or an output system compared to conventional output methods 104 that include a page description language (PDL) printer controller. In the present invention, an information apparatus generates and sends an intermediate output data to an output device or system. The intermediate output data in one preferred embodiment includes a rasterized output image corresponding to the content intended for output. An output controller included in an output device or an output system decodes and processes the intermediate output data for output, without performing complex interpretation and rasterization compared to conventional methods described in process 104. In comparison, the conventional data output process 104 generates complex PDL and sends this PDL from an information apparatus to an output device that includes a printer controller (e.g. a PostScript controller or a PCL5 controller among others). Interpretation and raster image processing of a PDL have much higher computational requirements compared to decoding and processing the intermediate output data of this invention that include rasterized output image or images. Implementing a conventional printer controller with, for example, PDL increases component cost (e.g. memories, storages, ICs, software and processors etc.) when compared to using the output controller included in the data output method of this present invention.

[0037] Furthermore, an output data that includes PDL can create a large file size compared to an intermediate output data that includes rasterized output image. The data output method for this invention comparatively transmits a smaller output data from an information apparatus to an output device. Smaller output data size can speed up transmission, lower communication bandwidth, and reduce memory requirements. Finally, this invention can provide a convenient method to render content at an output device with or without connection to a static network. In conventional network printing, both information apparatus and output device must be

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connected to a static network. In this invention, through local communication and synchronization between an information apparatus and an output device, installation of hardware and software to maintain static network connectivity may not be necessary to enable the rendering of content to an output device.

[0038] According to the several aspects of the present invention there is provided the subject matter defined in the appended independent claims.

[0039] Additional objects and advantages of the present invention will be apparent from the detailed description of the preferred embodiment thereof, which proceeds with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0040] Fig. 1A is a flow diagram of a conventional data output method and its corresponding raster image process in accordance with prior art.

[0041] Fig. 1B is a flow diagram of a second conventional data output method and its corresponding raster image process for an output device that includes a conventional printer controller in accordance with prior art.

[0042] Figs. 2A and 2B are block diagrams illustrating components of an operating environment that can implement the process and apparatus of the present invention.

[0043] Fig. 3A is a schematic block diagram illustrating hardware/software components of an information apparatus implementation in accordance with present invention. The information apparatus includes an operating system.

[0044] Fig. 3A is a second schematic block diagram illustrating hardware/software components of an information apparatus implementation in accordance with present invention.

[0045] Fig. 4A is a block diagram of a conventional printing system or printer with a conventional printer controller.

[0046] Fig. 4B is a block diagram of a second conventional output system or output device.

[0047] Fig. 5A is a schematic block diagram of a printing system or printer with a conventional printer controller and an output controller in accordance with present invention.

[0048] Fig. 5B is a schematic block diagram of a second output system or output device that includes an output controller in accordance with present invention.

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[0049] Fig. 6A is a schematic block diagram illustrating hardware/software components of an output controller in accordance with present invention. The output controller includes an operating system.

[0050] Fig. 6B is a second schematic block diagram illustrating hardware/software components of an output controller in accordance with present invention. The output controller does not include an operating system.

[0051] Fig. 6C is a third schematic block diagram illustrating hardware/software components of an output controller in accordance with present invention. The output controller combines the functionality of a printer controller and an output controller of present invention.

[0052] Figs. 7A-7F illustrate various configurations and implementations of output controller with respect to an output device such as a printer.

[0053] Fig. 8A is a block diagram illustrating an exemplary implementation of hardware/software components of wireless communication unit.

[0054] Fig. 8B is block diagram illustrating a second exemplary implementation of hardware/software components of wireless communication unit.

[0055] Fig. 9 is a flow diagram of a universal data output method and its corresponding raster imaging process of the present invention.

[0056] Fig. 10 is a block diagram of a universal data output method of the present invention with respect to the components, system and apparatus described with reference to Fig 2.

[0057] Fig. 11 is a flow diagram illustrating one way of implementing a discovery process optionally included in the output process of Fig. 10.

[0058] Fig. 12A and 12B are flow diagrams of exemplary client application process included in the output process of Fig. 10.

[0059] Fig. 13A and 13B are flow diagrams of exemplary output device or output system process included in the output process of Fig. 10.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0060] Sets forth below are definitions of terms that are used in describing implementations of the present invention. These definitions are provided to facilitate understanding and illustration of implementations of the present invention and should

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in no way be construed as limiting the scope of the invention to a particular example, class, or category.

Output device profile (or object)

[0061] An output device profile (or object) includes software and data entity, which encapsulates within itself both data and attributes describing an output device and instructions for operating that data and attributes. An output device profile may reside in different hardware environments or platforms or applications, and may be transported in the form of a file, a message, a software object or component among other forms and techniques. For simplicity of discussion, a profile or object may also include, for example, the concept of software components that may have varying granularity and can consist of one class, a composite of classes, or an entire application.

[0062] The term profile or object used herein is not limited to software or data as its media. Any entity containing information, descriptions, attributes, data, instructions etc. in any computer-readable form or medium such as hardware, software, files based on or including voice, text, graphics, image, or video information, electronic signals in analog or digital form, etc., are all valid forms of profile and object definition.

[0063] A profile or object may also contain in one of its fields or attributes a reference or pointer to another profile or object, or a reference or pointer to data and or content. A reference to a profile or object may include one or more, or a combination of pointers, identifiers, names, paths, addresses or any descriptions relating to a location where an object, profile, data, or content can be found.

[0064] An output device profile may contain one or more attributes that may identify and describe, for example, the capabilities and functionalities of a particular output device such as a printer. An output device profile may be stored in the memory component of an output device, an information apparatus or in a network node. A network node includes any device, server or storage location that is connected to the network. As described below in greater detail, an information apparatus requesting output service may communicate with an output device. During such local service negotiation, at least a partial output device profile may be uploaded to the information apparatus from the output device. By obtaining the output device profile (or printer profile in the case of a printer), the information apparatus may learn about the

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capability, compatibility, identification, and service provided by the output device.

[0065] As an example, an output device profile may contain one or more of the following fields and or attribute descriptions. Each of following fields may be optional, and furthermore, each of the following fields or attributes may or may not exist in a particular implementation (e.g., may be empty or NULL):

[0066] Identification of an output device (e.g., brand, model, registration, IP address etc.)

- Services and feature sets provided by an output device (e.g., color or grayscale output, laser or inkjet, duplex, output quality, price per page, quality of service, etc.)
- Type of input languages, formats, output data and/or input requirements (e.g., PostScript, PCL, XML, RTL, etc.) supported by an output device.
- Device specific or dependent parameters and information (e.g., communication protocols, color space, color management methods and rendering intents, resolution, halftoning methods, dpi (dots-per-inch), bit depth, page size, printing speed, number of independent colors channels or ink etc.)
- Data and tables needed for image processing such as color table, halftone table, scale factor, encoding/decoding parameters and methods, compression and decompression parameters and method etc.
- Another profile which contain parameters and information about the output device and its service (e.g. color profiles, halftoning profiles, communication profiles, rasterization profiles, quality of service etc.).
- Payment information on a plurality of services provided by an output device.
- Information or security requirements and type of authentication an output device supports.
- Date and version of the output device profile, history of its modification and updates.
- Software components containing algorithms or instructions or data, which may be uploaded to run in an information apparatus. For example, a graphical user interface (GUI) software component may be uploaded to an information apparatus. The software component may be incorporated into or launched in the information apparatus by a client application of present invention to capture a user's preferences (e.g., print quality, page layout, number of copies, number of cards per page, etc.). In another example,

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software components may include methods, instructions or executables for compression/decompression, encoding/decoding, color matching or correction, segmentation, scaling, halftoning, encryption/decryption among others.

• Pointer or reference to one or more output device parameters, including one or more of the above described output device profile or object fields and or attribute descriptions. For example, a more up-to-date or original version of output device parameters may sometimes be stored in a network node (any device, server or storage location that is connected to the network), or within the information apparatus where it can be obtained by the client application. An output device profile may include pointer or pointers to these output device parameters.

Content (or data content, digital content, output content)

[0067] Content (or data content, digital content, output content) is the data intended for output, which may include texts, graphics, images, forms, videos, audio among other content types. Content may include the data itself or a reference to that data. Content may be in any format, language, encoding or combination, and it can be in a format, language or encoding that is partially or totally proprietary. A digital document is an example of content that may include attributes and fields that describe the digital document itself and or reference or references to the digital document or documents. Examples of a digital document may be any one or combination of file types: HTML, VHTML, PostScript, PCL, XML, PDF, MS Word, PowerPoint, JPEG, MPEG, GIF, PNG, WML, VWML, CHTML, HDML, ASCII, 2-byte international coded characters, etc. Content may be used interchangeably with the term data content, output content or digital content in the descriptions of present invention.

Intermediate output data

[0068] Output data (or print data in case of a printer) is the electronic data sent from an information apparatus to an output device. Output data is related to the content intended for output and may be encoded in a variety of formats and languages (e.g. postscript, PCL, XML), which may include compressed or encrypted data. Some output device manufacturers may also include in the output data (or print data) a combination of proprietary or non-proprietary languages, formats, encoding, compression, encryption etc.

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[0069] Intermediate output data is the output data of the present invention, and it includes the broader definition of an output file or data generated by an information apparatus, or a client application or device driver included in the information apparatus. An intermediate output data may contain text, vector graphics, images, video, audio, symbols, forms or combination and can be encoded with one or more of a page description language, a markup language, a graphics format, an imaging format, a metafile among others. An intermediate output data may also contain instructions (e.g. output preferences) and descriptions (e.g. data layout) among others. Part or all of an intermediate output data may be compressed, encrypted or tagged.

[0070] In a preferred embodiment of this invention, intermediate output data contains rasterized image data. For example, vector graphics and text information or objects that are not in image form included in content can be rasterized or conformed into image data in an information apparatus and included in an intermediate output data. Device dependent image processing operations of a RIP such as digital halftoning and color space conversions can be implemented at an output device or an output system.

[0071] The intermediate output data can be device dependent or device independent. In one implementation, the rasterized output image is device dependent if the rasterization parameters used, such as resolution, scale factor, bit depth, output size and or color space are device dependent. In another implementation of this invention, the rasterized image may be device independent if the rasterization parameters used are device independent. Rasterization parameter can become device independent when those parameters include a set of predetermined or predefined rasterization parameters based on a standard or a specification. With predefined or device independent rasterization parameters, a client application of present invention can rasterize at least a portion of the content and generate a device independent image or images included in the intermediate output data. By doing so, the intermediate output data may become device independent and therefore, become universally acceptable with output devices that have been pre-configured to accept the intermediate output data.

[0072] One advantage of rasterizing or converting text and graphics information into image data at the information apparatus is that the output device or printer controller no longer needs to perform complex rasterization operation nor do they need to include

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multiple fonts. Therefore, employing the intermediate output data and the data output method described herein could potentially reduce the cost and complexity of an output controller, printer controller and or output device.

[0073] One form of image data encoding is known as mixed raster content, or MRC. Typically, an image stored in MRC includes more than one image or bitmap layers. In MRC, an image can be segmented in different layers based on segmentation criteria such as background and foreground, luminance and chrominance among others. For example, an MRC may include three layers with a background layer, a foreground layer and a toggle or selector layer. The three layers are coextensive and may include different resolution, encoding and compression. The foreground and background layers may each contain additional layers, depending on the manner in which the respective part of the image is segmented based on the segmentation criteria, component or channels of a color model, image encoding representation (HLS, RGB, CMYK, YCC, LAB etc) among others. The toggle layer may designate, for each point, whether the foreground or background layer is effective. Each layer in a MRC can have different bit depths, resolution, color space, which allow, for example, the foreground layer to be compressed differently from the background layer. The MRC form of image data has previously been used to minimize storage requirements. Further, an MRC format has been proposed for use in color image fax transmission.

[0074] In one embodiment of present invention, the intermediate output data includes one or more rasterized output images that employ MRC format, encoding and or related compression method. In this implementation, different layers in the output image can have different resolutions and may include different compression techniques. Different information such as chrominance and luminance and or foreground and background information in the original content (e.g. digital document) can be segmented and compressed with different compression or encoding techniques. Segmented elements or object information in the original content can also be stored in different image layers and with different resolution. Therefore, with MRC, there is opportunity to reduce output data file size, retain greater image information, increase compression ratio, and improve image quality when compared to other conventional image encoding and compression techniques. Implementations of rasterization, raster image processing and

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intermediate output data that include MRC encoding in the present invention are described in more detail below.

Rasterization

[0075] Rasterization is an operation by which graphics and text in a digital document are converted to image data. For image data included in the digital document, rasterization may include scaling and interpolation. The rasterization operation is characterized by rasterization parameters including, among others bit depth and resolution. A given rasterization operation may be characterized by several more rasterization parameters, including output size, color space, color channels etc. Values of one or more of the rasterization parameters employed in a rasterization operation may be specified by default; values of one or more of the rasterization parameters may be supplied to the information apparatus as components of a rasterization vector. In a given application, the rasterization vector may specify a value of only one rasterization parameter, default values being employed for other rasterization parameters used in the rasterization operation. In another application the rasterization vector may specify values of more than one, but less than all, rasterization parameters, default values being employed for at least one other rasterization parameter used in the rasterization operation. And in yet another application the rasterization vector may specify values of all the rasterization parameters used in the rasterization operation.

[0076] Fig. 2A and 2B are block diagrams illustrating components of an operating environment that can implement the process and apparatus of present invention. Fig 2A shows an electronic system which includes an information apparatus 200 and an output device 220. The output device 220 includes an output controller 230. Fig. 2B illustrates a second implementation of an electronic system that includes an information apparatus 200 and an output system 250. The output system 250 includes an output device 220 and an output controller 230 which may be externally connected to, or otherwise associated with, the output device 220 in the output system 250.

[0077] Information apparatus 200 is a computing device with processing capability. In one embodiment, information apparatus 200 may be a mobile computing device such as palmtop computer, handheld device, laptop computer, personal digital assistant (PDA), smart phone, screen phone, e-book, Internet pad, communication pad, Internet appliance, pager, digital camera, etc. It is possible

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that information apparatus 200 may also include a static computing device such as a desktop computer, workstation, server, etc.

[0078] Fig. 3A and 3B are block diagrams illustrating examples of hardware/software components included in an information apparatus 200 of present invention.

[0079] Information apparatus 200 may contain components such as a processing unit 380, a memory unit 370, an optional storage unit 360 and an input/output control unit (e.g. communication manager 330). Information apparatus 200 may include an interface (not shown) for interaction with users. The interface may be implemented with software or hardware or a combination. Examples of such interfaces include, without limitation, one or more of a mouse, a keyboard, a touch-sensitive or non-touch-sensitive screen, push buttons, soft keys, a stylus, a speaker, a microphone, etc.

[0080] Information apparatus 200 typically contains one or more network communication unit 350 that interfaces with other electronic devices such as network node (not shown), output device 220, and output system 230. The network communication unit may be implemented with hardware (e.g., silicon chipsets, antenna), software (e.g., protocol stacks, applications) or a combination.

[0081] In one embodiment of the present invention, communication interface 240 between information apparatus 200 and output device 220 or output system 250 is a wireless communication interface such as a short-range radio interface including those implemented according to the Bluetooth or IEEE 802.11 standard. The communication interface may also be realized by other standards and/or means of wireless communication that may include radio, infrared, cellular, ultrasonic, hydrophonic among others for accessing one or more network node and/or devices. Wired line connections such as serial or parallel interface, USB interface and fire wire (IEEE 1394) interface, among others, may also be included. Connection to a local network such as an Ethernet or a token Ring network, among others, may also be implemented in the present invention for local communication between information apparatus 200 and output device 220. Examples of hardware/software components of communication units 350 that may be used to implement wireless interface between the information apparatus 200 and the output device 220 are described in more detail with reference to Figs. 8A and 8B below.

[0082] For simplicity, Fig. 3 illustrates one implementation where an information apparatus 200 includes one communication unit 350. However, it should be noted that an information apparatus 200

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may contain more than one communication unit 350 in order to support different interfaces, protocols, and/or communication standards with different devices and/or network nodes. For example, information apparatus 200 may communicate with one output device 220 through a Bluetooth standard interface or through an IEEE 802.11 standard interface while communicating with another output device 220 through a parallel cable interface. The information apparatus 200 may also be coupled to a wired or wireless network (e.g. the Internet or corporate network) to send, receive and/or download information.

[0083] Information apparatus 200 may be a dedicated device (e.g., email terminal, web terminal, digital camera, e-book, web pads, Internet appliances etc.) with functionalities that are pre-configured by manufacturers. Alternatively, information apparatus 200 may allow users to install additional hardware components and or application software 205 to expand its functionality.

[0084] Information apparatus 200 may contain a plurality of applications 205 to implement its feature sets and functionalities. As an example, a document browsing or editing application may be implemented to help user view and perhaps edit, partially or entirely, digital documents written in certain format or language (e.g., page description language, markup language, etc.). Digital documents may be stored locally in the information apparatus 200 or in a network node (e.g., in content server). An example of a document browsing application is an Internet browser such as Internet Explorer, Netscape Navigator, or a WAP browser. Such browsers may retrieve and display content (e.g. digital content) written in mark-up languages such as HTML, WML, XML, CHTML, HDML, among others. Other examples of software applications in the information apparatus 200 may include a document editing software such as Microsoft Word™ which also allows users to view and or edit digital documents that have various file extensions (e.g., doc, rtf, html, XML etc.) whether stored locally in the information apparatus 200 or in a network node. Still, other example of software applications 205 may include image acquisition and editing software.

[0085] As illustrated previously with reference to Fig. 1, there are many difficulties in providing output capability to an information apparatus 200 that has limited memory and processing capability. To address theses difficulties, information apparatus 200 includes a client application 210 that helps provide the universal data output capability of the present invention. Client

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application 210 may include software and data that can be executed by the processing unit 380 of information apparatus 200. Client application 210 may be implemented as a stand-alone software application or as a part of or feature of another software application, or in the form of a device driver, which may be invoked, shared and used by other application software 205 in the information apparatus 200. Client application 210 may also include components to invoke other applications 205 (e.g., a document browsing application, editing application, data and/or image acquisition application, a communication manager, a output manager etc.) to provide certain feature sets, as described below. Fig 3 illustrates a configuration where the client application 210 is a separate application from the other application 205 such as the case when the client application is a device driver; however, it should be noted that the client application 210 can be combined or being part of the other application not shown in Fig 3. Client application 210 may be variously implemented in an information apparatus 200 and may run on different operating systems or platforms. The client application 210 may also run in an environment with no operating system. For example, Fig. 3A illustrates an implementation where the information apparatus 200A includes an operating system 340A; while Fig. 3B illustrates an implementation where the information apparatus 200B does not include an operating system.

[0086] Client application 210 includes a rasterization component 310 to conform content into one or more raster output images according to one or more rasterization parameters; an intermediate output data generator component 320 that generates and/or encodes intermediate output data that includes the one or more output images; and a communications manager 330 that manages the communication and interaction with an output device 220 or system 250 or output controller 230. Communications manager can be implemented as part of the client application 210 (shown in Fig. 3) or as a separate application (not shown). Components in a client application can be implemented in software, hardware or combination. As an example, client application 210 may include or utilize one or more of the following:

- Components or operations to obtain content (e.g. digital document) for output. The client application 210 may obtain a digital document from other applications 205 (e.g. document browsing application, content creation and editing application,

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etc.), or the client application 210 may provide its own capability for user to browse, edit and or select a digital document.

• Components or operations to rasterize content that includes text, graphics and images among others objects or elements into one or more raster images according to a set of rasterization parameters such as scale factor, output size, bit depth, color space and resolution. The rasterization parameters may be obtained in various ways, for example, from an output device profile uploaded from an output device 220, or stored locally in information apparatus 200, or manually inputted by a user. Alternatively, rasterization parameters may be based on a predefined standard or specification stored in the information apparatus 200 as a set of defaults, or hard-coded in the client application 210, or calculated by the client application 210 after communicating with an output device 220, output controller 230, and/or a user.

• Components or operations to generate intermediate output data that includes at least one rasterized output image corresponding to the content (e.g. digital document). This process may further include one or combination of compression, encoding, encryption and color correction among others. The intermediate output data may include, for example, images, instructions, documents and or format descriptions, color profiles among others.

• Components or operations to transmit the intermediate output data to an output device 220 or system 250 through wired or wireless communication link 240.

[0087] The client application 210 may also optionally include or utilize one or more of the following components or operations:

• Components or operations to communicate with one or more output devices 220 to upload an output device profile.

• Components or operations to communicate directly or indirectly (such as through an operating system or component or object model, messages, file transfer etc.) with other applications 205 residing in the same information apparatus 200 to obtain objects, data, and or content needed, or related to the pervasive output process of present invention (e.g. obtain a digital document for printing).

• Components or operations to manage and utilize directly or indirectly functionalities provided by hardware components (e.g. communication unit 350) residing in its host information apparatus 200.

• Components or operations to provide a graphical user

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interface (GUI) in host information apparatus to interact with user.

• Components or operations to obtain user preferences. For example, a user may directly input his or her preferences through a GUI. A set of default values may also be employed. Default values may be pre-set or may be obtained by information apparatus 200 as result of communicating and negotiating with an output device 220 or output controller 230.

[0088] The above functionalities and process of client application 210 of present invention are described in further detail in the client application process with reference to FIG 12.

[0089] Output device 220 is an electronic system capable of outputting digital content regardless of whether the output medium is substrate (e.g., paper), display, projection, or sound. A typical example of output device 220 is a printer, which outputs digital documents containing text, graphics, image or any combination onto a substrate. Output device 220 may also be a display device capable of displaying still images or video, such as, without limitation, televisions, monitors, and projectors. Output device 220 can also be a device capable of outputting sound. Any device capable of playing or reading digital content in audio (e.g., music) or data (e.g., text or document) formats is also a possible output device 220.

[0090] A printer is frequently referred to herein as an example of an output device to simplify discussion or as the primary output device 220 in a particular implementation. However, it should be recognized that present invention applies also to other output devices 220 such as fax machines, digital copiers, display screens, monitors, televisions, projectors, voice output devices, among others.

[0091] Rendering content with an output device 220 refers to outputting the content on a specific output medium (e.g., papers, display screens etc). For example, rendering content with a printer generates an image on a substrate; rendering content with a display device generates an image on a screen; and rendering content with an audio output device generates sound.

[0092] A conventional printing system in general includes a raster image processor and a printer engine. A printer engine includes memory buffer, marking engine among other components. The raster image processor converts content into an image form suitable for printing; the memory buffer holds the rasterized image ready

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for printing; and the marking engine transfers colorant to substrate (e.g., paper).

[0093] The raster image processor may be located within an output device (e.g. included in a printer controller 410) or externally implemented (in an information apparatus 200, external controller, servers etc). Raster image processor can be implemented as hardware, software, or a combination (not shown). As an example, raster image processor may be implemented in a software application or device driver in the information apparatus 200. Examples of raster image processing operations include image and graphics interpretation, rasterization, scaling, segmentation, color space transformation, image enhancement, color correction, halftoning, compression etc.

[0094] Fig. 4A illustrates a block diagram of one conventional printing system or printer 400A that includes a printer controller 410 and a printer engine 420A. The printer controller 410 includes an interpreter 402 and a raster image processor 406, and the printer engine 420 includes memory buffer 424A and a marking engine 426A.

[0095] Marking engine may use any of a variety of different technologies to transfer a rasterized image to paper or other media or, in other words, to transfer colorant to a substrate. The different marking or printing technologies that may be used include both impact and non-impact printing. Examples of impact printing may include dot matrix, teletype, daisywheel, etc. Non-impact printing technologies may include inkjet, laser, electrostatic, thermal, dye sublimation, etc.

[0096] The marking engine 426 and memory buffer 424 of a printer form its printer engine 420, which may also include additional circuitry and components, such as firmware, software or chips or chipsets for decoding and signal conversion, etc. Input to a printer engine 420 is usually a final rasterized printer-engine print data generated by a raster image processor 406. Such input is usually device dependent and printer or printer engine specific. The printer engine 420 may take this device dependent input and generate or render output pages (e.g. with ink on a substrate).

[0097] When a raster image processor is located inside an output device 220, it is usually included in a printer controller 410 (as shown in Fig. 4A). A printer controller 410 may interpret, rasterize, and convert input print data in the form of a page description language (e.g., PostScript, PCL), markup language

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(e.g., XML, HTML) or other special document format or language (e.g. PDF, EMF) into printer-engine print data which is a final format, language or instruction that printer engine 420A can understand.

[0098] Print data sent to a printer with printer controller 410 is usually in a form (e.g. postscript) that requires further interpretation, processing or conversion. A printer controller 410 receives the print data, interprets, process, and converts the print data into a form that can be understood by the printer engine 420A. Regardless of the type of print data, conventionally, a user may need a device-specific driver in his or her information apparatus 200 in order to output the proper language, format, or file that can be accepted by a specific printer or output device 220.

[0099] Fig. 4B illustrates another conventional output device 400B. Output device 400B may be a printing device, a display device, a projection device, or a sound device. In the case that the output device is a printing device or a printer, the printer with reference to Fig. 4B does not include a printer controller 410. As an example, printer 400B may be a low-cost printer such as a desktop inkjet printer. RIP operations in this example may be implemented in a software application or in a device driver included in an information apparatus 200. The information apparatus 200 generates device dependent output data (or print data in case of a printer) by rasterizing and converting a digital document into output data (e.g. into a compressed CMKY data with one or more bits per pixel) that can be understood by an output engine (or printer engine in case of a printer) 420B.

[0100] Regardless of type or sophistication level, different output device 220 conventionally needs different printer drivers or output management applications in an information apparatus 200 to provide output capability. Some mobile devices with limited memory and processing power may have difficulty storing multiple device drivers or perform computational intensive RIP operations. It may also be infeasible to install a new device dependent or specific printer driver each time there is a need to print to a new printer. To overcome these difficulties, present invention provides several improvements to output device 220 or output system 250 as described in detail next.

[0101] In present invention, output device 220 may include an output controller 230 to help managing communication and negotiation processes with an information apparatus 200 and to

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process output data. Output controller 230 may include dedicated hardware or software or combination of both for at least one output device 220. Output controller 230 may be internally installed, or externally connected to one or more output devices 220. The output controller 230 is sometimes referred to as a print server or output server.

[0102] Fig 5A and 5B illustrate two exemplary internal implementations of the output controller 230 of present invention. Fig 5A illustrates the implementation of an output controller 230 inside a conventional printer with reference to Fig. 4A, which includes a conventional printer controller 410(5A). The output controller 230(5A) includes an interpreter 510A component for decoding the intermediate output data of present invention; and a converter component 530A for converting one or more decoded output images into a printer-controller print data that is suitable for input to the printer controller 410(5A). An optional image processing component 520A may be included in the output controller 230(5A).

[0103] Fig 5B illustrates the implementation of an output controller 230 included internally in a conventional output device 220 with reference to Fig. 4B, which does not include a printer controller. The output controller 230(5B) includes an interpreter 510B component for decoding the intermediate output data of present invention; an image processor 520B component for performing one or more image processing operations such as color space conversion, color matching and digital halftoning; and an optional encoder 530B component to conform the processed output images into an output-engine output data that is suitable for input to the output engine 420B if the result of the image processing is not already in required form suitable for the output engine 420B.

[0104] In one implementation, output device 220 may include a communication unit 550 or adapter to interface with information apparatus 200. Output device 220 may sometimes include more than one communication unit 550 in order to support different interfaces, protocols, or communication standards with different devices. For example, output device 220 may communicate with a first information apparatus 200 through a Bluetooth interface while communicating with a second information apparatus 200 through a parallel interface. Examples of hardware components of a wireless communication unit are described in greater detail below with reference to Figs. 8A and 8B.

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[0105] In one embodiment, output controller 230 does not include a communication unit, but rather utilizes or manages a communication unit residing in the associated output device 220 such as the illustration in Fig 5. In another embodiment, output controller 230 may include or provide a communication unit to output device 220 as shown in Fig. 6. For example, an output controller 230 with a wireless communication unit may be installed internally or connected externally to a legacy printer to provide it with wireless communication capability that was previously lacking.

[0106] Fig. 6 includes three functional block diagrams illustrating the hardware/software components of output controller 230 in three different implementations. Each components of an output controller 230 may include software, hardware, or combination. For example, an output controller 230 may include components using one or more or combinations of an application-specific integrated circuit (ASIC), a digital signal processor (DSP), a field programmable gate array (FPGA), firmware, system on a chip, and various communication chip sets. Output controller 230 may also contain embedded processors 670 A with software components or embedded application software to implement its feature sets and functionalities.

[0107] Output controller 230 may contain an embedded operating system 680. With an operating system, some or all functionalities and feature sets of the output controller 230 may be provided by application software managed by the operating system. Additional application software may be installed or upgraded to newer versions in order to, for example, provide additional functionalities or bug fixes. Fig. 6A and Fig 6C illustrates examples of implementation with an operating system 680 while Fig. 6B illustrates an example without the operating system 680 or the optional embedded processor 670.

[0108] Output controller 230 typically includes a memory unit 640, or may share a memory unit with, for example, printer controller 410. The memory unit and storage unit, such as ROM, RAM, flash memory and disk drive among others, may provide persistent or volatile storage. The memory unit or storage unit may store output device profiles, objects, codes, instructions or data (collectively referred to as software components) that implement the functionalities of the output controller 230. Part of the software components (e.g., output device profile) may be

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uploaded to information apparatus 200 during or before a data output operation.

[0109] An output controller 230 may include a processor component 670A and 670C, a memory component 650, an optional storage component 640, and an optional operating system component 680. Fig. 6 shows one architecture or implementation where the memory 650, storage 640, processor 670, and operating system 680 components, if exist, can be share or accessed by other operational components in the output controller 230 such as the interpreter 610 and image processor 650. Fig 6 shows two communication units 660A and 660B included in the output controller 230; however, the output controller 230 of present invention may include any number of communication units 660. It is also possible that the output controller does not contain any communication unit but rather utilizes the communication unit of an output device.

[0110] The output controller 230 may be connected externally to an output device 220 or integrated internally into the output device 220. Fig 5A and 5B illustrate implementations of output controller 230 inside an output device 220. The output controller 230, however, may also be implemented as an external box or station that is wired or wirelessly connected to an output device 220. An output controller 230 implemented as an external box or station to an output device 220 may contain its own user interface. One example of such an implementation is a print server connected to an output device 220 in an output system 250. Another configuration and implementation is to integrate or combine the functionalities of an output controller 230 with an existing printer controller 410 (referred to as "combined controller") if the output device 220 is a printer as shown with reference to Fig. 7C or 7F. A combined controller can also be internally integrated or externally connected to output device 220, and include functionalities of both printer controller 410 (e.g., input interpretation and or raster image processing) and output controller 230 of present invention. One advantage of this configuration is that the functionalities or components of output controller 230 and printer controller 410 may share the same resources, such as processing unit, memory unit, etc. Fig 6C illustrates an example of a combined controller implementation or output controller 230 where the printer controller 410C, interpreter 610C and converter 630C shares the use of the processor 670C, memory 650C and storage 640C, managed by an operating system 680C. Various exemplary implementations and configurations of an output controller 230 with respect to an

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output device 220 or output system 250 are illustrated in further detail with reference to FIG 7.

[0111] Other possible implementations of output controller 230 may include, for example, a conventional personal computer (PC), a workstation, and an output server or print server. In these cases, the functionalities of output controller 230 may be implemented using application software installed in a computer (e.g., PC, server, or workstation), with the computer connected with a wired or wireless connection to an output device 220. Using a PC, server, workstation, or other computer to implement the feature sets of output controller 230 with application software is just another possible embodiment of the output controller 230 and in no way departs from the spirit, scope and process of the present invention.

[0112] The difference between output controller 230 and printer controller 410 should be noted. Printer controller 410 and output controller 230 are both controllers and are both dedicated hardware and or software for at least one output device 220. Output controller 230 refers to a controller with feature sets, capabilities, and functionalities of the present invention. A printer controller 410 may contain functions such as interpreting an input page description language, raster image processing, and queuing, among others. An output controller 230 may include part or all of the features of a printer controller 410 in addition to the feature sets, functionalities, capabilities, and processes of present invention.

[0113] Functionalities and components of output controller 230 for the purpose of providing universal data output may include or utilize:

- Components and operations to receive output data from a plurality of information apparatus 200; the output data may include an intermediate output data containing at least one rasterized image related to the data content intended for output.
- Components and operations to interpret and/or decode the intermediate output data.
- Components and operations to process the intermediate output data. Such components and operations may include image processing functions such as scaling, segmentation, color correction, color management, GCR, image enhancement, decompression, decryption, and or halftoning among others.

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• Components and operations to generate an output-engine output data, the output-engine output data being in an output data format acceptable for input to an output engine.

• Components and operations to send the output-engine output data to the output engine.

[0114] When associated with an output device 220 that includes a printer controller 410, the output controller of present invention may further include or utilize:

• Components and operations to convert the intermediate output data into a printer-controller print data (e.g. a PDL such as PostScript and PCL), the printer-controller print data being in a format acceptable to a printer controller.

• Components and operations to send printer-controller print data to one or more printer controllers.

[0115] In addition to the above components and functionalities, output controller 230 may further include one or more of the following:

• Components and operations to communicate with one or more information apparatus 200 through a wired or wireless interface.

• Components and operations to communicate and or manage a communication unit included in the output controller 230 or output device 220.

• Components and operations to store at least part of an output device profile (a printer profile in case of a printer) in a memory component.

• Components and operations to respond to service request from an information apparatus 200 by transmitting at least part of an output device profile to the information apparatus requesting service. The output controller 230 may transmit the output device profiles or object in one or multiple sessions.

• Components and operations to broadcast or advertise the services provided by a host output device 220 to one or more information apparatus 200 that may request such services.

• Components and operations to implement payment processing and management functions by, for example, calculating and processing payments according to the services requested or rendered to a client (information apparatus 200).

• Components and operations to provide a user interface such as display screen, touch button, soft key, etc.

• Components and operations to implement job management functions such as queuing and spooling among others.

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• Components and operations to implement security or authentication procedures. For example, the output controller 230 may store in its memory component (or shared memory component) an access control list, which specifies what device or user may obtain service from its host (or connected) output device 220. Therefore, an authorized information apparatus 200 may gain access after confirming with the control list.

[0116] When output controller 230 is implemented as firmware, or an embedded application, the configuration and management of the functionalities of output controller 230 may be optionally accomplished by, for example, using controller management software in a host computer. A host computer may be a desktop personal computer (PC), workstation, or server. The host computer may be connected locally or through a network to the output device 220 or the controller 230. Communication between the host computer and the output controller 230 can be accomplished through wired or wireless communication. The management application software in the host computer can manage the settings, configurations, and feature sets of the output controller 230. Furthermore, host computer's configuration application may download and or install application software, software components and or data to the output controller 230 for the purpose of upgrading, updating, and or modifying the features and capabilities of the output controller 230.

[0117] Output device 220 in one implementation includes or is connected to output controller 230 described above. Therefore, functionalities and feature sets provided by output controller 230 are automatically included in the functionalities of output device 220. The output device 220 may, however, implement or include other controllers and/or applications that provide at least partially the features and functionalities of the output controller 230.

[0118] Therefore, the output device 220 may include some or all of the following functionalities:

• Components and operations to receive multiple service requests or queries (e.g., a service request, a data query, an object or component query etc.) from a plurality of information apparatus 200 and properly respond to them by returning components, which may contain data, software, instructions and/or objects.

• Components and operations to receive output data from a plurality of information apparatus 200; the output data may include an intermediate output data containing one or more rasterized image related to the content intended for output.

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• Components and operations to interpret and/or decoding the intermediate output data.

• Components and operations to process and/or convert the intermediate output data into a form (e.g. output-engine print data) suitable for rendering at an output engine associated with the output device.

• Components and operations to render a representation or an image related to the content onto an output medium (e.g. substrate or a display screen).

[0119] An output device 220 may further comprise optionally one or more of the following functionalities:

• Components and operations for establishing and managing a communication link with an information apparatus 200 requesting service; the communication link may include wired or wireless communication.

• Components and operations for storing at least part of an output device profile (e.g. printer profile) in a memory component.

• Components and operations to provide at least part of an output device profile (e.g., printer profile in case of a printer) to one or more information apparatus 200 requesting service. The output device 220 may transmit the output device profile in one or multiple sessions.

• Components and operations to advertise or broadcast services provided or available to one or more information apparatus 200.

• Components and operations to implement payment processing and management functions by, for example, calculating and processing payments according to the services requested by or rendered to a client (information apparatus 200).

• Components and operations to implement job management functionalities such as queuing and spooling among others.

• Components and operations to provide a user interface such as display screen touch button, soft key, power switch, etc.

• Components and operations to implement security or authentication procedures. For example, the output device 220 may store in its memory component (or a shared memory component) an access control list, which specifies what device or user may obtain service from it. Therefore, an authorized information apparatus 200 may gain access after confirming with the control list.

[0120] Figs. 7A - 7F illustrate various alternative configurations and implementations of output controller 230 with respect to an output device 230. Printer is sometimes used as an

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exemplary output device 230 to demonstrate the various configurations. It should be understood, however, the output device 230 of present invention is not limited to printers.

[0121] As described with reference to Fig 4., a printer may or may not contain a printer controller 410. Printer 400A that includes a printer controller 410 typically has higher speed and is more expensive than printer 400B which does not include a printer controller 410.

[0122] Fig. 7A shows that output controller 230 may be cascaded externally to one or more printers (only one shown). Information apparatus 200 communicates with output controller 230A, which then communicates with output device 220 such as a printer 220A. The communication link between the output controller 230A and the printer 220A may be a wired link or a wireless link, as described above. Fig 6A and 6B illustrates two examples of functional component design of the output controller that can implement the configuration illustrated in Fig 7A. The Image processor 620 in this implementation is optional.

[0123] Fig. 7B shows another implementation in which output controller 230B is installed as one or more circuit boards or cards internally inside printer 220B. The output controller 230B may co-exist with printer controller 410 and other components of the printer 220B. One example of this implementation is to connect output controller 230B sequentially with the printer controller 310. Fig 5A shows as an example of an implementation.

[0124] Fig. 7C shows another implementation in which the functionalities of output controller 230 and printer controller 410 are combined into a single controller (referred to as "combined controller") 230C. In this implementation, it is possible to reduce the cost of material when compared to implementing two separate controllers as shown in Fig 7B. As an example, the combined controller 230C may share the same processors, memories, and storages to run the applications and functionalities of the two types of controllers and therefore, may have lower component costs when compared to providing two separate controllers. Fig. 6C illustrates an example of a combined controller functional component implementation.

[0125] Some printers do not include a raster image processor or printer controller 410, as illustrated in Fig. 4B. An example of this type of printer is a lower cost desktop inkjet printer. Input to an inkjet printer may consist of a compressed CMYK data (proprietary or published) with one or more bits per pixel input.

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To output to a printer that does not include a printer controller, a device specific software application or a printer driver is typically required in an information apparatus 200 to perform raster image processing operations. Accordingly, output controller 230 can be implemented into a variety of output devices 220 and/or output systems 250 including printers that do not have printer controllers for performing raster image processing operations.

[0126] Fig. 7D and Fig 7E illustrate two implementations of output controller 230 in an output device 220 or system 250. The output device 230 or system 250 may include a display device, a projection device, an audio output device or a printing device. In the case when the output device 220D or 220E is a printer, it does not include a printer controller. Fig. 7D illustrates an implementation of an output controller 230D installed as an external component or "box" to output device 220D. For example, the output controller 230 may be implemented as an application in a print server or as a standalone box or station. In this configuration, some or all of raster image processing operations may be implemented in the output controller 230D. Output controller 230D receives intermediate output data from an information apparatus 200 and generates output-engine output data that is acceptable to the output engine included in the output device 220D. The output controller 230D may send the output data to the output device 220D through a wired or wireless communication link or connection. Fig 6A and 6B illustrates two example of functional component design of the output controller that can implement the configurations for both Fig. 7D and 7E.

[0127] Fig. 7E shows a fifth implementation of output controller 230E in which the output controller 230E is incorporated within output device 220E as one or more circuit boards or cards and may contain software and applications running on an embedded processor. As with output device 220D (Fig. 7D), output device 220E does not include a printer controller 410. Accordingly, the output controller 230E implements the functionalities and capabilities of present invention that may include part of or complete raster imaging processing operation.

[0128] Fig. 7F shows a sixth implementation, an external combined controller 230F that integrates the functionalities of a printer controller 310 and an output controller into a single external combined controller component or "box" 230F. The two controller functions may share a common processor as well as a common memory space to run applications of the two types of

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controllers. Under this configuration, either information apparatus 200 or the combined controller 230F could perform or share at least part of raster image processing functionality. Fig. 6C shows an example of functional components of a combined controller 230F.

[0129] Another implementation of the combined controller 230F shown in Fig 7F is to use an external computing device (PC, workstation, or server) running one or more applications that include the functionality of output controller 230 and printer controller 410.

[0130] The above are examples of different implementations and configurations of output controller 230. Other implementations are also possible. For example, partial functionalities of output controller 230 may be implemented in an external box or station while the remaining functionalities may reside inside an output device 220 as a separate board or integrated with a printer controller 410. As another example, the functionalities of output controller 230 may be implemented into a plurality of external boxes or stations connected to the same output device 220. As a further example, the same output controller 230 may be connected to service a plurality of output devices 220

[0131] Figs. 8A and 8B are block diagrams illustrating two possible configurations of hardware/software components of wireless communication units. These wireless communication units can be implemented and included in information apparatus 200, in output controller 230 and in output device 220. Referring to Fig. 8A, a radio adapter 800 may be implemented to enable data/voice transmission among devices (e.g., information apparatus 200 and output device 220) through radio links. An RF transceiver 814 coupled with antenna 816 is used to receive and transmit radio frequency signals. The RF transceiver 814 also converts radio signals into and from electronic signals. The RF transceiver 814 is connected to an RF link controller 810 by an interface 812. The interface 812 may perform functions such as analog-to-digital conversion, digital-to-analog conversion, modulation, demodulation, compression, decompression, encoding, decoding, and other data or format conversion functions.

[0132] RF link controller 810 implements real-time lower layer (e.g., physical layer) protocol processing that enables the hosts (e.g., information apparatus 200, output controller 230, output device 220, etc.) to communicate over a radio link. Functions performed by the link controller 810 may include, without limitation, error detection/correction, power control, data packet

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processing, data encryption/decryption and other data processing functions.

[0133] A variety of radio links may be utilized. A group of competing technologies operating in the 2.4 GHz unlicensed frequency band is of particular interest. This group currently includes Bluetooth, Home radio frequency (Home RF) and implementations based on IEEE 802.11 standard. Each of these technologies has a different set of protocols and they all provide solutions for wireless local area networks (LANs). Interference among these technologies could limit deployment of these protocols simultaneously. It is anticipated that new local area wireless technologies may emerge or that the existing ones may converge. Nevertheless, all these existing and future wireless technologies may be implemented in the present invention without limitation, and therefore, in no way depart from the scope of present invention.

[0134] Among the currently available wireless technologies, Bluetooth may be advantageous because it requires relatively lower power consumption and Bluetooth-enabled devices operate in piconets, in which several devices are connected in a point-to-multipoint system. Referring to Fig. 8B, one or more infrared (IR) adapters 820 may be implemented to enable data transmission among devices through infrared transmission. The IR adapters 820 may be conveniently implemented in accordance with the Infrared Data Association (IrDA) standards and specifications. In general, the IrDA standard is used to provide wireless connectivity technologies for devices that would normally use cables for connection. The IrDA standard is a point-to-point (vs. point-to-multipoint as in Bluetooth), narrow angle, ad-hoc data transmission standard.

[0135] Configuration of infrared adapters 820 may vary depending on the intended rate of data transfer. Fig. 8B illustrates one embodiment of infrared adapter 820. Transceiver 826 receives/emits IR signals and converts IR signals to/from electrical signals. A UART (universal asynchronous receiver/transmitter) 822 performs the function of serialization/deserialization, converting serial data stream to/from data bytes. The UART 822 is connected to the IR transceiver 826 by encoder/decoder (ENDEC) 824. This configuration is generally suitable for transferring data at relatively low rate. Other components (e.g., packet framer, phase-locked loop) may be needed for higher data transfer rates.

[0136] Figs. 8A and 8B illustrate exemplary hardware configurations of wireless communication units. Such hardware

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components may be included in devices (e.g., information apparatus 200, output controller 230, output device 220, etc.) to support various wireless communications standards. Wired links, however, such as parallel interface, USB, Firewire interface, Ethernet and token ring networks may also be implemented in the present invention by using appropriate adapters and configurations.

[0137] FIG 9 is a logic flow diagram of an exemplary raster imaging process (RIP) 902 that can implement the universal output method of present invention. Content (e.g. digital document) 900 may be obtained and/or generated by an application running in an information apparatus 200. For example, a document browsing application may allow a user to download and or open digital document 900 stored locally or in a network node. As another example, a document creating or editing application may allow a user to create or edit digital documents in his/her information apparatus 200.

[0138] A client application 210 in the information apparatus may be in the form of a device driver, invoked by other applications residing in the information apparatus 200 to provide output service. Alternatively, the client application 210 of present invention may be an application that includes data output and management component, in addition of other functionalities such as content acquisitions, viewing, browsing, and or editing etc. For example, a client application 210 in an information apparatus 200 may itself include components and functions for a user to download, view and or edit digital document 900 in addition of the output management function described herein.

[0139] Raster image process method 902 allows an information apparatus 200 such as a mobile device to pervasively and conveniently output content (e.g. a digital document) to an output device 220 or system 250 that includes an output controller 230. A client application 210 in an information apparatus 200 may perform part of raster image processing operations (e.g. rasterization operation). Other operations of raster image processing such as halftoning can be completed by the output device 220 or by the output controller 230. In conventional data output methods, raster image processing is either implemented entirely in an information apparatus (e.g. a printer that does not include a printer controller with reference to Fig. 1A) or in an output device (e.g. a printer that includes a printer controller with reference to Fig. 1B). Present invention provides a more balanced approach where raster image process operations are shared between an information

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apparatus 200 and an output device 220 or system 250. For example, content 600 may be processed (e.g. raster image processed) by different components or parts of an overall output system from a client application 210 to an output controller 230 before being sent to an output engine or a printer engine for final output in step 960. Because the raster image processing operations are not completely implemented in the information apparatus 200, there is less processing demand on the information apparatus 200. Therefore, present RIP process may enable additional mobile devices with less memory and processing capability to have data output capability.

[0140] In step 910, rasterization operation, a content (e.g. digital document), which may include text, graphics, and image objects, is conformed or rasterized to image form according to one or more rasterization parameters such as output size, bit depth, color space, resolution, number of color channels etc. During the rasterization operation, text and vector graphics information in the content are rasterized or converted into image or bitmap information according to a given set of rasterization parameters. Image information in the content or digital document may be scaled and or interpolated to fit a particular output size, resolution and bit depth etc. The rasterization parameters are in general device dependent, and therefore may vary according to different requirements and attributes of an output device 220 and its output engine. There are many ways to obtain device dependent rasterization parameters, as described in more detail below with reference to Fig 12A. Device dependent rasterization parameters, in one example, may be obtained from an output device profile stored in an information apparatus 200, an output device 220 or an output controller 230.

[0141] In an alternative implementation, rasterization parameters may be predetermined by a standard or specification. In this implementation, in step 910 the content 900 is rasterized to fit or match this predefined or standard rasterization parameters. Therefore, the rasterized output image becomes device independent. One advantage of being device independent is that the rasterized output image is acceptable with controllers, devices and/or output devices implemented or created with the knowledge of such standard or specification. A rasterized image with predefined or standardized attributes is usually more portable. For example, both the client application 210 and output device 220 or its output controller 230 may be preprogrammed to receive, interpret, and or

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output raster images based on a predefined standard and/or specification.

[0142] Occasionally, a predefined standard or specification for rasterization parameters may require change or update. One possible implementation for providing an easy update or upgrade is to store information and related rasterization parameters in a file or a profile instead of hard coding these parameters into programs, components or applications. Client application 210, output controller 230, and/or the output device 220 can read a file or a profile to obtain information related to rasterization parameters. To upgrade or update the standard specification or defaults requires only replacing or editing the file or the profile instead of replacing a software application or component such as the client application 210.

[0143] In step 920 the rasterized content in image form is encoded into an intermediate output data. The intermediate output data, which describes the output content, may include image information, instructions, descriptions, and data (e.g. color profile). The rasterized output image may require further processing including one or more of compression, encoding, encryption, smoothing, image enhancement, segmentation, color correction among others before being stored into the intermediate output data. The output image in the intermediate output data may be encoded in any image format and with any compression technique such as JPEG, BMP, TIFF, JBIG etc. In one preferred embodiment, a mixed raster content (MRC) format and its related encoding and/or compression methods are used to generate the output image. The advantages of using MRC over other image formats and techniques may include, for example, better compression ratio, better data information retention, smaller file size, and or relatively better image quality among others.

[0144] In step 930, the intermediate output data is transmitted to the output device 220 or output system 250 for further processing and final output. The transmission of the intermediate output data may be accomplished through wireless or wired communication links between the information apparatus 200 and the output device 220 and can be accomplished through one or multiple sessions.

[0145] In step 940, the output device 220 or output system 250 receives the transmitted intermediate output data. The output device 220 or output system 250 may include an output controller 230 to assist communicating with the information apparatus 200

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and/or processing the intermediate output data. Output controller 230 may have a variety of configurations and implementations with respect to output device 220 as shown in Fig. 7A-7F. Interpretation process 940 may include one or more of parsing, decoding, decompression, decryption, image space conversion among other operations if the received intermediate output data requires such processing. An output image is decoded or retrieved from the intermediate output data and may be temporarily stored in a buffer or memory included in the output device/output system (220/250) or output controller 230 for further processing.

[0146] If the intermediate output data includes components with MRC format or encoding techniques, it may contain additional segmented information (e.g. foreground and background), which can be used to enhance image quality. For example, different techniques or algorithms in scaling, color correction, color matching, image enhancement, anti-aliasing and or digital halftoning among others may be applied to different segments or layers of the image information to improve output quality or maximize retention or recovery of image information. Multiple layers may later be combined or mapped into a single layer. These image processing and conversion components and/or operations can be included in the output controller 230 of present invention.

[0147] In step 950, the decoded or retrieved output image from the intermediate output data may require further processing or conversion. This may include one or more of scaling, segmentation, interpolation, color correction, GCR, black generation, color matching, color space transformation, anti-aliasing, image enhancement, image smoothing and or digital halftoning operations among others.

[0148] In an embodiment where the output device 220 does not include a printer controller, an output controller 230 or an output device 220 that includes output controller, after performing the remaining portion of RIP operations (e.g. color space conversion and halftoning) on the output image, may further convert the output data in step 950 into a form that is acceptable for input to a printer engine for rendering.

[0149] In an alternative embodiment where the output device 220 or the output system 250 includes a conventional printer controller, the output controller may simply decodes and or converts the intermediate output data (print data in this example) into format or language acceptable to the printer controller. For example, a printer controller may require as input a page

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description language (e.g. PostScript, PCL, PDF, etc.), a markup language (HTML, XML etc) or other graphics or document format. In these cases, the output controller 230 may interpret, decompress and convert the intermediate print data into an output image that has optimal output resolution, bit depth, color space, and output size related to the printer controller input requirements. The output image is then encoded or embedded into a printer-controller print data (e.g. a page description language) and sent to the printer controller. A printer-controller print data is a print data that is acceptable or compatible for input to the printer controller. After the printer controller receives the printer-controller print data, the printer controller may further perform operations such as parsing, rasterization, scaling, color correction, image enhancement, halftoning etc on the output image and generate an appropriate printer-engine print data suitable for input to the printer engine.

[0150] In step 960, the output-engine output data or printer-engine print data generated by the output controller 230 or the printer controller in step 950 is sent to the output engine or printer engine of the output device for final output.

[0151] Fig. 10 illustrates a flow diagram of a universal data output process of the present invention that includes the raster image processing illustrated with reference to Fig. 9. A universal data output process allows an information apparatus 200 to pervasively output content or digital document to an output device. The data output process may include or utilize:

- A user interface component and operation where a user initiates an output process and provides an indication of the selected output content (e.g. digital document) for output.
- A client application component or operation that processes the content indicated for output, and generates an intermediate output data. The intermediate output data may include at least partly a raster output image description related to the content.
- An information apparatus component or operation that transmits the intermediate output data to one or more selected output device 220.
- An output device component (e.g. output controller) or operation that interprets the intermediate output data and may further process or convert the output data into a form more acceptable to an output engine for rendering of the content.

[0152] With reference to Fig. 10, a user in step 1000 may initiate the universal output method or process 1002. Typically, a

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user initiates the output process by invoking a client application 210 in his/her information apparatus 200. The client application 210 may be launched as an independent application or it may be launched from other applications 205 (such as from a document browsing, creating or editing application) or as part of or component of or a feature of another application 205 residing in the same information apparatus 200. When launched from another application 205, such as the case when the client application is a device driver or helper application, the client application 210 may obtain information, such as the content (e.g. digital document) from that other application 205. This can be accomplished, for example, by one or combinations of messages or facilitated through an operating system or a particular object or component model etc.

[0153] During output process 1002, a user may need to select one or more output devices 220 for output service. An optional discovery process step 1020 may be implemented to help the user select an output device 220. During the discovery process step 1020, a user's information apparatus 200 may (1) search for available output devices 220; (2) provide the user with a list of available output devices 220; and (3) provide means for the user to choose one or more output devices 220 to take the output job. An example of a discovery process 1020 is described below in greater detail with reference to Fig. 11.

[0154] The optional discovery process 1020 may sometimes be unnecessary. For example, a user may skip the discovery process 1020 if he or she already knows the output device (e.g., printer) 220 to which the output is to be directed. In this case, the user may simply connect the information apparatus 200 to that output device 220 by wired connections or directly point to that output device 220 in a close proximity such as in the case of infrared connectivity. As another example, a user may pre-select or set the output device or devices 220 that are used frequently as preferred defaults. As a result, the discovery process 1020 may be partially or completely skipped if the default output device 220 or printer is found to be available.

[0155] In stage 1030, the client application may interact with output device 220, the user, and/or other applications 205 residing in the same information apparatus 200 to (1) obtain necessary output device profile and/or user preferences, (2) perform functions or part of raster image processing operations such as rasterization, scaling and color correction, and/or (3) convert or encode at least partially the rasterized content (e.g. digital

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document) into an intermediate output data. The processing and generation of the intermediate output data may reflect in part a relationship to an output device profile and/or user preferences obtained, if any. The intermediate output data generated by the client application 210 is then transmitted through wired or wireless local communication link(s) 240 to the output controller 230 included or associated with the selected output device 220 or output system 250. An exemplary client application process is described in greater detail with reference to FIG 12.

[0156] In step 1040, the output controller 230 of present invention receives the intermediate output data. In the case where the selected output device 230 does not include a printer controller, the output controller 230 of present invention may further perform processing functions such as parsing, interpreting, decompressing, decoding, color correction, image enhancement, GCR, black generation and halftoning among others. In addition, the output controller 230 may further convert or conform the intermediate output data into a form or format suitable for the output engine (e.g. printer engine in the case of a printer). The generated output-engine output data from the output controller is therefore, in general, device dependent and acceptable for final output with the output engine (or the printer engine in case of a printer) included in the selected output device 220 or output system 250.

[0157] In the case where the selected output device 220 is a printer, and when the printer includes or is connected to a printer controller, the output controller 230 may generate the proper language or input format required to interface with the printer controller (referred to as printer-controller print data). The printer controller may for example require a specific input such as a page description language (PDL), markup language, or a special image or graphics format. In these cases, the output controller 230 in step 1040 may interpret and decode the intermediate output data, and then convert the intermediate output data into the required printer-controller print data (e.g. PDL such as PostScript or PCL). The printer-controller print data generated by the output controller is then sent to the printer controller for further processing. The printer controller may perform interpretation and raster image processing operations among other operations. After processing, the printer controller generates a printer-engine print data suitable for rendering at the printer engine.

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[0158] In either case, the output controller 230 or printer controller generates an output-engine output data that is suitable for sending to or interfacing with the output engine or the printer engine included in the output device for rendering. The output data may be temporarily buffered in components of the output device 220. An implementation of the output device process 1040 is described in greater detail with reference to FIG 13.

[0159] The steps included in the universal pervasive output process 1002 may proceed automatically when a user requests output service. Alternatively, a user may be provided with options to proceed, cancel, or input information at each and every step. For example, a user may cancel the output service at any time by, for example, indicating a cancellation signal or command or by terminating the client application 210 or by shutting down the information apparatus 200 etc.

[0160] Fig. 11 is a flow diagram of an example of a discovery process 720, which may be an optional step to help a user locate one or more output devices 220 for an output job. The discovery process 1020 may, however, be skipped partially or entirely. Implementation of discovery process 1020 may require compatible hardware and software components residing in both the information apparatus 200 and the output device 220. The information apparatus 200 may utilize the client application 210 or other application 205 in this process. The discovery process 1020 may include:

- An information apparatus 200 communicating with available output devices 220 to obtain information and attributes relating to the output device 220 and or its services such as output device capability, feature sets, service availability, quality of service, condition.
- An Information apparatus 200 provides the user information on each available and or compatible output devices 220.
- A user selects or the client application 210 (automatically or not) selects one or more output devices 220 for the output service from the available or compatible output devices 220.

[0161] Various protocols and or standards may be used during discovery process 1020. Wireless communication protocols are preferred. Wired communication, on the other hand, may also be implemented. Examples of applicable protocols or standards may include, without limitation, Bluetooth, HAVi, Jini, Salutation, Service Location Protocol, and Universal Plug-and-play among others. Both standard and proprietary protocols or combination may be implemented in the discovery process 1020. However, these

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different protocols, standards, or combination shall not depart from the spirit and scope of present invention.

[0162] In one implementation an application (referred here for simplicity of discussion as a "communication manager," not shown) residing in the information apparatus 200 helps communicate with output device 220 and manages service requests and the discovery process 1020. The communication manager may be a part of or a feature of the client application 210. Alternatively or in combination, the communication manager may also be a separate application. When the communication manager is a separate application, the client application 210 may have the ability to communicate, manage or access functionalities of the communication manager.

[0163] The discovery process 1020 may be initiated manually by a user or automatically by a communication manager when the user requests an output service with information apparatus 200.

[0164] In the optional step 1100, a user may specify searching or matching criteria. For example, a user may indicate to search for color printers and or printers that provide free service. The user may manually specify such criteria each time for the discovery process 1020. Alternatively or in combination, a user may set default preferences that can be applied to a plurality of discovery processes 1020. Sometimes, however, no searching criteria are required: the information apparatus 200 may simply search for all available output devices 220 that can provide output service.

[0165] In step 1101, information apparatus 200 searches for available output devices 220. The searching process may be implemented by, for example, an information apparatus 200 (e.g. with the assistance of a communication manager) multi-casting or broadcasting or advertising its service requests and waiting for available output devices 220 to respond. Alternatively or in combination, an information apparatus 200 may "listen to" service broadcasts from one or more output devices 220 and then identify the one or more output devices 220 that are needed or acceptable. It is also possible that multiple output devices 220 of the same network (e.g., LAN) register their services with a control point (not shown). A control point is a computing system (e.g., a server) that maintains records on all service devices within the same network. An information apparatus 200 may contact the control point and search or query for the needed services.

[0166] In step 1102, if no available output device 220 is found, the communication manager or the client application 210 may

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provide the user with alternatives 1104. Such alternatives may include, for example, aborting the discovery process 1020, trying discovery process 1020 again, temporarily halting the discovery process 1020, or being notified when an available output device 220 is found. As an example, the discovery process 1020 may not detect any available output device 220 in the current wired/wireless network. The specified searching criteria (if any) are then saved or registered in the communication manager. When the user enters a new network having available output devices 220, or when new compatible output devices 220 are added to the current network, or when an output device 220 becomes available for any reason, the communication manager may notify the user of such availability.

[0167] In step 1106, if available output devices 220 are discovered, the communication manager may obtain some basic information, or part of or the entire output device profile, from each discovered output device 220. Examples of such information may include, but not limited to, device identity, service charge, subscription, service feature, device capability, operating instructions, etc. Such information is preferably provided to the user through the user interface (e.g., display screen, speaker, etc.) of information apparatus 200.

[0168] In step 1108, the user may select one or more output devices 220 based on information provided, if any, to take the output job. If the user is not satisfied with any of the available output device 220, the user may decline the service. In this case, the user may be provided with alternatives such as to try again in step 1110 with some changes made to the searching criteria. The user may choose to terminate the service request at any time. In step 1112, with one or more output devices 220 selected or determined, the communication link between information apparatus 200 and the selected output device or devices 220 may be "locked". Other output devices 220 that are not selected may be dropped. The output process 1020 may then proceed to the client application process of step 1030 of Fig. 10.

[0169] Fig. 12A is a flow diagram of an exemplary client application process with reference to step 1030 of Fig. 10. A client application process 1202 for universal output may include or utilize:

- A client application 210 that obtains content (e.g. digital document) intended for output.
- A client application 210 that obtains output device parameters (e.g. rasterization parameters, output job parameters).

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One example of implementation is to obtain the output device parameters from an output device profile (e.g. printer profile), which includes device dependent parameters. Such profile may be stored in an output controller 230, output device 220 or information apparatus 200.

- A client application 210 that may optionally obtain user preferences through (1) user's input (automatic or manual) or selections or (2) based on preset preference or pre-defined defaults or (3) combination of the above.
- A client application 210 that rasterizes at least part of the content intended for output (e.g. a digital document) according to one or more rasterization parameters obtained from previous steps such as through output device profile, user selection, predefined user preferences, predefined default or standard etc.
- A client application 210 that generates an intermediate output data containing at least part of the rasterized image related at least partly to the content intended for output.
- A client application that transmits the intermediate output data to an output device 220 or output controller 230 for further processing and or final output.

[0170] A client application 210 may obtain content (e.g. digital document) 900 or a pointer or reference to the content in many ways. In a preferred embodiment, the client application 210 is in the form of a device driver or an independent application, and the content or its reference can be obtained by the client application 210 from other applications 205 in the same information apparatus 200. To illustrate an example, a user may first view or download or create a digital document by using a document browsing, viewing and or editing application 205 in his/her information apparatus 200, and then request output service by launching the client application 210 as a device driver or helper application. The client application 210 communicates with the document browsing or editing application to obtain the digital document or reference to the digital document. As another example, the client application 210 is an independent application and it launches another application to help locate and obtain the digital document for output. In this case, a user may first launch the client application 210, and then invoke another application 205(e.g. document editing and or browsing application) residing in the same information apparatus 200 to view or download a digital document. The client application 210 then communicates with the document

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browsing or editing application to obtain the digital document for output.

[0171] In another embodiment, the client application 210 itself provides multiple functionalities or feature sets including the ability for a user to select the content (e.g. digital document) for output. For example, the client application 210 of present invention may provide a GUI where a user can directly input or select the reference or path of a digital document that the user wants to output.

[0172] In order to perform rasterization operation on content (e.g. digital document) 900, the client application 210 in step 1210 needs to obtain device dependent parameters of an output device 220 such as the rasterization parameters. Device dependent parameters may be included in an output device profile. A client application 210 may obtain an output device profile or rasterization parameters in various ways. As an example, an output device profile or rasterization parameters can be obtained with one or combination of the following:

- The client application communicates with an output device 220 to upload output device profile or information related to one or more rasterization parameters.
- The client application 210 obtains the output device profile from a network node (e.g. server).
- A user selects an output device profile stored in the user's information apparatus 200.
- The client application 210 automatically retrieves or uses a default profile, predefined standard values or default values among others.
- The client application 210 obtains output device parameters by calculating, which may include approximation, based at least partly on the information it has obtained from one or combination of an output device 220, a user, default values, and a network node.

[0173] It is important to note that step 1210 is an optional step. In some instance, part of or the entire output device profile or related device dependent information may have been already obtained by the client application 210 during the prior optional discovery process (step 1020 in FIG 10). In this case, step 1210 may be partially or entirely skipped.

[0174] In one implementation, the client application 210 communicates with one or more output devices 220 to upload output device profiles stored in the memory or storage components of those

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one or more output devices 220 or their associated one or more output controllers 230. In some instance, the uploaded output device profile may contain partially or entirely references or pointers to device parameters instead of the device parameters themselves. The actual output device parameters may be stored in a network node or in the information apparatus 200, where they can be retrieved by the client application 210 or by other applications 205 using the references or pointers. It should be noted that a plurality of information apparatuses 200 may request to obtain output device profile or profiles from the same output device 220 at the same time or at least during overlapping periods. The output device 220 or its associated output controller 230 may have components or systems to manage multiple communication links and provide the output device profile or profiles concurrently or in an alternating manner to multiple information apparatuses 200. Alternatively, an output device 220 may provide components or systems to queue the requests from different information apparatuses 200 and serve them in a sequential fashion according to a scheme such as first come first served, quality of service, etc. Multi-user communication and service management capability with or without queuing or spooling functions may be implemented by, for example, the output controller 230 as optional feature sets.

[0175] In another implementation, one or more output device profiles may be stored locally in the information apparatus 200. The client application 210 may provide a GUI where a user can select a profile from a list of pre-stored profiles. As an example, the GUI may provide the user with a list of output device names (e.g. makes and models), each corresponding to an output device profile stored locally. When the user selects an output device 220, the client application 210 can then retrieve the output device profile corresponding to the name selected by the user.

[0176] In certain cases, during a discovery or communication process described earlier, the client application 210 may have already obtained the output device ID, name, or reference or other information in a variety of ways described previously. In this case, the client application 210 may automatically activate or retrieve an output device profile stored in the information apparatus 200 based on the output device ID, name, or reference obtained without user intervention.

[0177] In yet another implementation, the client application 210 may use a set of pre-defined default values stored locally in a user's information apparatus 200. Such defaults can be stored in

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one or more files or tables. The client application 210 may access a file or table to obtain these default values. The client application 210 may also create or calculate certain default values based on the information it has obtained during previous steps (e.g. in optional discovery process, based on partial or incomplete printer profile information obtained, etc). A user may or may not have an opportunity to change or overwrite some or all defaults.

[0178] Finally, if, for any reason, no device dependent information is available, the client application 210 may use standard output and rasterization parameters or pre-defined default parameters. The above illustrates many examples and variations of implementation, these and other possible variations in implementation do not depart from the scope of the present invention.

[0179] In step 1220, the client application 210 may optionally obtain user preferences. In one exemplary implementation, the client application 210 may obtain user preferences with a GUI (graphical user interface). For simplicity, a standard GUI form can be presented to the user independent of the make and model of the output device 220 involved in the output process. Through such an interface, the user may specify some device independent output parameters such as page range, number of cards per page, number of copies, etc. Alternatively or in combination, the client application 210 may also incorporate output device-dependent features and preferences into the GUI presented to the user. The device-dependent portion of the GUI may be supported partly or entirely by information contained in the output device profile obtained through components and processes described in previous steps. To illustrate, device dependent features and capabilities may include print quality, color or grayscale, duplex or single sided, output page size among others.

[0180] It is preferred that some or all components, attributes or fields of user preferences have default values. Part or all default values may be hard-coded in software program in client application 210 or in hardware components. Alternatively, the client application 210 may also access a file to obtain default values, or it may calculate certain default values based on the information it has obtained during previous steps or components (e.g. from an output device profile). A user may or may not have the ability to pre-configure, or change or overwrite some or all defaults. The client application 210 may obtain and use some or all defaults with or without user intervention or knowledge.

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[0181] In step 1230, the client application 210 of present invention performs rasterization operation to conform a content (e.g. a digital document), which may includes objects and information in vector graphics, text, and images, into one or more output images in accordance with the rasterization parameters obtained in previous steps. During rasterization process, text and vector graphics object or information in the content is rasterized or converted into image or bitmap form according to the given set of rasterization parameters. Image information in the content may require scaling and interpolation operations to conform the rasterization parameters. Rasterization process may further include operations such as scaling, interpolation, segmentation, image transformation, image encoding, color space transformation etc. to fit or conform the one or more output images to the given set of rasterization parameters such as target output size, resolution, bit depth, color space and image format etc.

[0182] In step 1240, the client application 210 generates an intermediate output data that includes the rasterized one or more output images. The intermediate output data of the present invention may contain image information, instructions, descriptions, and data such as color profile among others. Creating and generating intermediate output data may further include operations such as compression, encoding, encryption, smoothing, segmentation, scaling and or color correction, among others. The image or images contained in an intermediate output data may be variously encoded and/or implemented with different image formats and/or compression methods (e.g. JPEG, BMP, TIFF, JBIG etc or combination). One preferred implementation is to generate or encode the output image in the intermediate output data with mixed raster content (MRC) description. The use of MRC in the data output process of present invention provides opportunities to improve the compression ratio by applying different compression techniques to segmented elements in the content. In addition, MRC provides opportunities to maintain more original content information during the encoding process of the output image and, therefore, potentially improve output quality.

[0183] In step 1250, the client application 210 transmits intermediate output data to an output device 220 through local communication link 240. The communication link may be implemented with wired or wireless technologies and the transmission may include one or multiple sessions.

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[0184] It should be recognized that FIG 12A illustrates one example of a client application process 1030 in the data output method 1002 of present invention. Other implementations with more or less steps are possible, and several additional optional processes not shown in Fig 12 may also be included in the client application process 1030. Use of these different variations, however, does not result in a departure from the scope of the present invention. As an example, an optional authentication step may be included when the selected output device 220 provides service to a restricted group of users. Various authentication procedures may be added in step 1210 when client application 210 obtains output device profile by communicating with an output device or an output controller. As another example, authentication procedures may also be implemented in step 1250 when the client application transmits intermediate output data to one or more output devices 220 or output controllers 230. A simple authentication may be implemented by, for example, comparing the identity of an information apparatus 200 with an approved control list of identities stored in the output device 220 or output controller 230. Other more complex authentication and encryption schemes may also be used. Information such as user name, password, ID number, signatures, security keys (physical or digital), biometrics, fingerprints, voice among others, may be used separately or in combination as authentication means. Such identification and or authentication information may be manually provided by user or automatically detected by the selected output device or devices 220 or output controller 230. With successful authentication, a user may gain access to all or part of the services provided by the output device 220. The output device profile that the client application 210 obtains may vary according to the type or quality of service requested or determined. If authentication fails, it is possible that a user may be denied partially or completely access to the service. In this case, the user may be provided with alternatives such as selecting another output device 220 or alternative services.

[0185] Another optional process is that a user may be asked to provide payment or deposit or escrow before, during or after output service such as step 1210 or 1250 with reference to Fig. 12. Examples of payment or deposit may include cash, credit card, bankcard, charge card, smart card, electronic cash, among others. The output controller 220 may provide payment calculation or

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transaction processing as optional feature sets of present invention.

[0186] FIG 12B illustrates another exemplary client application output process 1030 with which an information apparatus 200 can pervasively and universally output content to one or more output devices 220 associated with or equipped with an output controller 230 of present invention.

[0187] The process illustrated in FIG 12B is similar to the process described in FIG 12A except that step 1210, obtaining output device profile, is skipped. In this embodiment, the client application 210 utilizes a set of hard-coded, standard or pre-defined output device parameters including rasterization parameters with which the client application 210 can perform rasterization operation and other required image processing functions. Users may be provided with the option of changing these parameters or inputting alternative parameters. Rasterization parameters include output size, output resolution, bit depth, color space, color channels, scale factors etc. These pre-defined parameters typically comply with a specification or a standard. The same specification and standard may also defined or describe at least partly the intermediate output data. Predefined standard parameters can be stored in a file or profile in an information apparatus 200, an output controller 230, and/or in an output device 220 for easy update or upgrade.

[0188] In client output process 1204, since the rasterization parameters are predefined, the client application 210 may not need to upload printer profiles from the selected output device 230. Consequently, no two-way communication between the information apparatus 200 and the output device or devices 220 is necessary in this process 1204 when compared with process 1202 illustrated in Fig. 12A. The client application 210 performs rasterization operation 1225 based on standard and/or predefined parameters and generates a rasterized output image with predefined or standard properties of those rasterization parameters. The resulting intermediate output data, which includes at least one rasterized output image, is transmitted from the information apparatus 200 to an output device 220 in step 1250 or to its associated output controller 230 for rendering or output. The intermediate output data generated in process 1202 in general is less device dependent compared to the intermediate output data generated in the process 1202 shown in Fig 12A. The output controller 230 included or associated with the output device 220 may be preprogrammed to

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interpret the raster output image, which includes properties or attributes that correspond to those standard or predefined parameters.

[0189] The standard or predefined rasterization parameters may be hard coded or programmed into the client application 210 and/or the output controller 230. However, instead of hard coding those parameters, one technique to facilitate updates or changes is to store those standard parameters in a default file or profile. The standard or predefined parameters contained in the file or profile can be retrieved and utilized by applications in an information apparatus 200 (e.g. client application 210) and/or by applications or components in an output device 220 or the output controller 230. In this way, any necessary updates, upgrades or required changes to those predefined or standard parameters can be easily accomplished by replacing or modifying the file or profile instead of modifying or updating the program, application or components in the information apparatus 200, output device 220 and/or output controller 230.

[0190] A client application process 1204 providing universal output capability to information apparatus 200 may include or utilize:

- A client application 210 that obtains content (e.g. digital document) intended for output.
- A client application 210 that optionally obtains user preferences (in step 1220) through (1) user's input (automatic or manual) or selections or (2) based on preset preference or pre-defined defaults or (3) combination of the above.
- A client application 210 that rasterizes content (in step 1230 or 1225) according to pre-defined or standard rasterization parameters.
- A client application 210 that generates intermediate output data (in step 1240) for rendering or output at an output device 220; the intermediate output data containing at least partially a rasterized image related to the content intended for output.
- A client application 210 that transmits the intermediate output data to an output device 220 (in step 1250) for further processing and final output.

[0191] One advantage of the client output process 1204 of Fig 12B compared to the process 1202 illustrated in Fig 12A is that the generated intermediate output data is in general less device dependent. The device independent attribute allows the intermediate output data to be more portable and acceptable to more output

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devices equipped or associated with output controllers. Both data output processes (1202 and 1204) enable universal output; allowing a user to install a single client application 210 or components in an information apparatus 200 to provide output capability to more than one output device 220.

[0192] FIG 13A illustrates one example of an output device process 1302 and its associated raster imaging method of present invention. In this output device process 1302, an output device 220 is capable of receiving an intermediate output data from an information apparatus 200. The output device process 1302 and its operations may include or utilize:

- An output device/system or output controller that receives intermediate output data (in step 1300). The intermediate output data includes at least partially a raster output image describing at least part of the content for rendering at the output device 220 or system 250.
- An output device/system or output controller that interprets (in step 1310) the intermediate output data; in one preferred embodiment, the intermediate output data includes an output image utilizing one or more MRC formats or components.
- An output device/system or output controller that performs image processing operation (in step 1320) on the raster image. The image processing operation may include but not limited to image decompression, scaling, halftoning, color matching, among others.
- An output device/system or output controller that converts and or generates (in step 1330) output-engine output data that is in a format or description suitable for input to an output engine (e.g. printer engine in case of a printer) included in an output device 220.
- An output engine in an output device 220 that renders or generates a final output (e.g. the output-engine output data) in step 1370.

[0193] The output device 220 or output system 250 may include an output controller 230 internally or externally to assist the management and operation of the output process 1302. As shown in Fig 7, there are many possible configurations and implementations of an output controller 230 associated to an output device 220 Herein and after, output controller 230 is regarded as an integral part of the output device to which it is attached. Hence, the following described output device operations may be partially or completely performed by the output controller associated with it.

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[0194] In step 1300, output device process 1302 is initiated by client application 210 transmitting an intermediate output data to output device 220 or output system 250. In step 1310, the output device 220 reads and interprets the intermediate output data, containing at least one raster output image relating to the content intended for output. During the reading and interpretation process 1310, the output device 220 may include components that parse the intermediate output data and perform operations such as decompression, decoding, and decryption among others. The output image may be variously encoded and may include one or more compression methods.

[0195] In the event that the method of image encoding includes MRC format, then, in one example implementation, during decoding and mapping of the output image in step 1310, the lower resolution layer and information in an image that includes MRC may be mapped, scaled or interpolated to a higher-resolution output image to produce a better image quality. Therefore, step 1310, in the event that the intermediate output data includes MRC component, each layer in an MRC image can be decompressed, processed, mapped and combined into a single combined output image layer. Step 1310 may also include scaling, color space transformation, and/or interpolation among others. In addition to the possibility of mapping methods using different scaling and interpolation ratio with different layers, another advantage of using MRC is that segmentation information contained in MRC can be utilized to apply different image processing and enhancement techniques to data in different layers of an MRC image in step 1320.

[0196] In step 1320, the output device 220 may further perform image processing operations on the decoded output image. These image processing operations may include, for example, color correction, color matching, image segmentation, image enhancement, anti-aliasing, image smoothing, digital watermarking, scaling, interpolation, and halftoning among others. The image processing operations 1320 may be combined or operated concurrently with step 1310. For example, while each row, pixel, or portion of the image is being decoded and or decompressed, image processing operations 1320 is applied. In another implementation, the image processing 1320 may occur after the entire output image or a large portion of the image has been decoded or decompressed.

[0197] If the intermediate output data includes MRC component, then in step 1320, there are additional opportunities to improve image quality. An image encoded in MRC contains segmented

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information that a traditional single layer image format does not usually have. As an example, foreground can be in one layer, and background in another. As another example, chrominance information may be in one layer and luminance may be in another. This segmented information in MRC may be used to apply different or selective image processing methods and algorithms to different layers or segments to enhance image quality or retain or recover image information. Different image processing techniques or algorithms may include color matching, color correction, black generation, halftoning, scaling, interpolation, anti-aliasing, smoothing, digital watermarking etc. For example, one can apply colorimetric color matching to foreground information and perceptual color matching to background information or vice versa. As another example, error diffusion halftoning can be applied to foreground and stochastic halftoning can be applied to background or vice versa. As yet another example, bi-cubic interpolation can be applied to a layer and bi-linear or minimum distance interpolation can be applied to a different layer.

[0198] In step 1330, the output device 220 or the output controller 230 may convert the processed image (e.g. halftoned) into a form acceptable to the output engine of output device 220. This conversion step is optional, depending on the type, format and input requirement of a particular output device engine (e.g. printer engine in case of a printer). Different output engines may have different input raster image input requirements. As an example different output engines may require different input image formats, number of bits or bytes per pixel, compression or uncompressed form, or different color spaces (e.g. such as RGB, CMY, CMYK, or any combination of Hi-Fi color such as green, orange, purple, red etc). Incoming raster image data can be encoded in a row, in a column, in multiple rows, in multiple columns, in a chunk, in a segment, or a combination at a time for sending the raster data to the output engine. In some cases, step 1330 may be skipped if the result of step 1320 is already in a form acceptable to the output device engine. In other cases, however, further conversion and or processing may be required to satisfy the specific input requirement of a particular output device engine.

[0199] It is important to note that the above described processing from step 1310 to step 1330 may require one or more memory buffers to temporarily store processed results. The memory buffer can store or hold a row, a column, a portion, or a chunk, of the output image in any of the steps described above. Storing and

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retrieving information into and from the memory buffer may be done sequentially, in an alternating fashion, or in an interlaced or interleaved fashion among other possible combinations. Step 1310 to step 1330 operations can be partially or completely implemented with the output controller 230.

[0200] In step 1370, the output device engine included in the output device 220 or output system 250 receives the output-engine output data generated in step 1330 or step 1320. The output-engine output data is in a form that satisfies the input requirements and attributes of the output engine, such as color space, color channel, bit depth, output size, resolution, etc. The output engine then takes this output-engine output data and outputs or renders the data content through its marking engine or display engine.

[0201] One advantage of data output method 1002 that includes output device process 1302 is that it has less processing requirements on an information apparatus 200 compared to conventional process with reference to Fig 1A, and therefore, enables more information apparatus 200 with relatively lower processing power and memory space to have output capability.

[0202] For example, some image processing functions, such as halftoning (e.g. error diffusion) may require substantial processing and computing power. In data output process 1002 that includes output device process 1302, halftoning is performed in step 1320 by an output device component (e.g. the output controller 230) included in the output device 220 or the output system 250, not in the information apparatus 200; therefore reducing the computational requirements for the information apparatus 200. Another advantage of data output 1302 is that the intermediate output data is less device dependent than the output data generated by conventional output method 102 with reference to Fig 1A. The device independence provides opportunity to allow a single driver or application in an information apparatus 200 to output intermediate output data to a plurality of output devices 220 that include output controllers 230.

[0203] Some output devices 220 may contain a printer controller 410. An example of this type of output device or printer is a PostScript printer or PCL printer among others. FIG 13B illustrates an example of an output device process 1304 with a printer that includes a printer controller 410. As discussed in Fig 1, a printer with a printer controller requires input such as page description language (e.g. PostScript, PCL etc.), markup language

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(HTML, XML etc), special image format, special graphics format, or a combination, depending on the type of the printer controller.

[0204] There are many printing system configurations for providing the data output capability and process to a printer or a printing system that includes a printer controller. In one example, the existing printer controller in the output device 220 may incorporate the feature sets provided by the output controller to form a "combined controller" as described previously with reference to Figs 7C and 7F. In another example, the output controller 230 of present invention may be connected sequentially or cascaded to an existing printer controller; the output controller 230 can be internally installed (with reference to FIG. 7B) or externally connected (with reference to FIG. 7A) to the output device 220. For output device 220 that includes a printer controller, the output controller 230 may simply decode the intermediate output data in step 1310 and then convert it into a form acceptable for input to the printer controller in step 1350.

[0205] An output device process 1304 and operations for an output device 220 or system 250 that includes a printer controller 410 may include or utilize:

- An output controller 230 or components in an output device 220 or system 250 that receives an intermediate print data or output data (with reference to step 1300), the intermediate print data includes at least a raster image related at least in part to the content for rendering at the output device 220.
- An output controller 230 or components in an output device 220 or system 250 that interprets the intermediate output data (with reference to step 1310); in one preferred embodiment, the intermediate output data includes an output image utilizing one or more MRC format or components.
- An output controller 230 or components in an output device 220 or system 250 that converts the intermediate output data into a printer-controller print data (with reference to step 1350); the printer-controller print data includes a format or language (e.g. PDL, PDF, HTML, XML etc.) that is acceptable or compatible to the input requirement of a printer controller.
- A printer controller or components in an output device 220 or system 250 that receives a printer controller print data; the printer controller may parse, interpret and further process (e.g. rasterization, scaling, image enhancement, color correction, color matching, halftoning etc.) and convert the printer-controller print data into a printer-engine print data (with reference to step

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1360); the printer-engine print data comprising of a format or description acceptable for input to a printer engine in the output device 220 or the output system 250.

- A printer engine or components in an output device 220 or system 250 that renders or generates a final output (with reference to step 1370) with the input printer engine print data.

[0206] In output device process 1304, step 1300 (receiving intermediate output data) and step 1310 (interpret intermediate output data) are identical to step 1300 and step 1310 in output device process 1302, which have been described in previous sections with reference to Fig. 13A.

[0207] In step 1350, the output controller 230 converts the intermediate print data into a printer-controller print data that is in a form compatible or acceptable for input to a printer controller. For example, a printer controller may require as input a specific page description language (PDL) such as PostScript. The output controller 230 then creates a PostScript file and embeds the output image generated or retrieved in step 1310 into the PostScript file. The output controller 230 can also create and embed the output image from step 1310 into other printer controller print data formats, instructions or languages.

[0208] In step 1360, the printer controller receives printer-controller print data generated in step 1350 that includes an acceptable input language or format to the printer controller. The printer controller may parse, interpret, and decode the input printer-controller print data. The printer controller may further perform raster image processing operations such as rasterization, color correction, black generation, GCR, anti-aliasing, scaling, image enhancement, and halftoning among others on the output image. The printer controller may then generate a printer-engine print data that is suitable for input to the printer engine. The type and or format of printer-engine print data may vary according to the requirement of a particular printer engine.

[0209] It is important to note that the above described process from step 1310 to step 1360 may require one or more memory buffer to temporarily store processed results. The memory buffer can store or hold a row, a column, a portion, or a chunk, of the output image in any of the steps described above. Storing and retrieving information into and from the memory buffer may be done sequentially, alternated, or in an interlaced or interleaved fashion among other possible combinations. Process and operations

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of step 1310 to step 1360 can be implemented with output controller 230.

[0210] In step 1370, the printer engine included in the output device 220 or output system 250 generates or renders the final output based on the printer-engine print data generated in step 1360. For example, the printer-engine print data may be in CMY, CMYK, and RGB etc, and this may be in one or more bits per pixel format, satisfying the size and resolution requirement of the printer engine. The printer engine included the output device 220 may take this print data and generate or render an output page through its marking engine.

[0211] Having described and illustrated the principles of our invention with reference to an illustrated embodiment, it will be recognized that the illustrated embodiment can be modified in arrangement and detail without departing from such principles. In view of the many possible embodiments to which the principles of our invention may be applied, it should be recognized that the detailed embodiments are illustrative only and should not be taken as limiting the scope of our invention. Rather, I claim as my invention all such embodiments as may come within the scope of the following claims and equivalents thereto.

[0212] Unless the context indicates otherwise, a reference in a claim to the number of instances of an element, be it a reference to one instance or more than one instance, requires at least the stated number of instances of the element but is not intended to exclude from the scope of the claim a structure or method having more instances of that element than stated. Specifically, but without limitation, a reference in a claim to an or one output device or system, to an or one image, or to a or one rasterization parameter is not intended to exclude from the scope of the claim a structure or method having, including, employing or supplying two or more output devices or system, images or rasterization parameters.

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CLAIMS

1. A method of operating an information apparatus that is on a local area network for outputting an image of a digital document that can be accessed by the information apparatus, the digital document including at least part of a text or graphics information, said method comprising:

rasterizing the digital document on the information apparatus to generate image data,

creating an intermediate output data from the image data,

transmitting the intermediate output data to an output device that is on said local area network and includes an output engine that outputs images with a device-specific output size and resolution,

recovering the image data from the intermediate output data,

converting the image data to instructions compatible with the output engine, based at least in part on the device-specific output size and resolution of the output engine,

providing the instructions to the output engine, and

operating the output engine in response to said instructions and thereby outputting an image of the digital document.

2. A method according to claim 1, wherein the output engine is one of a marking engine, a display engine and a projection engine.

3. A method according to claim 1, wherein the intermediate output data includes a mixed raster content encoding.

4. A method according to claim 1, wherein the output device is printing device that includes a printer controller and an output controller, the method further comprising,

generating with the output controller a print data that is acceptable to the printer controller and including the recovered image data into the print data, and

passing the print data to the printer controller for converting the image data into instructions compatible with the output engine, based at least in part on the device-specific output size and resolution of the marking engine.

5. A method according to claim 4, in which the print data includes a page description language and the method comprises generating with the output controller a page description language

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(PDL) representation of the digital document to the printer controller and interpreting with the printer controller the PDL representation and converting the image data based at least in part on said device-specific output size and resolution.

6. A method according to claim 1, wherein the image included in the intermediate output data is encoded at least with predetermined standard output size and resolution and the rasterizing step includes calculating at least one scale factor relating the output size and resolution of the digital document to said predetermined standard output size and resolution and employing said scale factor as a rasterization parameter in the rasterizing step.

7. A method according to claim 6, wherein the predetermined standard output size and resolution is included in the output device and the step of converting the image data to instructions compatible with the output engine further includes converting the image data from at least the standard output size and resolution to the output size and resolution of the output engine.

8. A method according to claim 1, wherein the step of creating the intermediate output data includes at least one of compression, encoding, encryption and color correction.

9. A method according to claim 1, wherein the step of creating the intermediate output data includes creating an intermediate output data that includes at least one of an image, instructions, and a color profile.

10. A method according to claim 1, wherein the step of recovering the raster image data from the intermediate output data includes at least one of decoding, decryption, and decompression.

11. A method according to claim 1, wherein the step of converting the image data to instructions includes at least one of color space conversion, scaling, interpolation, color matching and halftoning.

12. A method according to claim 1, including obtaining a rasterization vector to the information apparatus and using said rasterization vector in the rasterizing step.

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13. A method according to claim 12, wherein the rasterization vector has at least one component related to the output device and includes one or more of an output size, resolution, color space, and bit depth.

14. A method according to claim 12, wherein at least one component of the rasterization vector is based on a predetermined standard value or default.

15. A method according to claim 12, wherein the rasterization vector is obtained from the output device.

16. A method according to claim 1, wherein the method includes selecting an output device description from a plurality of output device descriptions presented to a user of the information apparatus.

17. A method according to claim 12, comprising inputting user preferences as components of a rasterization vector and using said rasterization vector in the rasterizing step.

18. A method of outputting an image of a digital document that can be accessed by an information apparatus to an output system, the output system including information related to predetermined standard rasterization parameter values that include one or more of bit depth, color space, output size, and resolution, said method comprising:

generating image data by rasterizing the digital document on the information apparatus in accordance at least in part with at least one predetermined standard rasterization parameter value,

creating on the information apparatus an intermediate output data that includes the image data,

transmitting the intermediate output data from the information apparatus to an output system that includes an output engine that outputs an image with at least one device specific value that includes bit depth, color space, output size, or resolution,

recovering the image data from the intermediate output data,

converting the image data with the at least one predetermined standard rasterization parameter value to instructions compatible with the output engine that include the at least one device specific value,

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providing the instructions to the output engine, and

operating the output engine in response to said instructions and thereby outputting an image of the digital document.

19. A method according to claim 18, wherein the output device is a printing device and the output engine is a marking engine.

20. A method according to claim 18, comprising selecting said output system from among a plurality of available output systems and uploading at least one value specifying said predetermined rasterization parameters to the information apparatus,

21. A method of outputting an image of a digital document that can be accessed by an information apparatus, the digital document including at least part of a text or graphics information, said method comprising:

selecting an output device model from a menu of models presented by the information apparatus, each model of output device including an output engine, and each output engine being characterized by a value of a rasterization vector,

accessing a value of the rasterization vector related to the output engine of the selected model,

rasterizing the digital document on the information apparatus in accordance with said rasterization vector to generate image data,

creating an intermediate output data on the information apparatus that includes the image data,

transmitting the intermediate output data from the information apparatus to an output device of said selected model,

recovering the image data from the intermediate output data,

converting the image data to instructions compatible with the output engine of the output device,

providing the instructions to the output engine of the output device, and

operating the operating engine in response to said instructions and thereby outputting an image of the digital document.

22. A method according to claim 21, wherein the rasterization vector is obtained form the output device.

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23. A method according to claim 21, wherein the output device is a printing device and the output engine is a marking engine.

24. A method of outputting an image of a digital document that can be accessed by an information apparatus, said method comprising:

rasterizing the digital document on the information apparatus to generate image data,

creating an intermediate output data on the information apparatus, the intermediate output data including the image data, the image data being composed of a background layer and at least one foreground layer,

transmitting the intermediate output data to an output device that includes an output engine,

recovering the image data from the intermediate output data,

converting the image data into instructions compatible with the output engine,

providing the instructions to the output engine, and

operating the output engine in response to said instructions and thereby outputting an image of the digital document.

25. A method according to claim 24, wherein the image data comprises a background layer and at least one pair of layers composed of a foreground layer and a mask layer.

26. An imaging system comprising:

a local area network having a propagation medium and at least first and second nodes, said first node including an information apparatus and said second node including an output device, said output device including an output engine for outputting images,

a first means on the information apparatus for rasterizing a digital document to generate image data,

a second means on the information apparatus for creating an intermediate output data that includes the image data,

a third means on the information apparatus for impressing the intermediate output data on the propagation medium, and

an output controller at the second node for retrieving the image data from the intermediate output data and converting the image data into instructions compatible with the output engine.

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27. An imaging system according to claim 26, wherein the information apparatus includes a means for storing values for the predetermined standard size and resolution and the first means is adapted to rasterize the digital document to said predetermined standard output size and resolution.

28. An imaging system according to claim 26, wherein the output device includes a means for uploading to the information apparatus an output device profile that specifies device specific rasterization parameter values that include one or more of bit depth, output size and resolution to the information apparatus.

29. A method of outputting an image of a digital document that can be accessed by an information apparatus, said method including:

(a) establishing bidirectional communication between the information apparatus and at least two output devices,

(b) receiving a message from a first available output device specifying a feature of the first available output device,

(c) determining from the message from the available output device whether the feature of the available output device matches a requirement for outputting the digital document,

(d) if so, selecting said available output device and transmitting image data to the selected output device, and otherwise receiving a message from another available output device specifying a feature of the other available output device, and

(e) repeating steps (c) and (d).

30. A method according to claim 29, comprising, prior to step (b), transmitting from the information apparatus a message that calls for a receiving output device to transmit a message that specifies a feature of the respective output device.

31. A method according to claim 29 in which the feature includes one or more of a quality of service, a price indicator, a status indicator, an availability indicator, and an output data format indicator.

32. An output controller for processing intermediate output data that includes image data and has a first bit depth and resolution, the image data corresponding to content that includes

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at least part of a text or graphics information, the controller comprising:

means for retrieving the image data from the intermediate output data, and

means for carrying out an image processing operation on the data, said image processing operation adjusting at least one of bit depth, color space and a combination of resolution and output size of an image represented by the data.

33. The controller of claim 32 further comprising means for receiving the intermediate output data via a short-range wireless communication channel.

34. The controller of claim 32 in which the image data includes mixed raster content encoding, and the means for retrieving the image data from the intermediate output data comprises means for generating an output image data from at least part of the mixed raster content data.

35. The controller of claim 32 in which the means for carrying out image processing operations on the data, includes means for carrying out one or more of a color correction operation, a color matching operation, a color management operation, a scaling operation, an interpolation operation, a color space conversion, a decompression, a decryption, and a halftoning operation.

36. The controller of claim 32 in which the first bit depth and resolution correspond to a predefined standard value included in the controller.

37. The controller of claim 32 in which the means for carrying out an image processing operation on the data adjusts at least one of bit depth, color space, and a combination of output size and resolution to a value corresponding to a specific input requirement of an output engine.

38. The controller of claim 32 in which the output controller is included in the output device.

39. The controller of claim 32 in which the output controller is included in one of a server, an external station, a board, a card, and a data access point.

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40. The controller of claim 32 further comprising means for storing one or more output device profiles.

41. An output controller method for processing intermediate output data that includes image data and having a first bit depth and resolution, the image data corresponding to content that includes at least part of a text or graphics information, the method comprising:

retrieving the image data from the intermediate output data, and

carrying out an image processing operation on the data, said image processing operation adjusting at least one of bit depth, color space and a combination of resolution and output size of an image represented by the data.

42. The controller method of claim 41 further comprising receiving the intermediate output data via a short-range wireless communication channel.

43. The controller method of claim 41 in which the image data includes data encoded with mixed raster content.

44. The controller method of claim 41 wherein the step of carrying out an image processing operation on the data, includes carrying out one or more of a color correction operation, a color matching operation, a color management operation, a scaling operation, an interpolation operation, a color space conversion, a halftoning operation, a compression operation, a decompression operation, and a decryption operation.

45. In a computer readable medium, data output controller software for processing intermediate output data that includes image data and has a first bit depth, and resolution, the image data corresponding to content that includes text or graphics information, the controller software comprising:

software for retrieving the image data from the intermediate output data, and

software for carrying out an image processing operation on the data, said image processing operation adjusting at least one of bit depth, color space and a combination of resolution and output size of an image represented by the data.

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46. The medium of claim 45 further comprising software for establishing a short-range wireless communicating channel with an information apparatus.

47. The medium of claim 46 further comprising software for providing an output device profile over the communication channel.

48. The medium of claim 45 further comprising software for calculating and collecting payment information as compensation for rendering of the content by the output device.

49. The medium of claim 45 wherein the software includes software for retrieving the image data from data encoded with mixed raster content.

50. The medium of claim 45 wherein the software for carrying out an image processing operation on the data includes software for carrying out one or more of a color correction operation, a color matching operation, a color management operation, a scaling operation, an interpolation operation, a color space conversion, and a halftoning operation.

51. The medium of claim 45 in which the first bit depth and resolution correspond to respective values that are included in said software for retrieving image data and carrying out image processing operations.

52. The medium of claim 45 in which the output controller software is included in a server, an external station, a board, and a data access point.

53. In a computer readable medium, an information apparatus data output software for managing output of content to a selected output device, comprising:

software for accessing at least part of said content;

software for establishing a communication channel between the information apparatus and one or more output devices;

software for receiving over the communication channel at least one attribute corresponding to the one or more output devices;

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software for selecting one of said one or more output devices for rendering content based at least in part on the received attributes;

software for conforming at least part of the content into one or more output images with the at least one attribute related at least in part to the selected output device;

software for generating at the information apparatus an output data that includes said one or more output images; and

software for delivering the output data for rendering by the selected output device.

54. The medium of claim 53 in which the software for establishing a communication channel includes software for establishing a wireless communication channel.

55. The medium of claim 53 further comprising software for discovering the selected output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

56. The medium of claim 53 further comprising software for providing payment information over the communication channel as compensation for the rendering of the content by the selected output device.

57. A method of operating an information apparatus with access to content, for managing output of said content to an output device, comprising:

establishing a communication channel between the information apparatus and the output device;

receiving over the communication channel an output device profile associated with the output device;

obtaining one or more image attributes associated with the output device employing the output device profile;

conforming at least part of the content into one or more output images with said one or more image attributes;

generating an output data associated with the output device, the output data

including said one or more output images; and

delivering the output data to the output device for rendering.

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58. The method of claim 57, wherein the output device is one of a plurality of output devices and the method includes the step of selecting the output device from said plurality of output devices.

59. The method of claim 57, comprising obtaining image attributes that include one or more of resolution, color space, output size, resolution, bit depth, number of color channels, compression method, an image format indicator, and rendering intent.

60. The method of claim 57 comprising encoding said one or more output images with mixed raster content encoding.

61. A method of operating an information apparatus with access to content, for managing output of said content to an output device, comprising:

establishing a communication channel between the information apparatus and an output device;

receiving over the communication channel at least an indication from the output device related to rendering the content at the output device;

obtaining one or more rasterization parameters related to the output device;

conforming at least part of the content into one or more output images with said one or more rasterization parameters; and delivering an output data to the output device for rendering, the output data including said one or more output images.

62. The method of claim 61 comprising establishing a short-range wireless communication channel.

63. The method of claim 61 wherein the output device is one of a plurality of output devices and the method includes the step of selecting the output device from among said plurality of output devices.

64. The method of claim 61 wherein the output device is one of a plurality of output devices and the step of receiving at least an indication includes receiving at least an indication from one or more output devices related to rendering the content at the output devices respectively.

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65. The method of claim 61 comprising obtaining, as said one or more rasterization parameters, one or more of resolution, color space, output size, resolution, bit depth, and number of color channels.

66. The method of claim 61 in which the conforming of at least part of the content includes one or more of a color correction operation, a color matching operation, a color management operation, a scaling operation, an interpolation operation, a color space conversion, a compression, a decompression, a segmentation, a de-segmentation, a storing, a retrieving and a halftoning operation.

67. A method of operating an information apparatus with access to content, for managing output of said content to an output device, comprising:

establishing a communication channel between the information apparatus and one or more output devices;

receiving over the communication channel at least one attribute corresponding to said one or more output devices;

selecting one of said one or more output devices for rendering content based at least in part on the received attributes;

conforming at least part of the content into one or more output images with at least one rasterization parameter related at least in part to the selected output device;

generating an output data that includes said one or more output image ; and

delivering the output data for rendering by the selected output device.

68. The method of claim 67, comprising establishing a wireless communication channel.

69. The method of claim 68, comprising conforming at least part of the content with rasterization parameters that include one or more of resolution, color space, output size, resolution, bit depth, and number of color channels.

70. The method of claim 68 further comprising providing payment information over the communication channel as compensation for the rendering of the content by the selected output device.

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71. A method of operating an information apparatus with access to content, the content includes at least part of a text or graphics information, for managing output of content to one or more output devices, comprising:

establishing a communication channel between the information apparatus and one or more output devices with short range wireless communication;

conforming at least part of the content into one or more output images with at least one image attribute associated with at least one predefined standard rasterization parameter values related to an intermediate output data format;

generating a device independent intermediate output data that includes said one or more output images; and

delivering via the communication channel the intermediate output data to at least one of said one or more output devices for rendering.

72. In a computer readable medium, an information apparatus data output software for managing output of content to an output device, comprising:

software for accessing at least part of the content;

software for managing a communication channel between the information apparatus and the output device;

software for receiving over the communication channel one or more components associated with the output device;

software for conforming at least part of the content into one or more output images with one or more rasterization parameters related at least in part to said one or more components;

software for generating an output data including at least said one or more output images; and

software for directing the output data over the communication channel to the output device for rendering.

73. A method of operating a printing device that includes a printer engine for rendering data encoded in a raster form, said method comprising:

receiving by short range wireless communication an intermediate data which includes image data corresponding to at least part of the content,

extracting the image data from said intermediate data,

converting the image data to data in a page description language form,

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converting the data in the page description language to the raster form rendered by the printer engine, and

supplying the data in the raster form to the printer engine.

74. An output device for rendering content, said output device including:

a communication unit to receive via short range wireless communication an intermediate output data in which includes at least part of the content encoded in image data form with a first bit depth and a first resolution, said intermediate output data including graphics or text elements exclusively encoded with image data,

an interpreter for receiving the intermediate output data and retrieving said image data from said intermediate output data,

a processor for carrying out at least one image processing operation on the interpreted data, said processing operation adjusting at least one of bit depth, color space and a combination of output size and resolution of the interpreted data, and

an output engine for receiving data from said processor and employing the data received from the processor to render the content.

75. The output device of claim 74, wherein the output device is a printer, the output engine is a printer engine, and the processor is an image processor, and the second bit depth is less than the first bit depth.

76. A method of outputting content encoded in image data having a first bit depth and a first resolution, the content including at least part of a text or graphics element, said method comprising:

receiving an intermediate output data that include the image data related to content,

interpreting the intermediate output data and retrieving said image data from the intermediate output data,

carrying out at least one processing operation on the interpreted image data, said processing operation adjusting at least one of bit depth, color space and a combination of output size and resolution of the interpreted data, and

employing the data generated by the processing operation to render the content.

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77. In a data output device for rendering content managed with an information apparatus, the data output device including an output engine that imparts output on a medium in accordance with output data received at the output device, a communication unit that communicates with one or more devices, and a memory storage that stores data for rendering; the improvement comprising:

means for providing at least an indication related to one or more data formats acceptable to the controller in connection with rendering content at the output device; and

means for receiving an intermediate output data related to the content managed from the information apparatus, the intermediate output data corresponding to at least part of the content and includes data in accordance with said one or more acceptable data formats.

78. The output device of claim 77 further comprising means for establishing a wireless communication channel with an information apparatus.

79. The output device of claim 78 including means for providing over the communication channel as said indication one or more of an output device identification, an intermediate output data indicator, a quality of service indicator, a price indicator, a status indicator, an output device attribute indicator, a rasterization parameter indicator, a format indicator, and a language indicator.

80. The output device of claim 78 further comprising means for providing over the communication channel an output device profile.

81. The output device of claim 77 further comprising means for converting the intermediate output data into an output data that is acceptable for rendering with the output device.

82. The output device of claim 77 further including means for receiving intermediate output data that includes at least one output image corresponding to at least part of the content.

83. The output device of claim 77 wherein the means for receiving an intermediate output data includes means for receiving

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the intermediate output data that includes data in accordance with MRC encoding.

84. The output device of claim 83 further comprising means for performing at least one image processing operation on the output image; the image processing operation including one or more of a color correction operation, a color matching operation, a color space conversion, a color management operation, a scaling operation, an interpolation operation, and a halftoning operation.

85. The output device of claim 77 further comprising means for conforming the intermediate output data into a print data that is acceptable to a printer controller associated with a printing device.

86. The output device of claim 77 in which the output medium is one or more of a substrate, a paper, a display screen, and a projector.

87. The output device of claim 77 in which the output device further comprises means for storing one or more output device profiles with one or more attributes corresponding to the output devices.

88. The output device of claim 77 further comprising means for receiving plural service requests from plural information apparatuses, the output device providing the at least part of the output device profile to each of the plural information apparatuses.

89. The output device of claim 77 in which the output device includes a printer.

90. The output device of claim 77 in which the output device further includes means for implementing payment processing as compensation for rendering of the output content on the output device.

91. The output device of claim 77 in which the output device further includes means for implementing job management functionalities with one or more of data output job queuing and spooling.

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92. The output device of claim 77 in which the output device further includes means for implementing a security procedure that limits access to the rendering provided by the selected output device.

93. The output device of claim 77 in which the output device further includes means for converting the output data content into a form compatible with the output engine.

94. An information apparatus for managing outputting of content to an output device, the content accessible at least partly by the information apparatus, the information apparatus comprising:

a communication unit to communicate with the output device,

a user interface for interacting with a user;

means for establishing a communication channel between the information apparatus and the output device;

means for receiving over the communication channel one or more components associated with the output device enabling the content to be rendered by the output device;

means for conforming at least part of the content into one or more output images with said one or more components;

means for generating an intermediate output data including said one or more output images and for rendering by the output device; and

means for delivering the intermediate output data to the output device for rendering.

95. The apparatus of claim 94, for managing outputting of content to an output device selected from a plurality of output devices, wherein the communication unit communicates with said plurality of output devices, and the apparatus includes means to select an output device from said plurality of output devices.

96. The apparatus of claim 94 in which the one or more components includes one or more of a rasterization vector, a price indicator, an availability indicator, a status indicator, an output data format indicator, and a quality of service indicator.

97. The apparatus of claim 94 in which the communication channel includes a wireless communication channel.

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98. The apparatus of claim 94 further comprising means for sending payment information over the communication channel as compensation for the rendering of the content by the output device.

99. An information apparatus for managing the outputting of content to an output device, the content accessible at least partly by the information apparatus, the information apparatus comprising:

a communication unit to communicate with one or more output devices;

a user interface for interacting with a user;

means for obtaining one or more device dependent attributes associated with the output device;

means for conforming at least part of the content into one or more output images with said one or more device dependent attributes, at least part of said one or more output images including mixed raster content encoding;

means for generating an intermediate output data including said one or more output images; and

means for delivering the intermediate output data to the output device for rendering.

100. The apparatus of claim 99 in which the means for obtaining one or more device dependent attributes includes means for obtaining from one or more sources that includes a user input, a network server, a default value stored in the information apparatus, and from the output device,

101. The apparatus of claim 99 further comprising means for establishing a wireless communication with one or more output devices.

102. The apparatus of claim 101 further comprising means for obtaining over the communication channel an output device profile that includes the device dependent attributes.

103. The apparatus of claim 101 further comprising means for sending payment information over the communication channel as compensation for the rendering of the content by the output device.

104. The apparatus of claim 99 in which the means for conforming includes means for conforming at least part of the content into at least one output image by one or more of a

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rasterization operation, a scaling operation, an interpolation operation, and a compression operation.

105. The apparatus of claim 99 in which the mixed raster content data includes at least a foreground layer.

106. An information apparatus capable of outputting content to an output device; the content accessible at least partly by the information apparatus, the information apparatus comprising:

a communication unit to communicate with an output device;

a user interface for interacting with a user;

means for establishing a communication channel between the information apparatus and the output device with short range wireless communication;

means for conforming at least part of the content into at least one output image with at least one predefined standard rasterization parameter values;

means for generating an intermediate output data including the one or more output image, the intermediate output data being at least partly device independent; and

means for delivering via the established communication channel the intermediate output data to the output device for rendering.

107. The apparatus of claim 106 wherein the communication unit communicates with a plurality of output devices and the information apparatus includes means for selecting an output device of said plurality to receive the intermediate output data.

108. The apparatus of claim 106 further comprising means for obtaining over the communication channel an output device profile.

109. The apparatus of claim 106 further comprising means for obtaining over the communication channel information related to the intermediate output data format.

110. The apparatus of claim 106 further comprising means for sending payment information over the communication channel as compensation for the rendering of the content by the output device.

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111. The apparatus of claim 106 in which the predefined standard rasterization values is included in the information apparatus.

112. The apparatus of claim 106 in which the means for conforming includes means for performing one or more of a rasterization operation, a scaling operation, an interpolation operation, and a compression operation.

113. The apparatus of claim 106 in which the means for conforming conforms at least part of the content into an output image that includes mixed raster content encoding.

114. A data output method for rendering at an output device content at least partly accessible with an information apparatus, comprising:

obtaining at the information apparatus one or more rasterization parameters corresponding to the output device;

conforming at the information apparatus at least part of the data content into one or more output images with said one or more rasterization parameters;

transmitting an intermediate output data from the information apparatus to an output controller that is distinct from the information apparatus and associated with the selected output device, the intermediate output data including said one or more output image;

converting at the output controller, the intermediate output data into an output data acceptable for rendering at the output device.

115. The method of claim 114 comprising obtaining the one or more rasterization parameters from one or more of the output device or user input or default value.

116. The method of claim 114 in which the one or more output images are associated with different slides, pages or cards.

117. The method of claim 114 in which the conforming includes one or more of a rasterization operation, a scaling operation, an interpolation operation, and a compression operation.

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118. The method of claim 114 in which the content includes text or graphics elements and the conforming of at least part of the content include rasterizing the content into image form.

119. The method of claim 114 comprising transmitting the intermediate output data by wireless communication.

120. The method of claim 114 in which the output controller is included in the output device.

121. The method of claim 114 further comprising performing at the output controller one or more image processing operations on the one or more output images included in the intermediate output data, the one or more image processing operations including one or more of a color correction operation, a color matching operation, a color management operation, a scaling operation, an interpolation operation, a color space conversion, a compression operation, and a halftoning operation.

122. The method of claim 114 in which the output device is a printing device and the method further comprising conforming the intermediate output data into a print data that is acceptable to a printer controller associated with the output device.

123. The method of claim 114 further comprising obtaining at the information apparatus a data content for rendering at the selected output device.

124. A data output method for rendering content at least partly accessible with an information apparatus, comprising:

establishing a communication channel between the information apparatus and one or more output devices with short range wireless communication;

conforming at the information apparatus at least part of the data content into one or more output images with at least one predefined or standard rasterization parameters;

generating at the information apparatus a device independent intermediate output data, the intermediate output data including the one or more output images ;

delivering via the established communication channel the intermediate output data from the information apparatus to said one or more output devices for rendering; and

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converting at said one or more output devices the intermediate output data into an output data acceptable for rendering by an output engine included in said one or more output devices.

125. The method of claim 124 further comprising discovering the selected output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

126. A data output method for rendering at an output device content at least partly accessible with an information apparatus, comprising:

selecting an output device with an output engine for rendering the data content;

conforming at least part of the content into one or more output images with at least one rasterization parameter related at least in part to the selected output device; generating an intermediate output data that includes said one or more output images;

delivering the intermediate output data for rendering by the selected output device;

receiving at the selected output device the intermediate output data;

performing one or more image processing operations on said one or more output images; and

converting at the selected output device the intermediate output data into an output data acceptable for rendering by the output engine included in the selected output device.

127. The method of claim 126 further comprising discovering the selected output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

128. The method of claim 127 in which the information apparatus discovers the one or more output devices with wireless communication.

129. The method of claim 127 in which discovering the one or more output devices includes the information apparatus sending an

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output service request and awaiting a response from one or more output devices.

130. The method of claim 127 in which discovering the one or more output devices includes one or more output devices posting their availability and the information apparatus contacting one or more of the one or more output devices.

131. The method of claim 127 in which discovering the one or more output devices includes the information apparatus obtaining from a service node information about the one or more output devices and the information apparatus contacting one or more of the one or more output devices.

132. The method of claim 127 in which discovering one or more output devices involves determining if the one or more output devices satisfy one or more output service requirements.

133. The method of claim 127 further comprising obtaining at least partial output device profile form the one or more output devices that are discovered.

134. The method of claim 127 further comprising providing at the information apparatus information related to the one or more output devices discovered by the information apparatus and obtaining from a user a selection of the selected output device.

135. The method of claim 126 in which the selecting includes automatic selection by one or more components of the information apparatus.

136. A raster image processing method for processing content into an output data acceptable for rendering by an output engine included in an output device, the output data corresponding to data content accessible at least partly from an information apparatus, the method comprising:

rasterizing at the information apparatus at least part of the content into one or more output images with at least one rasterization parameter associated with the output device;

generating at the information apparatus an intermediate output data for rendering of the data content at the output device,

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the intermediate output data including said one or more output images;

transmitting the intermediate output data from the information apparatus for rendering at the output device;

performing at least one image processing operation, at an output controller that is distinct from the information apparatus and associated with the output device, on said one or more output images included in the intermediate output data; and

conforming at the output controller the intermediate output data into the output data acceptable for rendering by the output engine.

137. The method of claim 136 comprising rasterizing at least part of the content into said one or more output images with rasterization parameters that include one or more of resolution, color space, output size, and bit depth.

138. The method of claim 136 comprising encoding said one or more images with mixed raster content encoding.

139. The method of claim 136 comprising transmitting the intermediate output data by wireless communication.

140. The method of claim 136 comprising performing at least one image processing operation, on the one or more output images that includes one or more of a color correction operation, a color matching operation, a color management operation, a scaling operation, an interpolation operation, a color space conversion, and a halftoning operation.

141. The method of claim 136 comprising conforming the intermediate output data by performing one or more of compression, decompression, segmentation, de-segmentation, storing, and retrieving.

142. A raster image processing method for processing content into a print data acceptable for rendering by a printer engine included in a printing device, the printing device including a printer controller, the print data corresponding to content accessible at least partly from an information apparatus, the method comprising:

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rasterizing at the information apparatus at least part of the content into one or more output images with at least one rasterization parameter;

generating at the information apparatus an intermediate output data that includes the one or more output images;

transmitting at the information apparatus the intermediate output data from the information apparatus to a processor distinct from the information apparatus and associated with the printing device;

converting at the processor the intermediate output data into a print data acceptable to the printer controller, and

raster image processing at the printer controller the print data for rendering by the printer engine.

143. The method of claim 142 comprising rasterizing at least part of the content with rasterization parameters including one or more of resolution, color space, output size, bit depth, and rendering intent.

144. The method of claim 142 comprising encoding the one or more images with mixed raster content encoding.

145. The method of claim 142 comprising transmitting the intermediate output data by wireless communication.

146. The method of claim 142 further comprising interpreting the intermediate output data and retrieving the one or more output images.

147. The method of claim 146 further comprising one or more operations on the one or more output images that include one or more of compression, decompression, segmentation, de-segmentation, storing, retrieving, color correction, color management, scaling, interpolation, color space conversion, and decryption.

148. The method of claim 142 in which the converting of the intermediate output data includes embedding the one or more output image information into the print data.

149. A method of processing content, comprising:

creating raster data by rasterizing at least part of the content;

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creating one or more images with at least two raster-form layers for storing segmented information associated with at least part of the content;

storing at least part of the raster data into the at least two raster-form layers according to the segmented information; and

transmitting an output data that includes said one or more images by local short range communication to an output device or system for rendering.

150. The method of claim 149 comprising creating raster data by rasterizing content that includes at least part of a text or graphics information.

151. The method of claim 149 comprising creating one or more images with each raster-form layer including one or more image attributes that differentiate it from other layers, the one or more attributes including one or more of resolution, color space, output size, bit depth, and compression method, digital watermark, and rendering intent.

152. The method of claim 149 comprising creating one or more images with at least two raster-form layers for storing segmented information that includes an association with one or more of a background and a foreground, and a luminance and a chrominance.

153. The method of claim 149 comprising creating one or more images with at least two raster-form layers for storing segmented information that includes an association with one or more of a text, a graphics, an image, a video, and an audio.

154. The method of claim 149 comprising creating one or more images with at least two raster-form layers, and at least one a selector layer.

155. The method of claim 150 further comprising one or more operations on one or more of the raster-form layers that include one or more of compression, decompression, segmentation, de-segmentation, storing, retrieving, color correction, color management, scaling, interpolation, color space conversion, encryption, digital watermarking, and halftoning.

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156. The method of claim 149 comprising transmitting the output data by short-range wireless communication.

157. A raster image processor for processing content, comprising:

means for creating raster data by rasterizing at least part of the content,

mean for creating one or more images with at least two raster-form layers for storing segmented information associated with at least part of the content,

means for storing at least part of the raster data into the at least two raster-form layer according to the segmented information, and

means for passing said one or more images for delivery to an output device or system.

158. The processor of claim 157 in which the content includes text or graphics information.

159. The processor of claim 157 wherein the means for creating one or more images creates raster-form layers that each include one or more image attributes that differentiate it from other layers, the one or more attributes including one or more of resolution, color space, output size, resolution, bit depth, compression method, digital watermark, and rendering intent.

160. The processor of claim 158 further comprising means for performing one or more operations on one or more of the raster-form layers, said one or more operations including one or more of compression, decompression, segmentation, de-segmentation, storing, retrieving, color correction, color management, scaling, interpolation, color space conversion, encryption, digital watermarking, and halftoning.

161. The processor of claim 157 further comprising means for delivering the one or more images to an output device or system with short-range wireless communication.

162. The method of claim 157 in which the output device or system includes printing device.

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163. A raster image processing method for processing content into output data acceptable for rendering by an output engine included in an output device, the output data corresponding to content accessible at least partly from an information apparatus, the method comprising:

rasterizing at the information apparatus at least part of the content into an output image with at least two raster-form data layers and a selector mask layer, each raster-form data layer being associated with a segmentation type associated to an attribute related to information contained in the data content;

performing at least one image processing operation, at a processor distinct from the information apparatus and associated with the output device, on each data layer of the output image; and

conforming at the processor the output image into a form acceptable for rendering by the output engine.

164. The method of claim 163 comprising rasterizing content that includes at least part of a text or graphics information.

165. The method of claim 163 comprising rasterizing content into raster-form layers that each include one or more attributes that differentiate it from other layers, the one or more attributes including one or more of resolution, color space, output size, bit depth, and rendering intent.

166. The method of claim 163 comprising rasterizing content into raster-form data layers each associated with segmentation information that includes an association with one or more of a background and a foreground, and a luminance and a chrominance.

167. The method of claim 163 in which the segmented information includes an association with one or more of text, graphics, image, video, and audio.

168. The method of claim 163 comprising performing image processing operations that include one or more of a compression, decompression, segmentation, de-segmentation, storing, retrieving, color correction, color management, scaling, an interpolation, color space conversion, encryption, digital watermarking, and halftoning.

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169. The method of claim 163 further comprising transmitting the output image to the processor with short-range wireless communication.

170. The method of claim 57 further comprising providing payment information over the communication channel as compensation for the rendering of the content by the output device.

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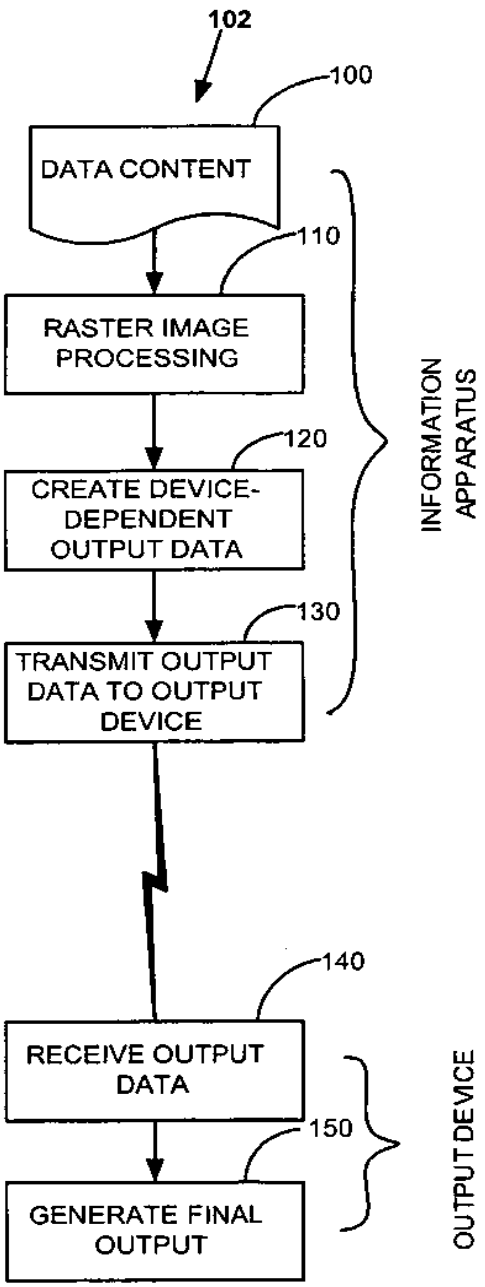


FIG 1 A

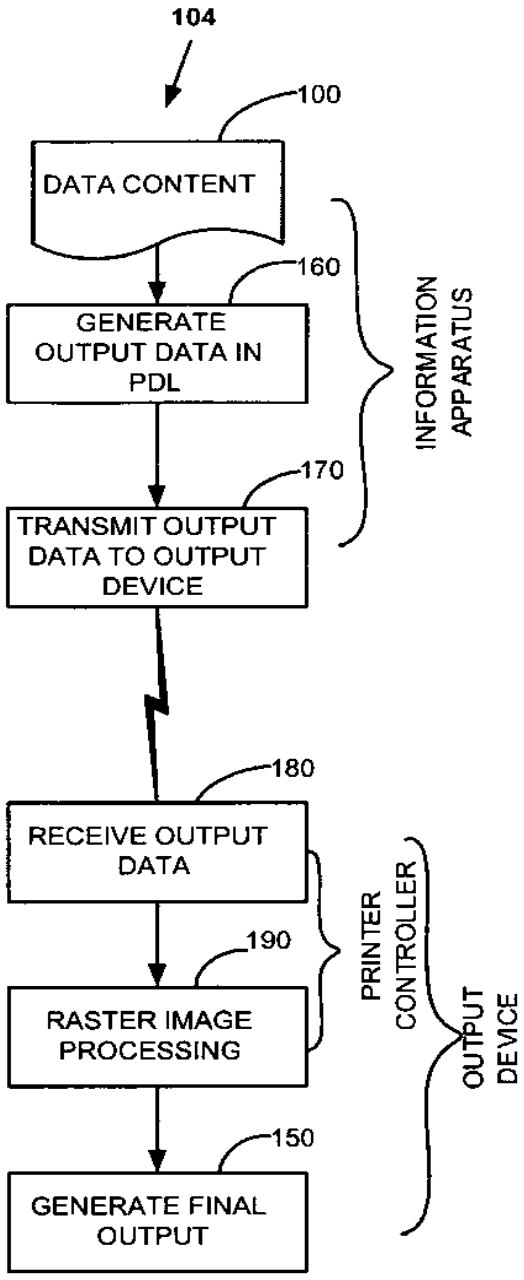


FIG 1 B

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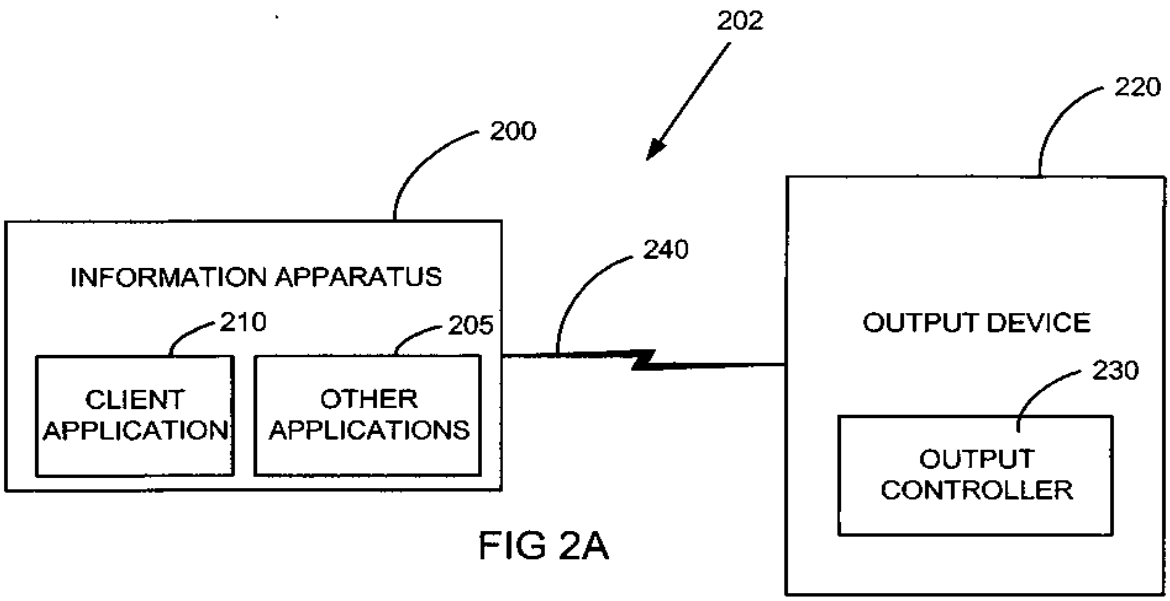


FIG 2A

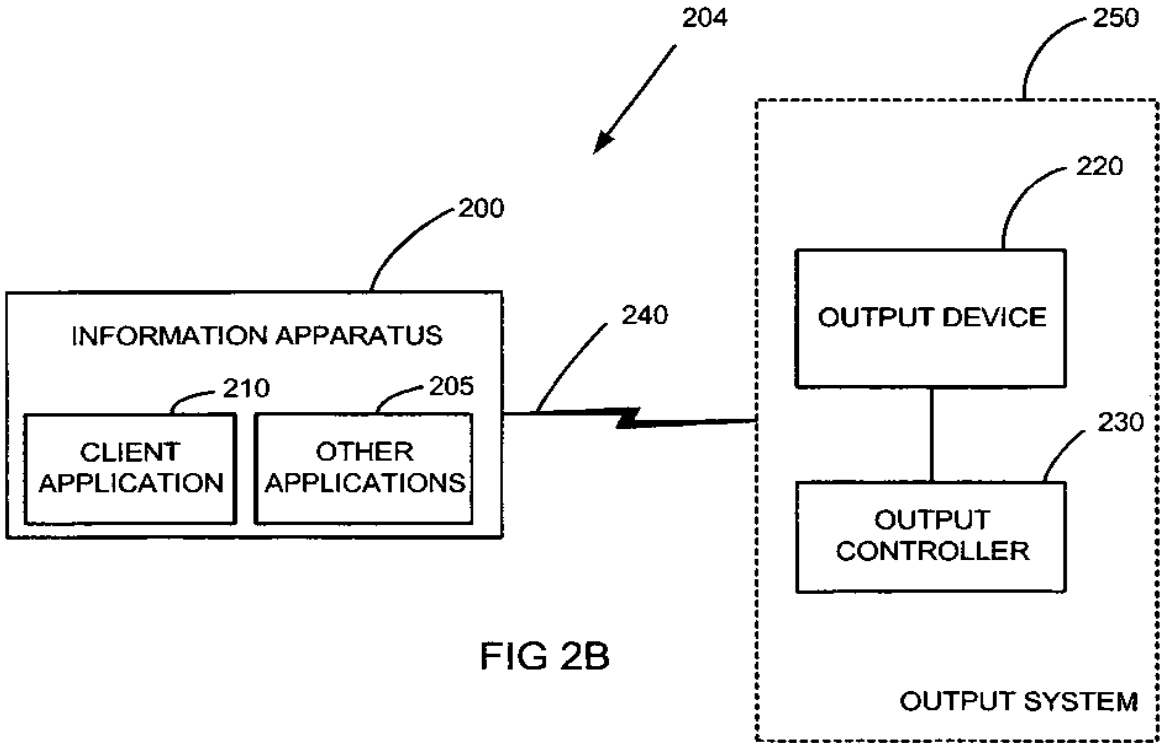


FIG 2B

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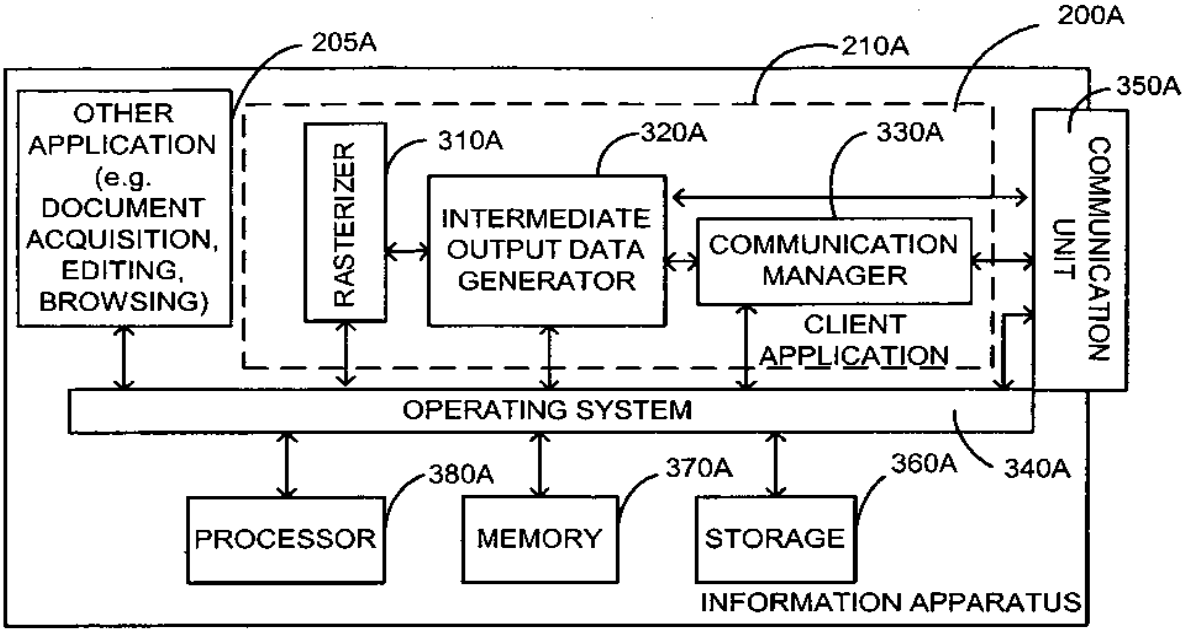


FIG 3A

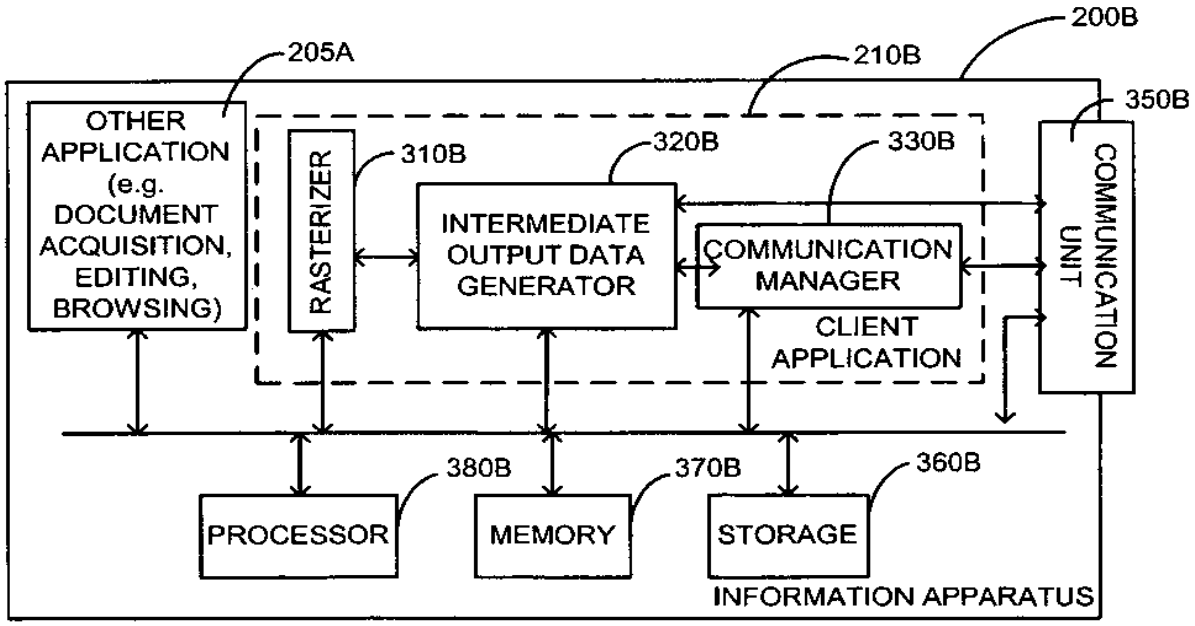


FIG 3B

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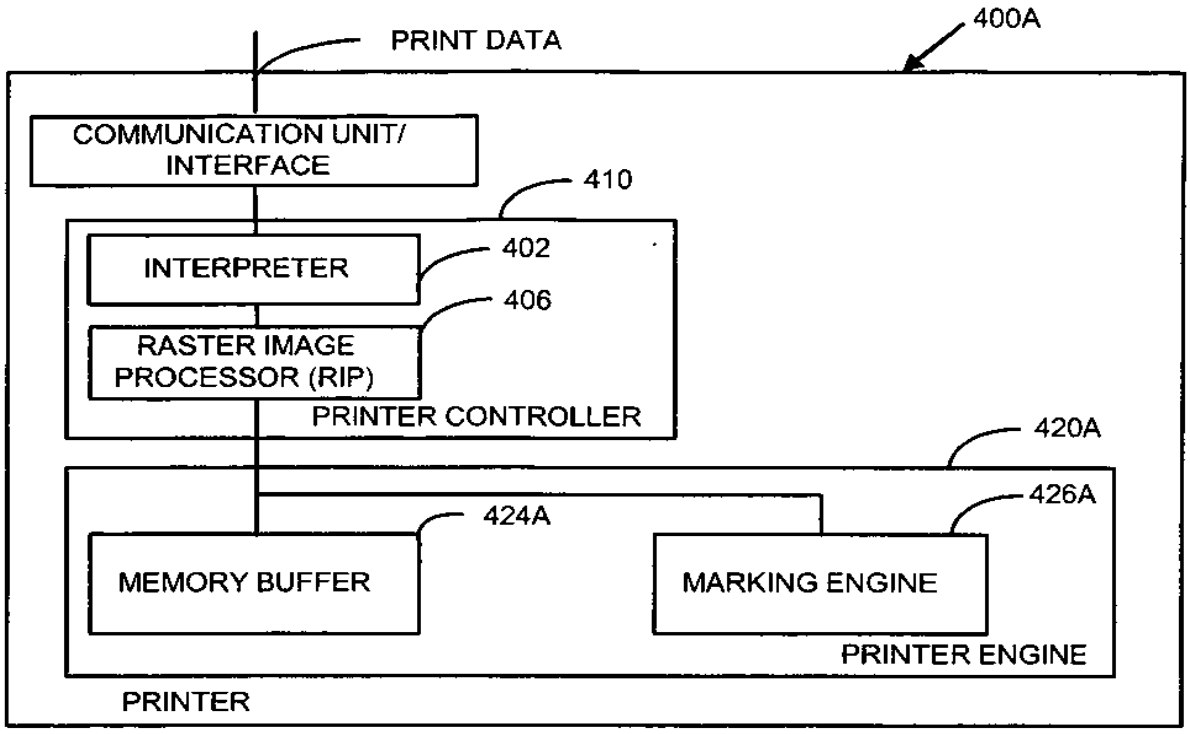


Fig. 4 A

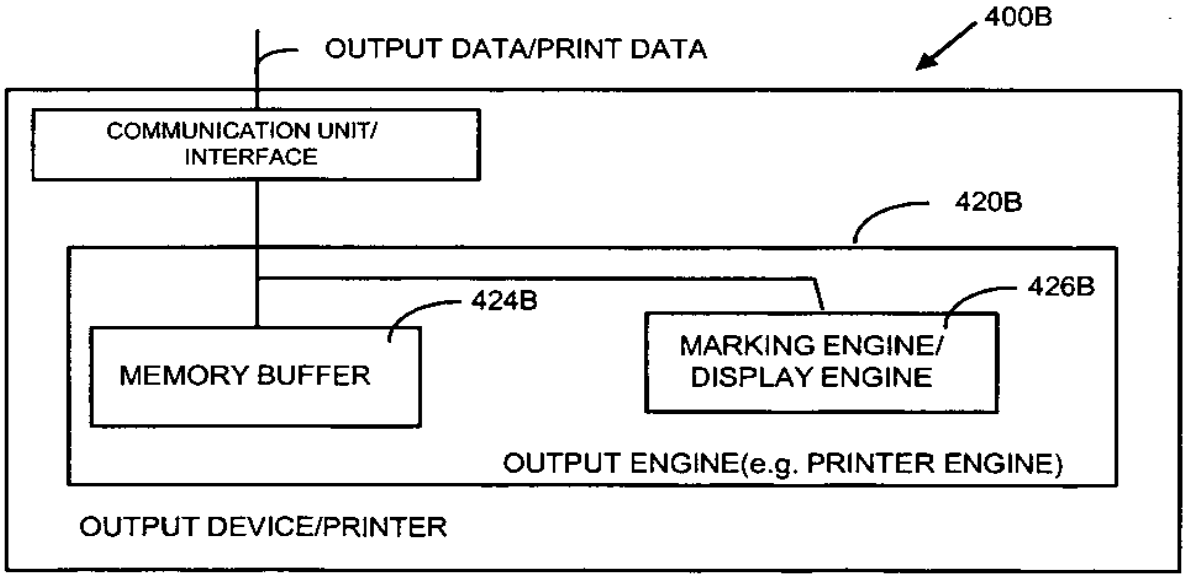


Fig. 4 B

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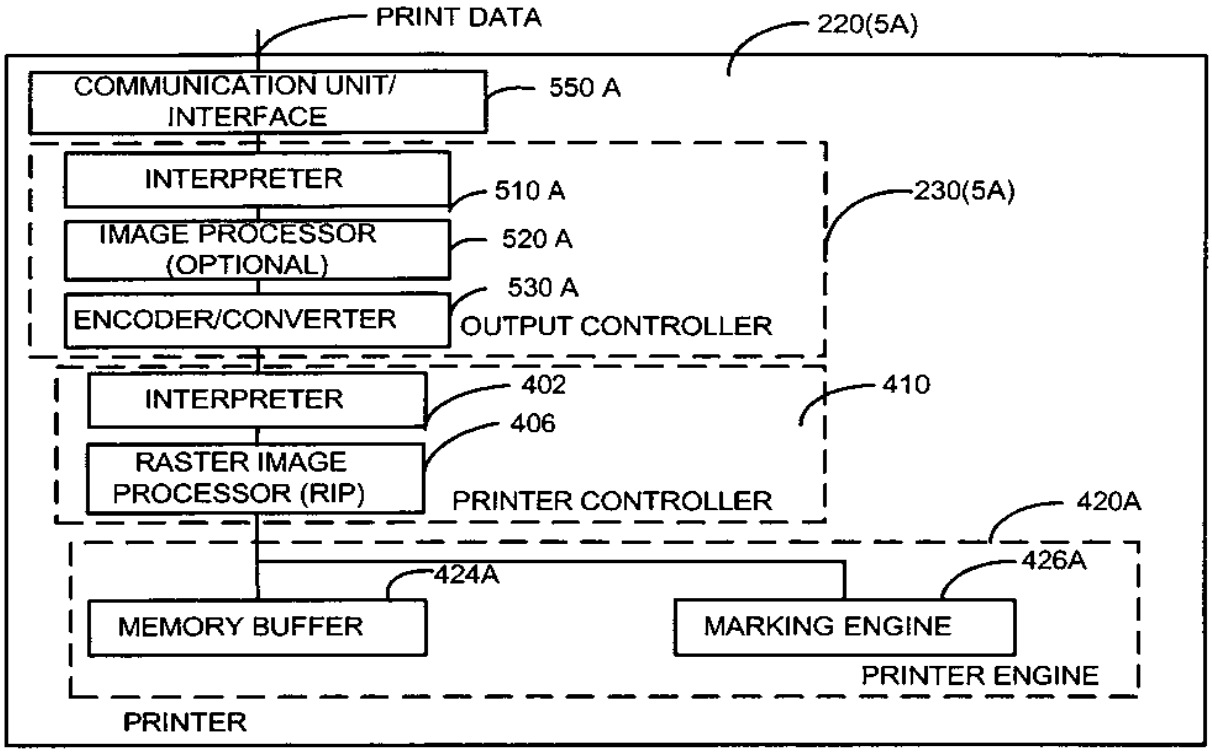


Fig. 5 A

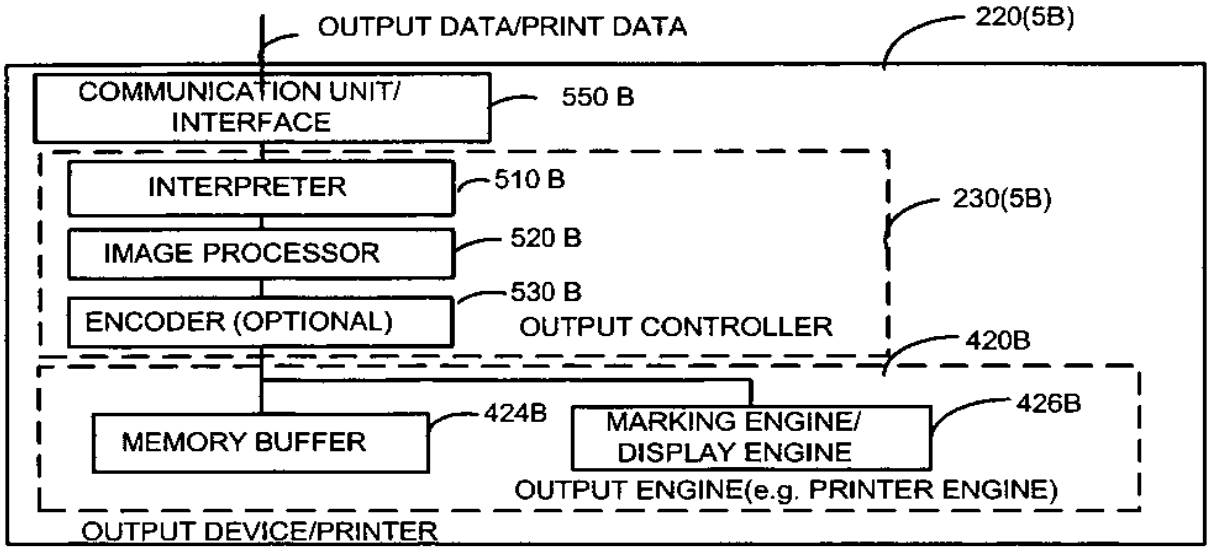


Fig. 5 B

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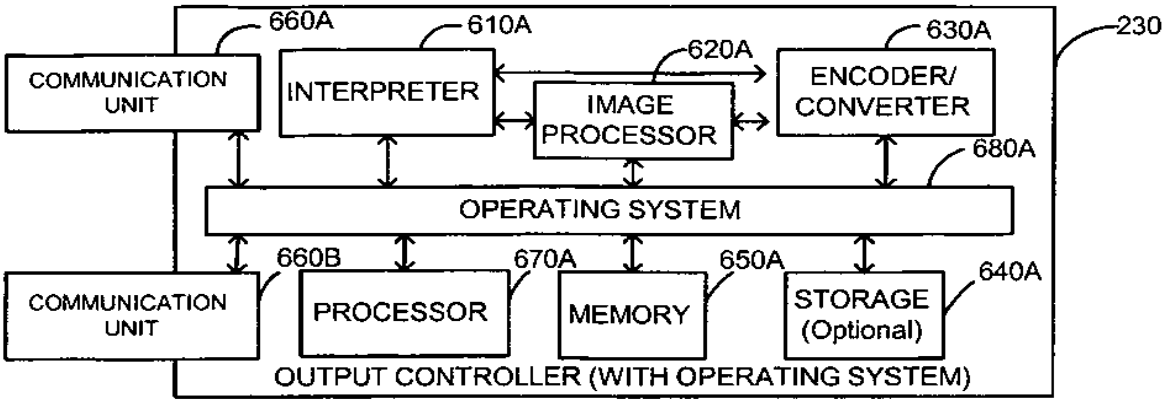


Fig 6 A

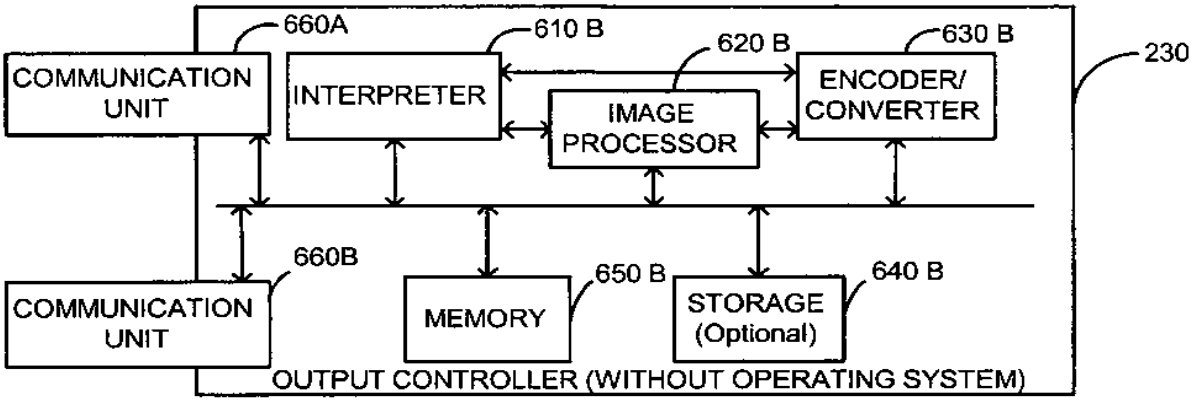


FIG 6 B

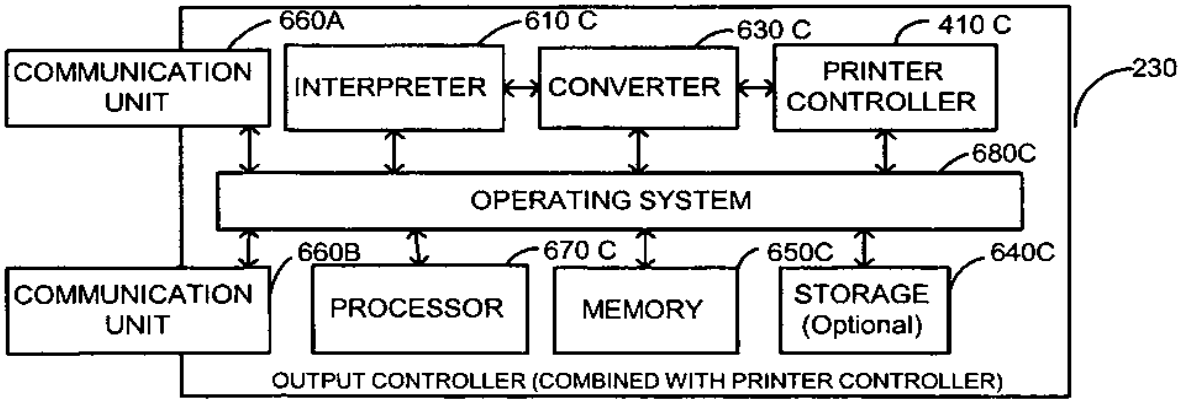


FIG 6 C

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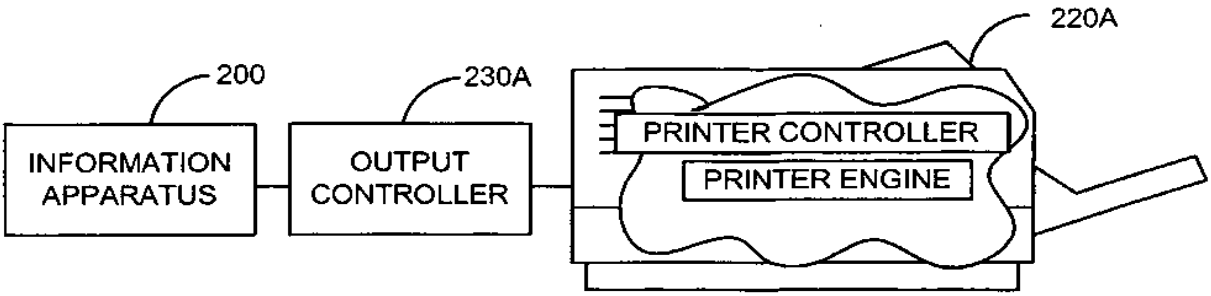


Fig. 7A

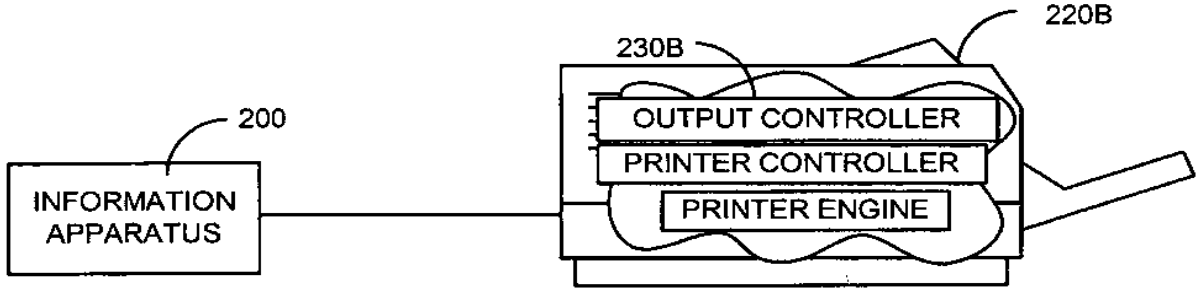


Fig. 7B

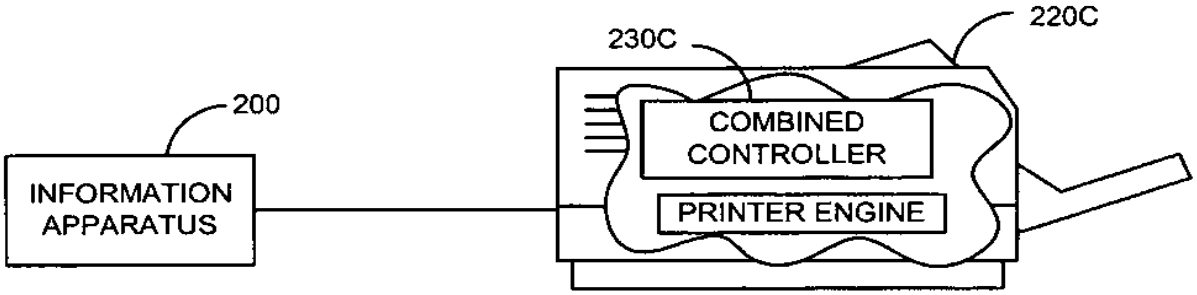


Fig. 7C

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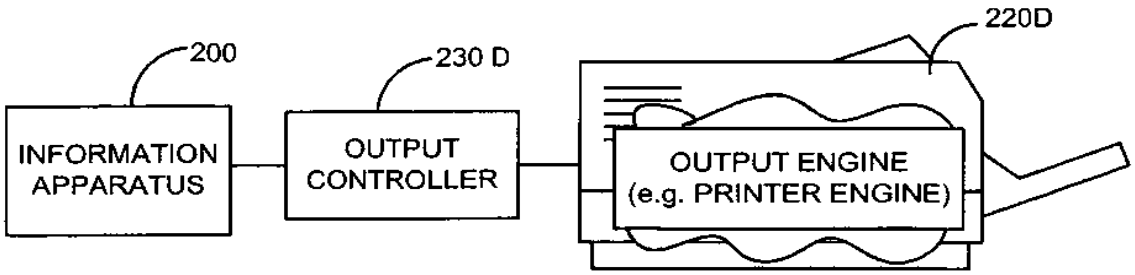


FIG 7D

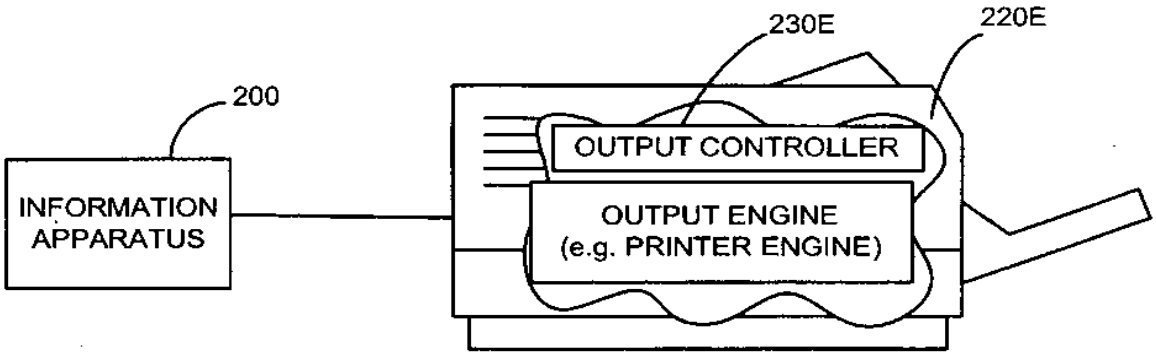


FIG 7E

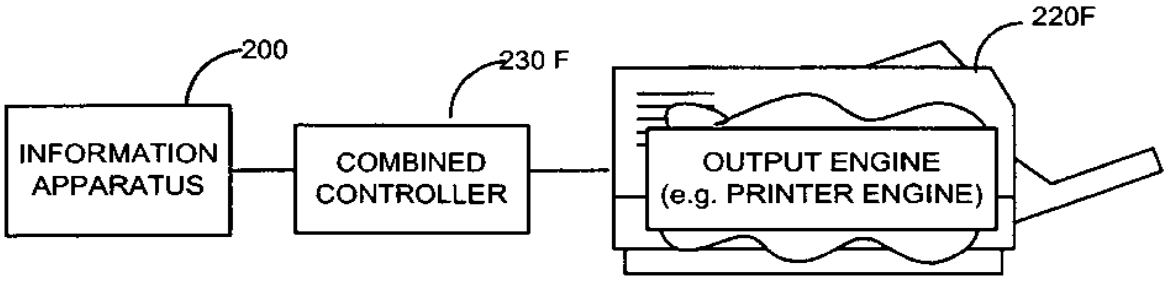


FIG 7F

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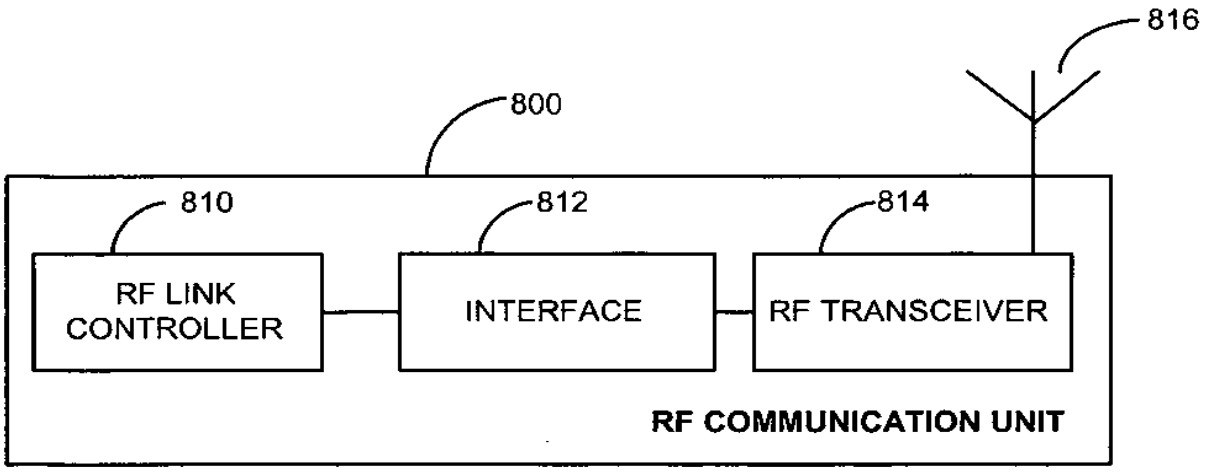


FIG 8A

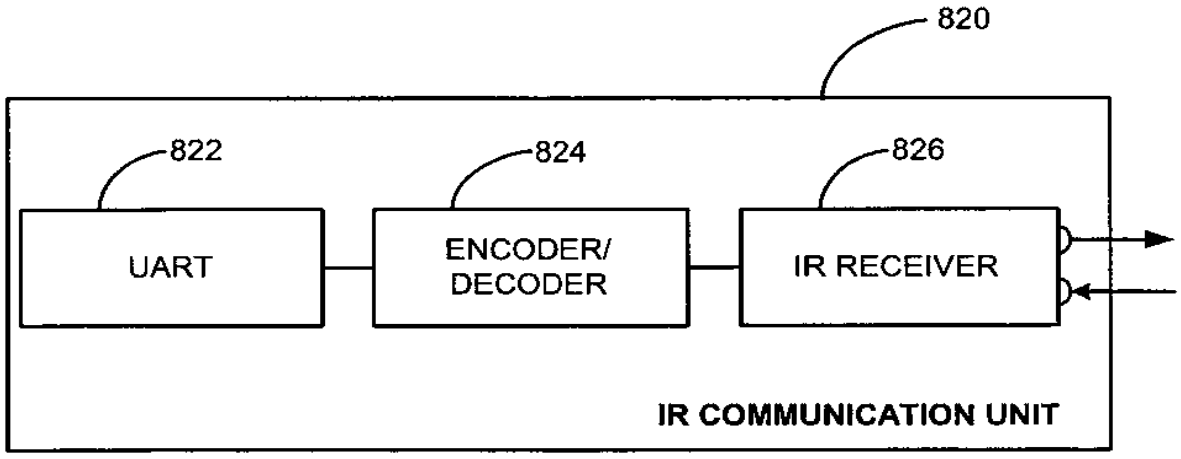


FIG 8B

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

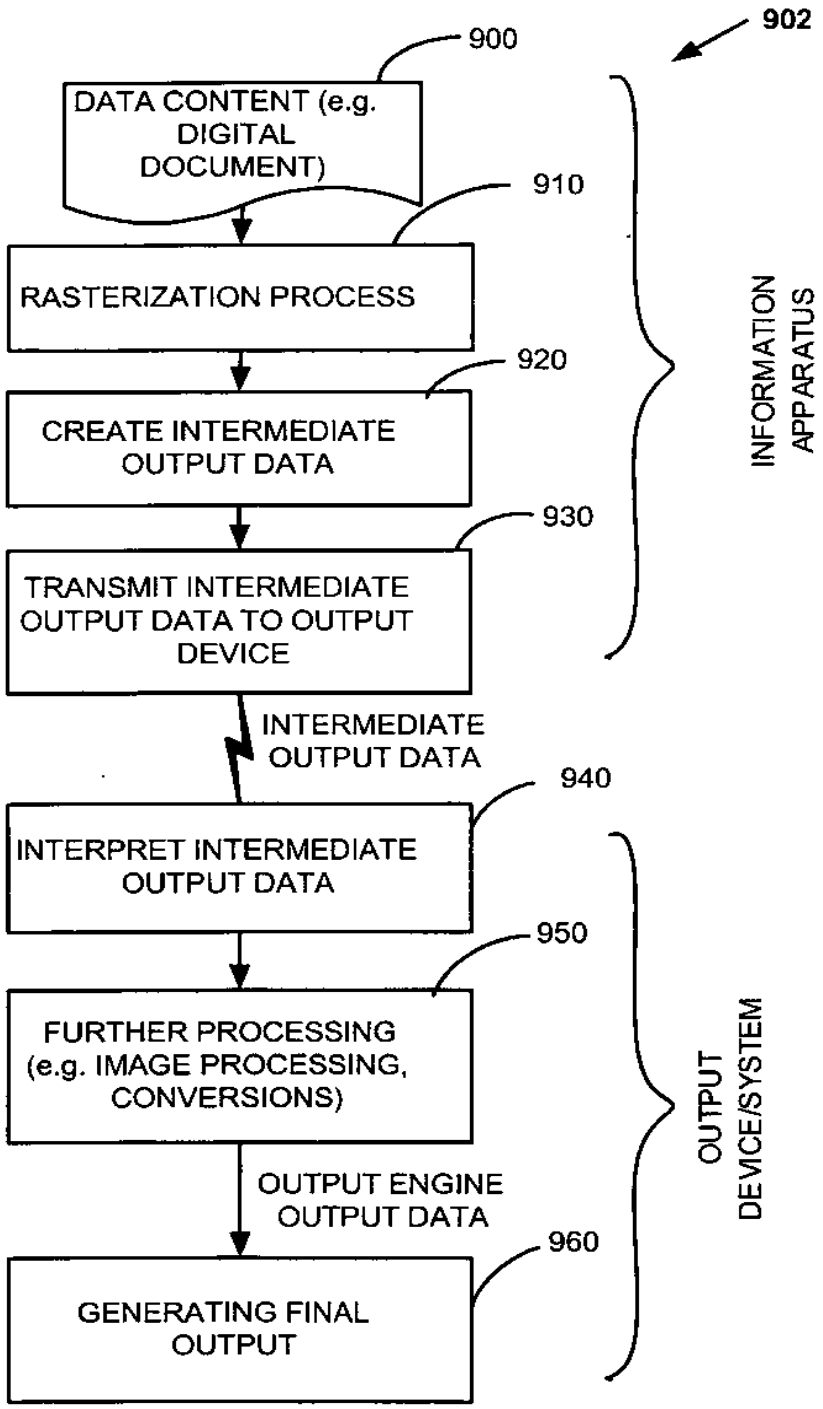


FIG 9

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Lexmark v. Flexiworld

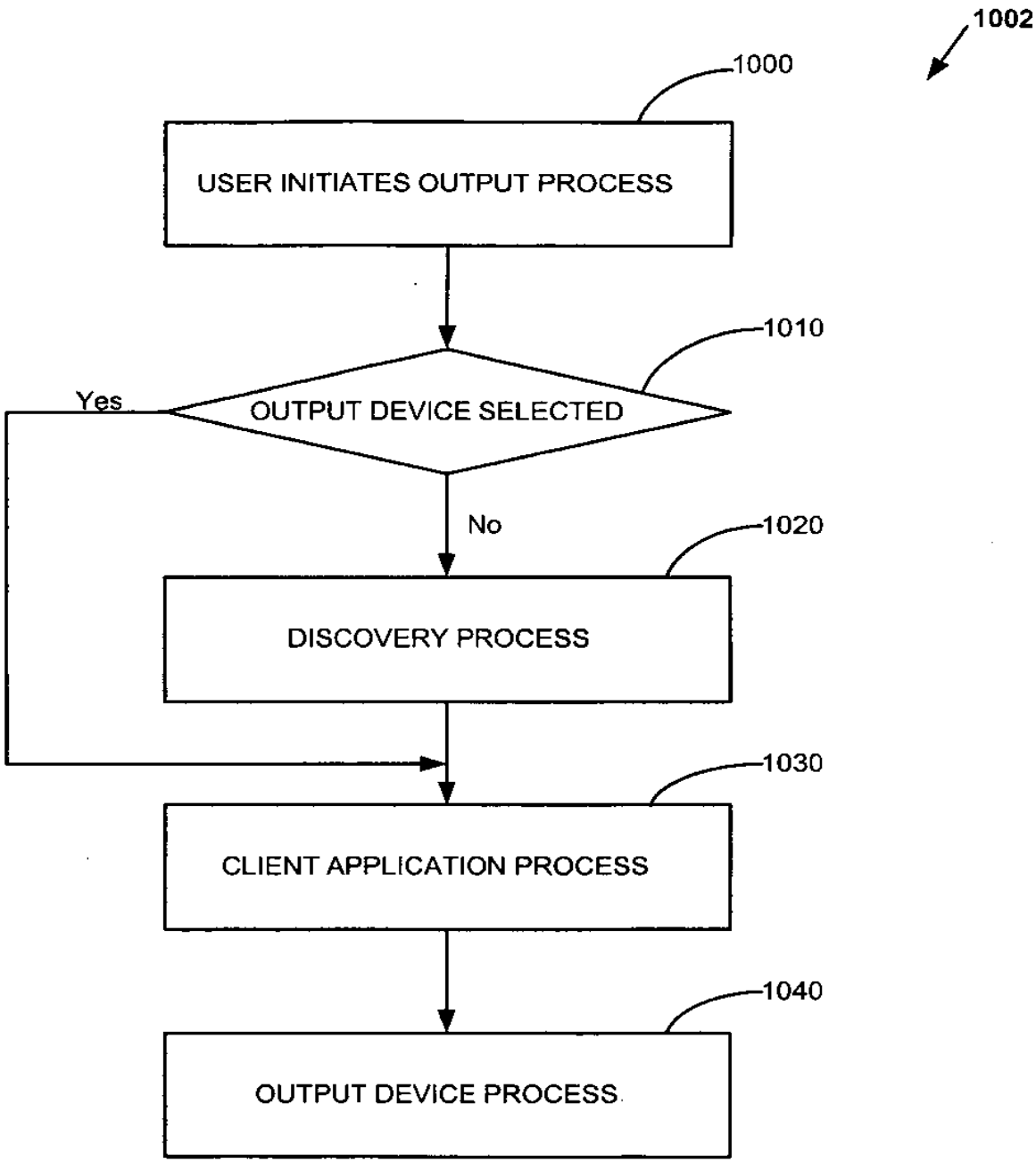


FIG 10

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

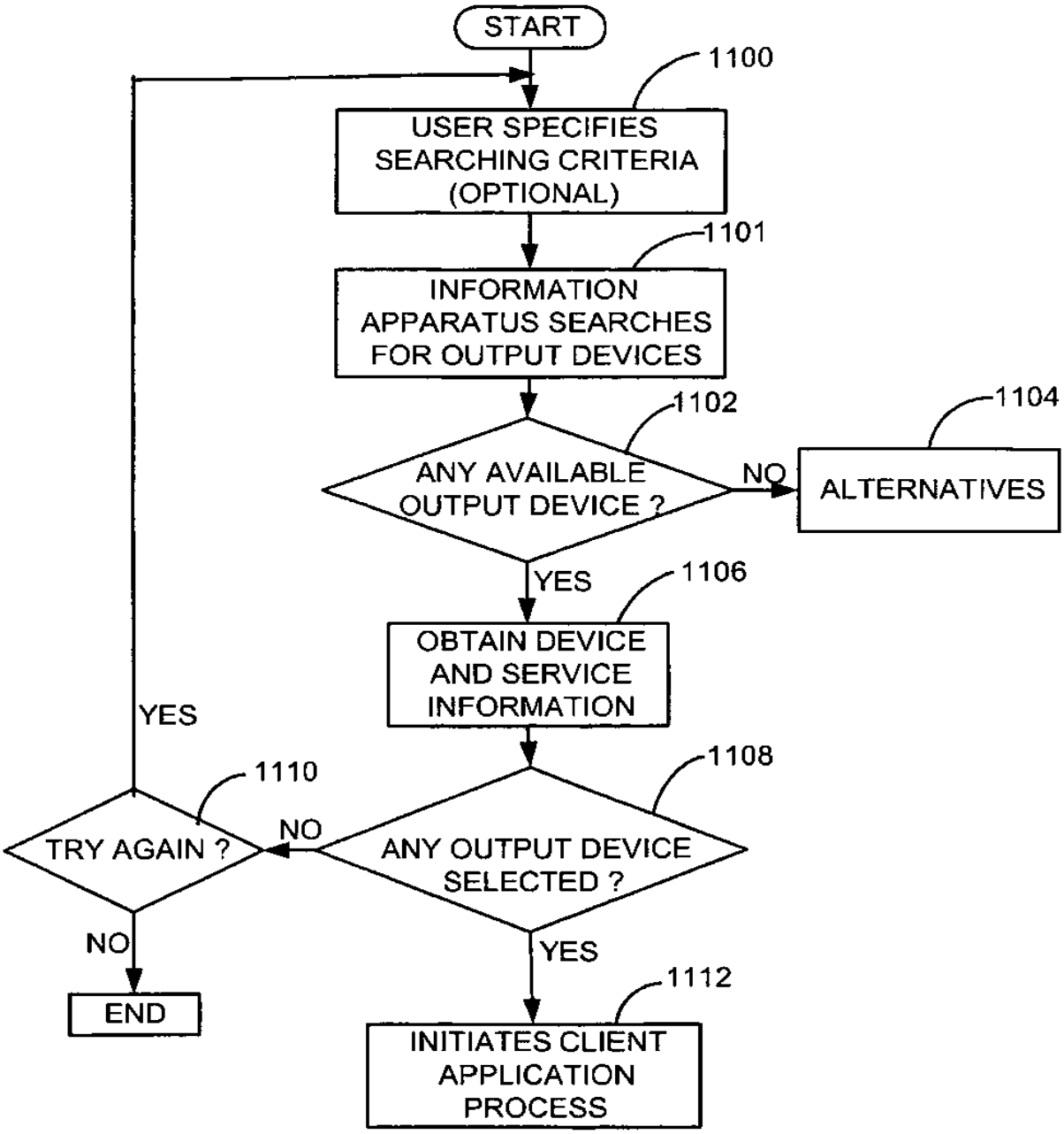


FIG 11

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

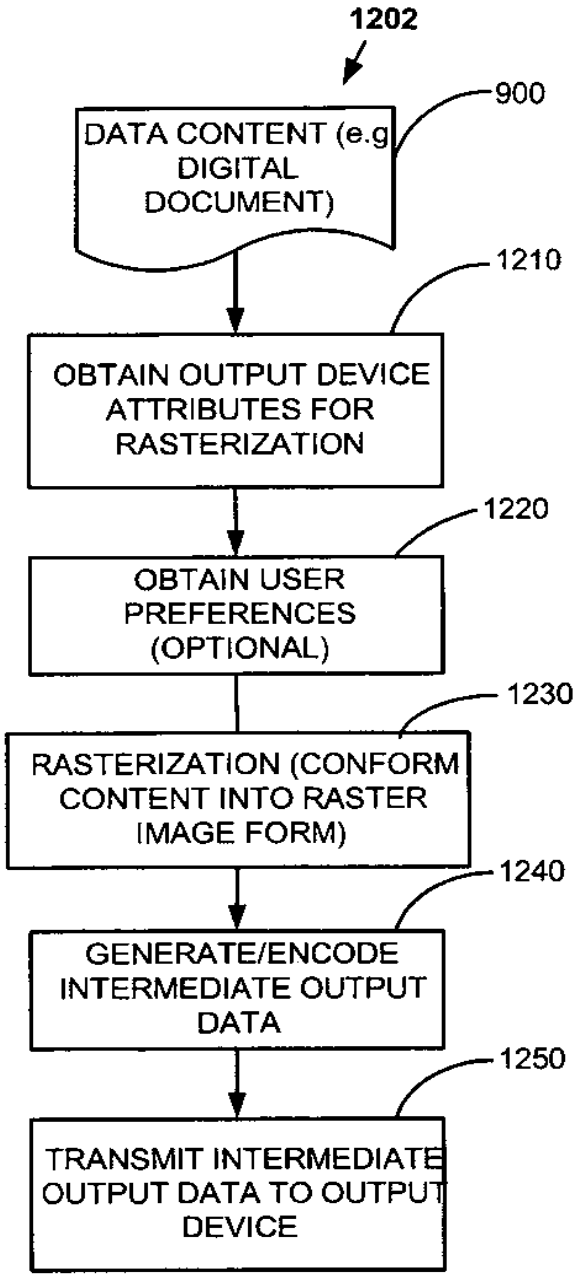


FIG 12 A

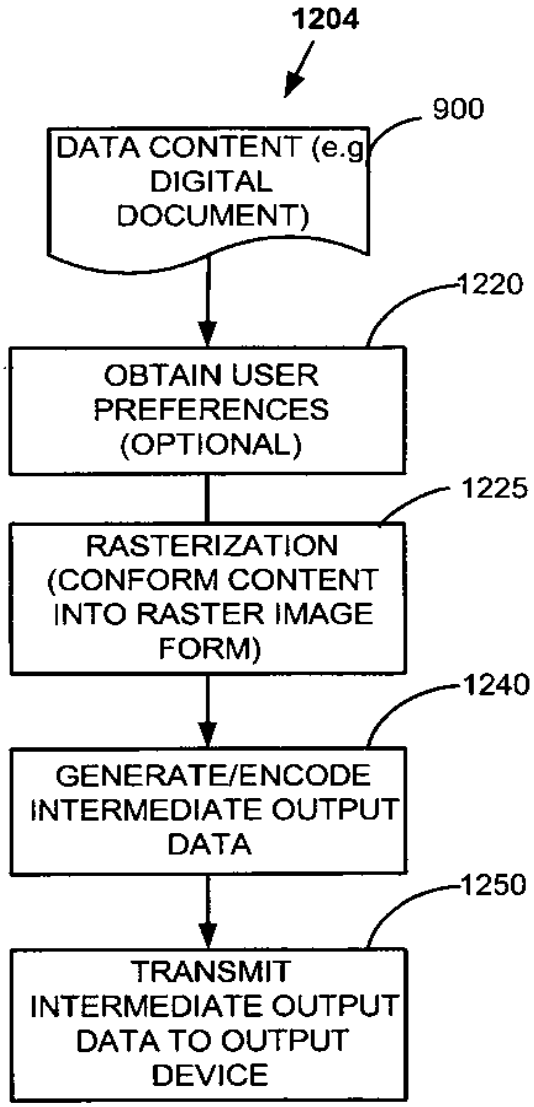


FIG 12 B

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

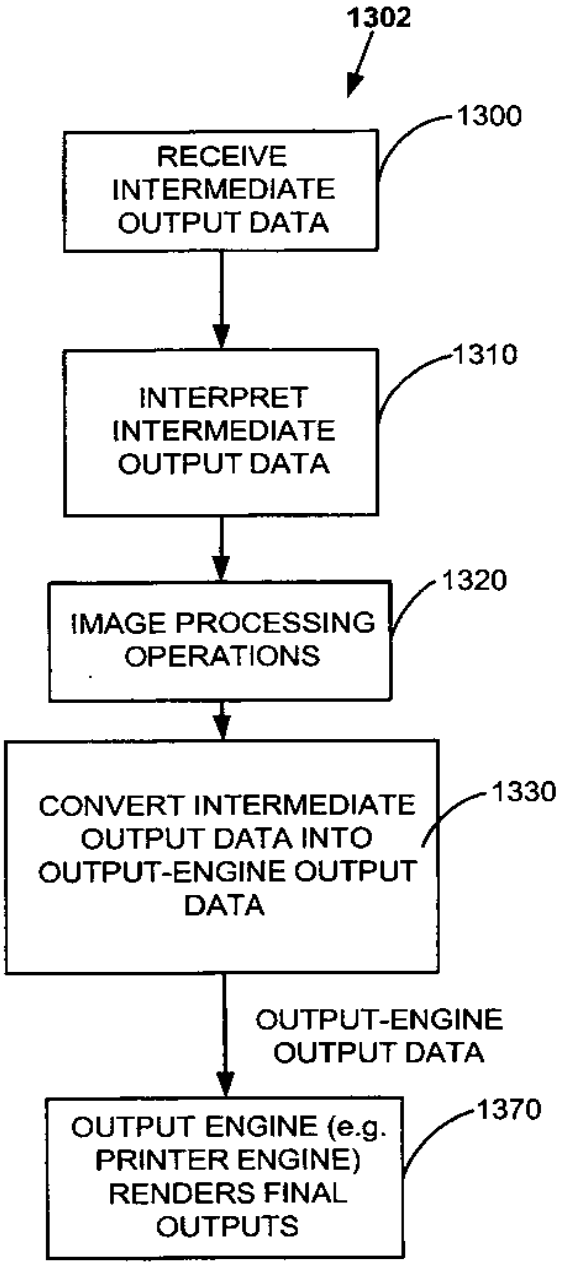


FIG 13 A

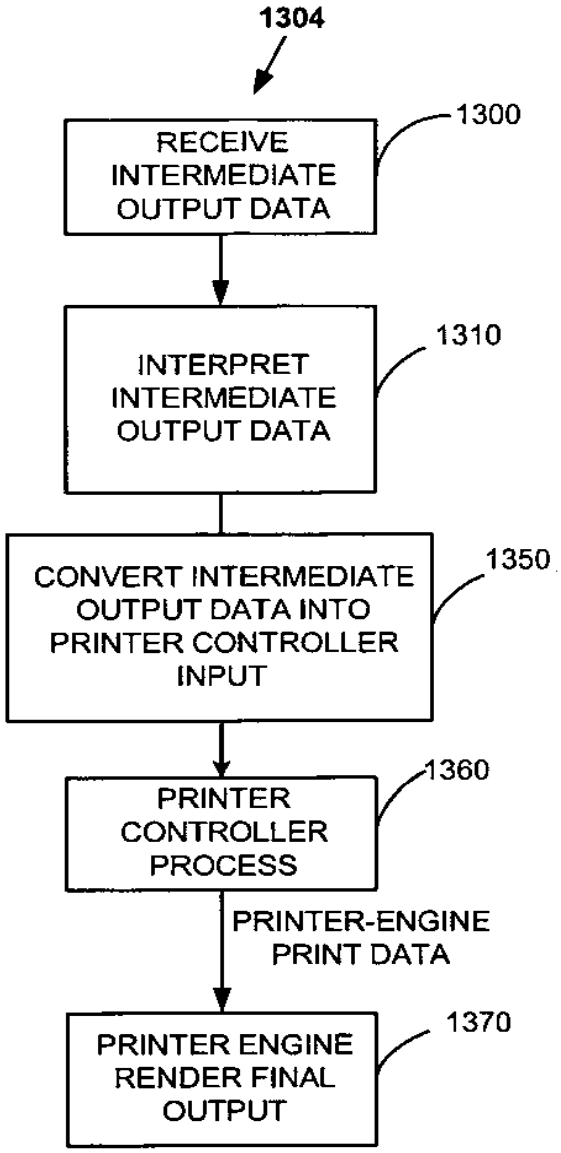


FIG 13 B

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/43796

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : G06F 3/12, 15/177
US CL : 707/526; 709/327, 358/1.6; 717/176
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 707/526; 709/327, 358/1.6; 717/176

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 5,867,633 A (TAYLOR, III et al.) 02 February 1999 (02.02.1999), abstract, Figures 1 & 4, column 1, lines 59-67, column 2, lines 1-40, column 3, lines 15-31, column 4, lines 45-64, column 5, lines 3-10 & 25-45, column 6, lines 1-7, 15-20, 30-40, & 55-61, column 7, lines 45-50, column 8, lines 10-20.	42-43, 45-48, 164-171, 195 ---------- 1-41,44,140,144,161,162,195
Y	EP 952513 A1 (HEWLWTT PACKARD COMPANY) 27 October 1999 (27.10.1999), abstract, Figure 1, column 2, lines 35-45, column 3, lines 25-30, column 4, lines 15-20, 29-35, column 5, lines 20-25, column 6, lines 1-7.	6-9, 12, 20-22, 25, 28, 40-41, 44
y	ANONYMOUS. Windows for Workgroups - This Newest Version of Windows has Features and Capabilities that Make it a Natural in a Networked Environment Windows Magazine January 1993, No. 401, page 132, see entire document.	1-41

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search 17 March 2002 (17.03.2002)	Date of mailing of the international search report 24 APR 2002
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer Jeffrey Allen ROSSI Telephone No. 305-3700

Form PCT/ISA/210 (second sheet) (July 1998)

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/43796

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 5,613,124 A (ATKINSON et al.) 18 March 1997 (18.03.1997), Figure 4, column 6, lines 9-20 & 30-52; column 8, lines 23-25 & 40-50, column 10, lines 10-15 & 57-60, column 12, lines 20-25 & 30-42.	49-73, 77-86, 88, 96-97, 100-103, 107, 111, 118-124, 126, 128, 130-131, 135-139, 141, 144, 146, 147-154, 156, 157, 160, 163, 180, 184, 186-190, 193-194, & 211-212 --- 74-74, 89-95, 104-105, 112-116, 140, 144, 161, 164-171, 173-175, 177-179, 196-204, 208-210
Y	SCHULYER, C. et al. Solution to Sharing Local Printers: LAN Systems Inc., LANSpool, $395 per Server PC Week October 1989, Vol. 6, No. 39, pages 75(2), see entire document.	164-171, 173-179, 181
A	US 5,748,859 A (TAKAYANAGI et al.) 05 May 1998 (05.05.1998).	1-212
A	US 6,061,142 A (SHIM) 09 May 2000.	1-212
A	US 6,115,133 A (WATANABE) 05 September 2000.	1-212
A	EP 751,650 A2 (CANON KABUSHIKI KAISHA) 02 January 1997 (02.01.1997).	1-212
A	EP 961,184 A2 (FISHER-ROSEMOUNT SYSTEMS, INC.) 01 December 1999 (01.12.1999).	1-212
A	CATON, M. JetEye Users Pay for Convenience PC Week June 1996, Vol. 13, No. 25, page 1.	1-212
A	ZULICH, M. Learning to Share in SOHO Computer Shopper, Vol. 18, No. 7, page 274.	1-212
A	WONG, W. Light Moves LAN Magazine, May 1995, Vol. 10, No. 5, page 164(4).	1-212
A	SULLIVAN, K. Hi-tech Achieved with Class; SchoolDistrict Adopts Wireless LAN to Bring PCs to Students. PC Week August 1997, Vol. 14, No. 34, pages 83(2).	1-212
A,P	US 6,178,468 B1 (RUDD et al.) 23 January 2001 (23.01.01).	1-212

Form PCT/ISA/210 (second sheet) (July 1998)

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/43796

Continuation of B. FIELDS SEARCHED Item 3:
Dialog: USPATFUL, European Patents Fulltext, PCT Fulltext, EECOMP, COMPSCI

keywords: output()object, display()object, printer, device()object, render, retrieving()(parameters or attributes), pervasive()output, remote()(processing or rendering), client, server, network, wireless, document, page,

Form PCT/ISA/210 (second sheet) (July 1998)

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

REC'D 25 FEB 2003
WIPO PCT

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 1282-015/MMM	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US01/43796	International filing date *(day/month/year)* 18 November 2001 (18.11.2001)	Priority date *(day/month/year)* 20 November 2000 (20.11.2000)
International Patent Classification (IPC) or national classification and IPC IPC(7): G06F 3/12, 15/177 and US Cl.: 707/526; 709/327, 358/1.6; 717/176		
Applicant FLEXIWORLD TECHNOLOGIES, INC		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of ___ sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
30 May 2002 (30.05.2002)	15 January 2003 (15.01.2003)
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer Heather Herndon Telephone No. 703.305.3900

Form PCT/IPEA/409 (cover sheet)(July 1998)

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US01/43796

I. Basis of the report

1. With regard to the **elements** of the international application:*

☒ the international application as originally filed.

☒ the description:
pages 1-56 as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____.

☒ the claims:
pages 57-79 , as originally filed
pages NONE , as amended (together with any statement) under Article 19
pages NONE , filed with the demand
pages NONE , filed with the letter of _____.

☒ the drawings:
pages 1-10 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____.

☐ the sequence listing part of the description:
pages NONE , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____.

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination(under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in printed form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

☒ the description, pages NONE

☒ the claims, Nos. NONE

☒ the drawings, sheets/~~fig~~ NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

** Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*
*** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

Form PCT/IPEA/409 (Box I) (July 1998)

Lexmark, Exhibit 1003
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US01/43796

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims Please See Continuation Sheet	YES
	Claims Please See Continuation Sheet	NO
Inventive Step (IS)	Claims Please See Continuation Sheet	YES
	Claims Please See Continuation Sheet	NO
Industrial Applicability (IA)	Claims Please See Continuation Sheet	YES
	Claims Please See Continuation Sheet	NO

2. CITATIONS AND EXPLANATIONS
Please See Continuation Sheet

Form PCT/IPEA/409 (Box V) (July 1998)

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

V.1. Reasoned Statements:
The opinion as to Novelty was positive (Yes)with respect to claims 1-41, 44, 74-75, 89-95, 104-105, 112-116, 140, 144, 161, 162, 164-171, 173-179, 181, 195, 196-204, 208-210
The opinion as to Novelty was negative (No) with respect to claims 42-43, 45-48, 49-73, 77-86, 88, 96-97, 100-103, 107, 111, 118-124, 126, 128, 130-131, 135-139, 141, 144, 146, 147-154, 156, 157, 160, 163, 180, 184, 186-190, 193-194, 211-212164-171, 195
The opinion as to Inventive Step was positive (Yes)with respect to claims NONE
The opinion as to Inventive Step was negative(NO) with respect to claims 1-212
The opinion as to Industrial Applicability was positive (YES) with respect to claims 1-212
The opinion as to Industrial Applicability was negative(NO) with respect to claims NONE

Claims 42-43, 45-48, 164-171, and 195 lack novelty under PCT Article 33(2) as being anticipated by Taylor, III et al., US Patent 5,867,633. Taylor discloses a method and system wherein a document processing application receives an image file for printing. The application registers the image with the image server. The application initiates a print job, sending the image identifier issued by the image server and selects print parameters to the printer device. The image server and printer driver can be independently executing processes. Taylor further discloses a system in which the application decides how to divide up the image processing tasks between the application and the printer driver in order to improve efficiency. The printer driver performs additional processing to generate an output for the printer at an appropriate resolution.

Claims 49-73, 77-86, 88, 96-97, 98-99, 100-103, 106, 108, 109, 110, 107, 111, 117-124, 125, 126, 127, 128, 129-131, 132-134, 135-139, 141, 144, 146, 147-154, 155, 156, 157, 158-159, 160, 163, 172, 180, 182-183, 184, 185, 186-190, 191-194, 205-207, and 211-213 lack novelty under PCT Article 33(2) as being anticipated by Atkinson et al., US Patent 5,613,124. Atkinson discloses a cache entry containing presentation data representing the content of the source object in a device-independent bitmap format formatted for a type of printer. The client program can also use cache entry to render the source object on the printer. See figure 4 and column 6, lines 9-20 and 30-52. Client programs can render source object data by requesting the desired data in a particular presentation format and retrieving the presentation data using a data transfer mechanism provided by the underlying system.

Claims 1, 2-5, 10-11, 13-19, 23-24, 26-27, 29-39, and 42-43 lack an inventive step under PCT Article 33(3) as being obvious over Taylor, III et al., US Patent 5,867,633 in view of Anonymous, Windows for Workgroups. Taylor discloses a method and system wherein a document processing application receives an image file for printing. The application registers the image with the image server. The application initiates a print job, sending the image identifier issued by the image server and selects print parameters to the printer device. The image server and printer driver can be independently executing processes. Taylor further discloses a system in which the application decides how to divide up the image processing tasks between the application and the printer driver in order to improve efficiency. The printer driver performs additional processing to generate an output for the printer at an appropriate resolution. Windows for Workgroups discloses a peer-to-peer network enabling a user to share disk and printer resources from any workstation running the program in enhanced mode. It would not involve an inventive step to provide a network enabling a user to share disk and printer resources for the purpose of printing image files as it is taught by Windows for Workgroups. Moreover, transmitting from an information apparatus to a processor that is distinct from the apparatus and the selected output device would not involve an inventive step as it was common to utilize apparatuses and output devices over a network sharing disk and printer resources.

Claims 6-9, 12, 20-22, 25, 28, 40-41, and 44 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Hewlett-Packard Company, EP 952513. Hewlett-Packard

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

discloses a method of configuring a peripheral device on a network without user intervention includes a server node receiving identification data for identifying the peripheral device on the network, and, if the peripheral device is a new device on the network or a driver for the peripheral device is not registered on the server node, the server node self-installing the driver for the peripheral device. See abstract and columns 2-6. It would not involve an inventive step to provide a communication channel between an information apparatus and an output device and receiving one or more attributes describing the output device as taught jointly by Taylor, Windows for Workgroups, and Hewlett-Packard.

Claims 74-76, 89-95, 104-105, 112-116, 140, 142-145, 161, 196-204, and 208-210 lack an inventive step under PCT Article 33(3) as being obvious over Atkinson et al., US Patent 5,613,124. Atkinson discloses a cache entry containing presentation data representing the content of the source object in a device-independent bitmap format formatted for a type of printer. The client program can also use cache entry to render the source object on the printer. See figure 4 and column 6, lines 9-20 and 30-52. Client programs can render source object data by requesting the desired data in a particular presentation format and retrieving the presentation data using a data transfer mechanism provided by the underlying system. It would not involve an inventive step to provide various types of output data comprising of different image processing operations as taught by Atkinson's presentation data rendering.

Claims 164-171, 173-179, and 181 lack an inventive step under PCT Article 33(3) as being obvious over Atkinson et al., US Patent 5,613,124 in view of Schulyer, C., Solution to Sharing Local Printers. Atkinson discloses a cache entry containing presentation data representing the content of the source object in a device-independent bitmap format formatted for a type of printer. The client program can also use cache entry to render the source object on the printer. See figure 4 and column 6, lines 9-20 and 30-52. Client programs can render source object data by requesting the desired data in a particular presentation format and retrieving the presentation data using a data transfer mechanism provided by the underlying system. Schulyer discloses a method for allowing local printers to be shared by users on the network. It would not involve an inventive step to transmit image data to various printers in a network as taught by both Atkinson and Schulyer.

---------- NEW CITATIONS ----------
NONE

Electronic Acknowledgement Receipt

EFS ID:	15962280
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Correspondence Address:	Edward B. Anderson Kolisch Hartwell, P.C. 200 Pacific Building 520 S.W. Yamhill Street Portland OR 97204 US 503-224-6655 docketing@khpatent.com
Filer:	Peter D. Sabido./Veronica Gotelli
Filer Authorized By:	Peter D. Sabido.
Attorney Docket Number:	FXT312
Receipt Date:	05-JUN-2013
Filing Date:	18-NOV-2001
Time Stamp:	20:14:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	20130605_IDS_FXT312.pdf	616490	no	15
Warnings:					
Information:					
2	Foreign Reference	FP01_CN1217503_with_English_abstract_FXT312.pdf	2281111	no	22
Warnings:					
Information:					
3	Foreign Reference	FP02_WO0195096_FXT312.pdf	2169584	no	45
Warnings:					
Information:					
4	Foreign Reference	FP03_WO0195097_FXT312.pdf	2226413	no	47
Warnings:					
Information:					
5	Foreign Reference	FP04_CN1488106_with_English_Abstract_FXT312.pdf	3710024	no	73
Warnings:					
Information:					
6	Foreign Reference	FP05_CN02806907_Chang_and_corresponding_English_PCT_02-084928_FXT312.pdf	8619249	no	156
Warnings:					
Information:					
7	Foreign Reference	FP06_CN101834892_SIPO_abstract_only_FXT312.pdf	120913	no	1
Warnings:					
Information:					
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Information:					
9	Foreign Reference	FP08_CN101825996_Issued_Patent_Abstract_Claims_PCT_02-084928_FXT312.pdf	11461854	no	173

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Lexmark v. Flexiworld

Warnings:					
Information:					
10	Non Patent Literature	NPL01_WiSAP_Wireless_Personal_Access_FXT312.pdf	1084953 94c9 ff2c2722 84f0 2d38 ca1 f48c 57ce 29ec f2f5	no	9
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Information:					
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Information:					
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Warnings:					
Information:					
13	Non Patent Literature	NPL04_Mapping_Salutations_Architecture_FXT312.pdf	1168591 3fa7 339a 27ce 9e9 5 1 16a 2a 883a 5e4 4a6 84b 1 27f e9c	no	26
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Information:					
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Information:					
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Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Warnings:					
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19	Non Patent Literature	NPL10_20130524_NOA_from_FXT312.PDF	6122582 e284fc6da0fb707ca31acad52b7f5fbde169f	no	24
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22	Non Patent Literature	NPL13_20120326_OA_13108925_FXT312.PDF	6775876 e6eaa7da10f399e882d67bde5d8b57b5df1a808	no	30
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Information:					
23	Non Patent Literature	NPL14_20020320_ISR_PCTUS01_43796_FXT312.pdf	106895 e90c59820d8024cb6a88148a0d0de1c100c7f86	no	3
Warnings:					
Information:					
24	Non Patent Literature	NPL15_20030115_IPER_PCTUS01_43796_FXT312.pdf	260211 512d507999990756d7721ab1717beaaed4877e26d4	no	5
Warnings:					
Information:					
		Total Files Size (in bytes):	72088349		

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(Not for submission under 37 CFR 1.99)

Application Number	09992413
Filing Date	2001-11-18
First Named Inventor	William Ho Chang
Art Unit	2453
Examiner Name	Esther Benoit
Attorney Docket Number	FXT312

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6252964	B1	2001-06-26	Wasilewski et al.	
	2	6363149	B1	2002-03-26	Candelore	
	3	6889385	B1	2005-05-03	Rakib et al.	
	4	7133845	B1	2006-11-07	Ginter et al.	
	5	7133846	B1	2006-11-07	Ginter et al.	

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	Filing Date	2001-11-18
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	Examiner Name	Esther Benoit
	Attorney Docket Number	FXT312

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] ¡	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	U.S. PATENT AND TRADEMARK OFFICE, Office action regarding U.S. Patent Application Serial No. 13/108,925, February 11, 2013, 44 pages.	☐

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	Filing Date	2001-11-18
	First Named Inventor	William Ho Chang
	Art Unit	2453
	Examiner Name	Esther Benoit
	Attorney Docket Number	FXT312

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☐ A certification statement is not submitted herewith.

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Signature	/Peter D. Sabido/	Date (YYYY-MM-DD)	2013-05-13
Name/Print	Peter D. Sabido	Registration Number	50,353

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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Electronic Acknowledgement Receipt

EFS ID:	15764804
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Correspondence Address:	Edward B. Anderson Kolisch Hartwell, P.C. 200 Pacific Building 520 S.W. Yamhill Street Portland OR 97204 US 503-224-6655 docketing@khpatent.com
Filer:	Peter D. Sabido.
Filer Authorized By:	
Attorney Docket Number:	FXT312
Receipt Date:	13-MAY-2013
Filing Date:	18-NOV-2001
Time Stamp:	19:28:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	20130513_Supp_IDS_FXT312.pdf	612628	no	4
Warnings:					
Information:					
2	Non Patent Literature	NPL1_20130211_OA_from_FXT309DIV2_FXT312.PDF	9708351	no	44
Warnings:					
Information:					
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Filing Date	2001-11-18
First Named Inventor	William Ho Chang
Art Unit	2453
Examiner Name	Esther Benoit
Attorney Docket Number	FXT312

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	1	JP11316658	JP	A	1999-11-16	Mitsui		☐

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	1	US PATENT AND TRADEMARK OFFICE, Office Action regarding US Patent Application Serial No. 13/108,922, November 5, 2012, 63 pages.	☐

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☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Peter D. Sabido/	Date (YYYY-MM-DD)	2013-02-05
Name/Print	Peter D. Sabido	Registration Number	50,353

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Espacenet

Bibliographic data: JP11316658 (A) — 1999-11-16

PRINTER

Inventor(s): MITSUI KENJIRO ± (MITSUI KENJIRO)

Applicant(s): RICOH KK ± (RICOH CO LTD)

Classification: - **international:** ***B41J29/38; G06F3/12; H04N1/00;*** (IPC1-7): B41J29/38; G06F3/12; H04N1/00

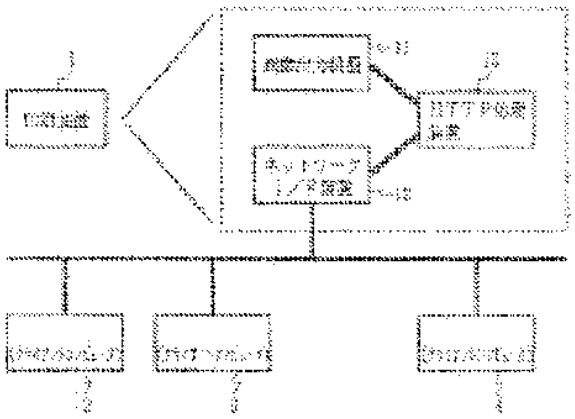
- **European:**

Application number: JP19980137684 19980502

Priority number (s): JP19980137684 19980502

Abstract of JP11316658 (A)

PROBLEM TO BE SOLVED: To provide a printer with which various settings of printing and network protocols are standardized and installation of a printer driver in each computer is not required. SOLUTION: A printer 1 provides a network address and a URL for HTTP from a network interface device 12 and an HTTP processor 13, identifies them from computers 2, 3 and 4 through a WWW browser of a client or the like when connected to a network and controls them. This browser can display the HTML and is not limited to Mosaic or Netscape. Since the computers 2, 3 and 4 control the printer 1 through the WWW browser any type of HTTP can be controlled in so far as it is controlled by the HTTP processor 13 independently of the type of its own computer or so to be used.



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Translated: 07:23:06 JST 10/25/2012
Dictionary: Last updated: 10/15/2012 / Priority: 1. Electronic engineering / 2. Information communication technology (ICT) / 3. Technical term

FULL CONTENTS

[Claim(s)]
[Claim 1]An airline printer comprising:
A network connection means which lets a network pass and communicates with the singular number or two or more computers.
A picture output means which outputs image data acquired from the aforementioned singular number or two or more computers via this network connection means, An HTTP processor which controls communication by an HTTP protocol used with a communications protocol of World Wide Web when communicating by the aforementioned network connection means.

[Claim 2]The airline printer according to claim 1 providing further an auxiliary memory for performing preservation of a printing establishment value corresponding to each computer, and extraction.
[Claim 3]The airline printer according to claim 1 or 2 characterized by performing transmission and reception of printing condition setting or image data by the aforementioned network connection means via the aforementioned HTTP processor from application which operates by other computers.

[Detailed Description of the Invention]
[0001]
[Field of the Invention]The present invention relates to the network printer which unified the network protocol peculiar to each computer.
[0002]
[Description of the Prior Art]In recent years, the demand which carries out the printing job of the processed document, the image, etc. is growing with the remarkable spread of office OA equipment. In order to respond to this request, for example, as shown in Fig.4, two or more computers and airline printers are connected in a network, and the system of the form that each computer shares an airline printer is used widely. Since such an airline printer connected to the network will start printing from on each computer if a user issues a printing instruction, it becomes unnecessary to install an airline printer for every user, and usability is excellent. By the way, the printing instruction published from each computer is made with a network protocol peculiar to the computer, analyzes it for this by the airline printer side, and carries out a printing job. It was the requisite to install the device driver for the airline printers one by one for every computer.
[0003]
[Problem to be solved by the invention]However, if it said that a printer driver for airline printers which a network protocol is different for every computer, and is different for every equipment had to be installed, it was truly inconvenient and was time-consuming work. Then, the present invention

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unifies variety network protocol and printing establishment, and an object of the present invention is to provide the airline printer which abolished the necessity of installing a printer driver in each computer.

[0004]

[Means for solving problem]The network connection means which lets a network pass and communicates with the singular number or two or more computers in the invention according to claim 1, The picture output means which outputs the image data acquired from the aforementioned singular number or two or more computers via this network connection means, When communicating by the aforementioned network connection means, the aforementioned purpose is attained by having had the HTTP processor which controls communication by the HTTP protocol used with the communications protocol of World Wide Web.

[0005]In the invention according to claim 2, the aforementioned purpose is attained in the invention according to claim 1 by having provided further the auxiliary memory for performing preservation of the printing establishment value corresponding to each computer, and extraction.

[0006]In the invention according to claim 3, the aforementioned purpose is attained via the aforementioned HTTP processor in the invention according to claim 1 or 2 from the application which operates by other computers by performing transmission and reception of printing condition setting or image data by the aforementioned network connection means.

[0007]

[Mode for carrying out the invention]Hereafter, the preferable embodiment of the present invention is described in detail with reference to Fig.1 thru/or Fig.3.Fig.1 is a configuration diagram showing the airline printer connected to the network concerning an embodiment of the invention. The airline printer 1 equips the inside with the network interface unit (I/F) 12 and HTTP processor 13 which connect the image output device 11 which outputs image data, and a network and the airline printer 1. And network connection of the computer 2, the computer 3, and the computer 4 using this airline printer 1 is carried out to the airline printer 1.

[0008]The airline printer 1 is provided with URL for a network address and HTTP (uniform resource locator) from the network interface unit (I/F) 12 and the HTTP (hyper-text transport protocol) processing unit 13, From the computer 2, the computer 3, and the computer 4, they are identified by the WWW (World Wide Web) browser of a client, etc., and it controls at the time connected to a network. This browser can display HTML (Hyper Text Markup Language), and is limited to neither Mosaic nor Netscape. HTTP is a protocol used for a WWW server and a WWW browser sending and receiving information, including a file etc.

[0009][the computer 2, the computer 3, and the computer 4] Since the airline printer 1 is controlled through a WWW browser, it will become controllable if it is HTTP which what kind of computer and something is not related at all in OS (operation system) currently used, and he can control by HTTP processor 13.

[0010]Fig.2 is a block diagram showing the internal structure of HTTP processor 13. The document application 5 is application which draws up a document, and consists of the WWW browser module 52 for printing establishment, and the data transfer module 51. This document application 5 does not communicate with the printer driver in the computer which is operating, but is a HTTP treatment module inside that application, and communicates with the airline printer 1 directly.

[0011][HTTP processor 13] . [about the print-data control module 131 and printing establishment value which control the print image transmitted from the print-data transmission module 51 of the document application 5] It comprises the printing establishment control module 132 and the auxiliary memory 133 which communicate with the WWW module 52 for printing establishment of the document application 5. The auxiliary memory 133 can save the printing establishment value corresponding to each computer, or can take this out now.

[0012]Using the value set up with the printing establishment control module 132, from the document application 5, a print image is received using HTTP, and the print image is processed (unfilled space

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control, print copies, scaling, etc.), and they transmit the print-data control module 131 to the airline printer 1. Also functionally, the latest computer is excellent also in price, and even if it creates a print image with the application with which the application is operating, it is satisfactory at all. Although this had to be used and the printer driver corresponding to the print languages only for an airline printer had to be prepared for computer each until now, it is the network communication by this HTTP, and becomes simple control of only image transmission, and a printer driver becomes unnecessary to the computer side.

[0013]The printing establishment control module 132 is equipment which carries out instead of [of the user interface of a printer driver], and internal processing has become like Fig.3. As characteristics, if connected from the document application 5, the identification number of the computer by which the application is operating will be acquired (IP address etc.), The set point for computers is acquired from the database constituted by the auxiliary memory 133, and there is a function replied to document application. This makes the set point what can be used independently between the connected computers by holding the printing establishment of computer each connected in the network.

[0014]Setup information is altogether displayed on the document application 5 (document application will be assumed if this specification is satisfied) graphically in HTML using HTTP. This can give the operativity and appearance which were unified into the printing establishment user interface by inharmonious computer and application, and the printer driver user interface which was required for the computer side becomes unnecessary.

[0015]

[Effect of the Invention]It becomes unnecessary according to the invention according to claim 1, to be able to unify a network protocol peculiar to each computer, and to install a printer driver in the computer itself by having equipped the airline printer with the HTTP processor.

[0016]According to the invention according to claim 2, the original share nature as a network printer is realizable by managing a setup of each computer with an auxiliary memory.

[0017]According to the invention according to claim 3, with the system which makes an airline printer control from the application on a network computer, The unified user interface and common operating instructions can be provided, and it is not dependent on the model of computer, and it becomes possible to transmit printing condition setting and image data to this airline printer by a network connection means.

[Brief Description of the Drawings]

[Drawing 1]It is a figure showing the composition of the airline printer concerning an embodiment of the invention.

[Drawing 2]It is a figure showing the internal structure of the HTTP processor.

[Drawing 3]It is a figure showing the method of the internal processing of a printing establishment control module.

[Drawing 4]It is a composition schematic diagram of the computer network which shares an airline printer.

[Explanations of letters or numerals]

1 Airline printer

2, 3, and 4 Computer

5 Document application

11 Image output device

12 Network interface unit

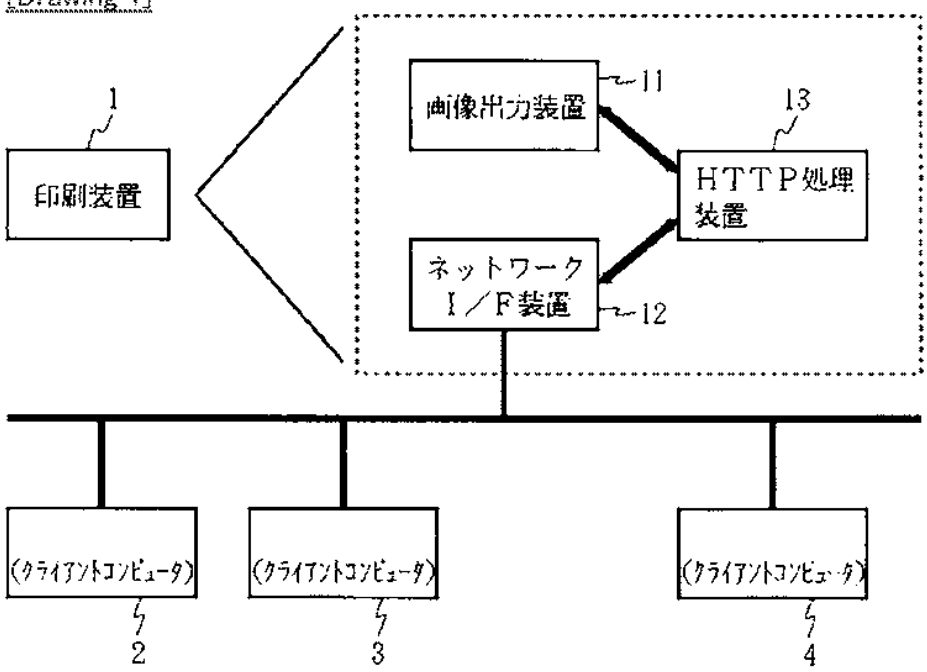
13 HTTP processor

51 Print-data transmission module

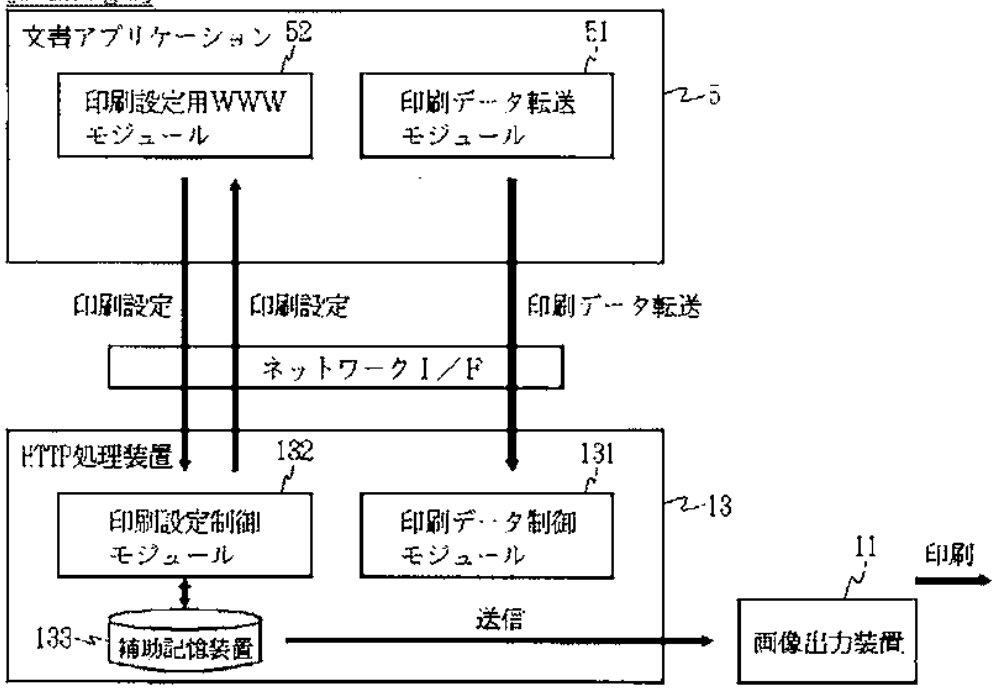
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52 WWW module for printing establishment
131 Print-data control module
132 Printing establishment control module
133 Auxiliary memory

[Drawing 1]

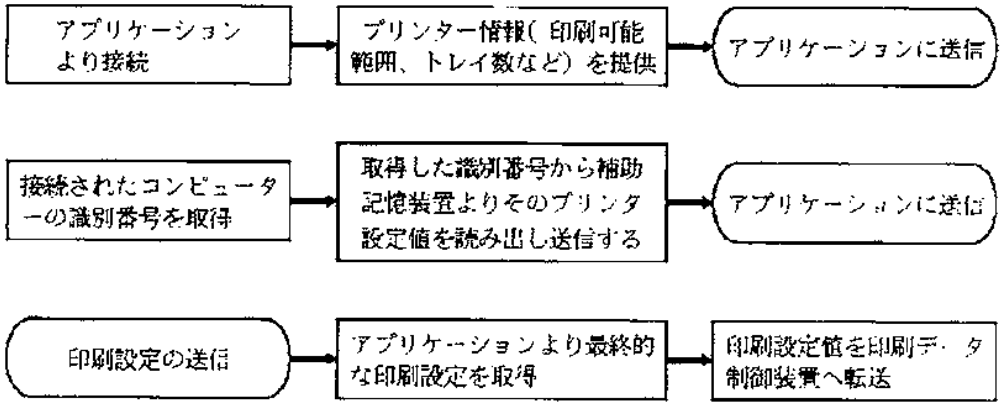


[Drawing 2]

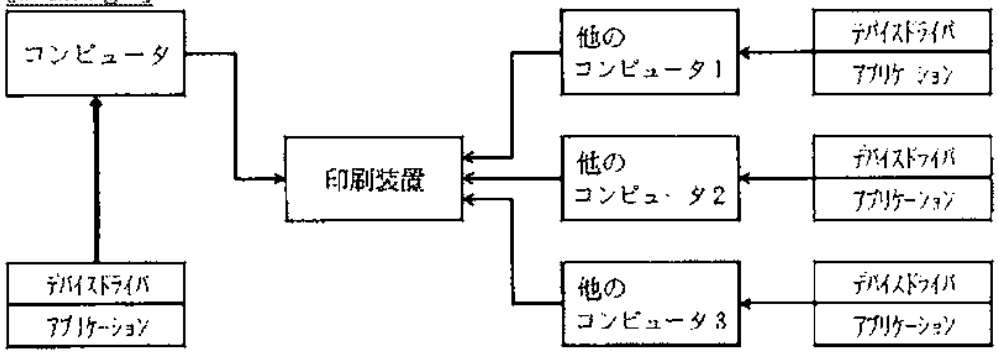


[Drawing 3]

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[Drawing 4]



[Translation done.]

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Ｂ４１Ｊ　29/38		Ｂ４１Ｊ　29/38	Ｚ
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東京都大山区中馬込１丁目３番６号

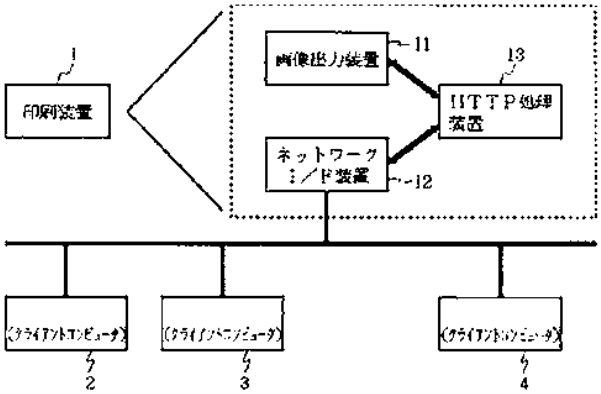
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(54)【発明の名称】　印刷装置

(57)【要約】

【課題】　多種なネットワークプロトコルと印刷設定を統一し、各コンピュータにプリンタドライバをインストールする必要を無くした印刷装置を提供すること。

【解決手段】　印刷装置１は、ネットワークインターフェイス装置１２とＨＴＴＰ処理装置１３からネットワークアドレスとＨＴＴＰ用のＵＲＬを備え、ネットワークに接続した時点でコンピュータ２、３、４より、それらをクライアントのＷＷＷブラウザなどで識別し、そして制御を行う。このブラウザは、ＨＴＭＬを表示できるものであり、ＭｏｓａｉｃやＮｅｔｓｃａｐｅに限定されない。コンピュータ２、３、４は、ＷＷＷブラウザを通して印刷装置１を制御するので、自分がどのようなコンピュータか、使用するＯＳが何かということは一切関係なく、ＨＴＴＰ処理装置１３で制御できるＨＴＴＰであれば制御が可能となる。



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【特許請求の範囲】

【請求項１】　ネットワークを通して、単数または複数のコンピュータと通信するネットワーク接続手段と、このネットワーク接続手段を介して、前記単数または複数のコンピュータから取得した画像データを出力する画像出力手段と、

前記ネットワーク接続手段で通信を行う際、ワールド・ワイド・ウェブの通信プロトコルで用いられているＨＴＴＰプロトコルで通信を制御するＨＴＴＰ処理装置と、を備えたことを特徴とする印刷装置。

【請求項２】　各コンピュータに対応した印刷設定値の保存、取り出しを行うための補助記憶装置をさらに設けたことを特徴とする請求項１記載の印刷装置。

【請求項３】　前記ＨＴＴＰ処理装置を介して、他のコンピュータで動作するアプリケーションから、印刷条件設定や画像データの送受信を前記ネットワーク接続手段により行うことを特徴とする請求項１または請求項２記載の印刷装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、各コンピュータ特有のネットワークプロトコルを統一したネットワーク印刷装置に関する。

【０００２】

【従来の技術】近年、オフィス等でのＯＡ機器の著しい普及に伴い、処理した文書、画像等を印刷処理する需要が増大している。この要請に対応するため、例えば、図４に示すように複数のコンピュータと印刷装置をネットワークで連結して、各コンピュータが印刷装置を共用する形式のシステムが広く用いられている。このような、ネットワークに接続された印刷装置は、各コンピュータから、ユーザーが印刷指示を出すと印刷を開始するので、ユーザー毎に印刷装置を設置する必要がなくなり、使い勝手が優れている。ところで、各コンピュータより発行される印刷指示は、そのコンピュータ特有のネットワークプロトコルでなされ、これを印刷装置の側でそれを解析し、印刷処理をするようになっていた。また、その印刷装置用のデバイスドライバを各コンピュータ毎にいちいちインストールすることが前提となっていた。

【０００３】

【発明が解決しようとする課題】しかしながら、コンピュータ毎にネットワークプロトコルが相違し、各装置ごとに異なる印刷装置用プリンタドライバをインストールしなければいけないというのでは、いかにも不便であり、手間のかかる作業であった。そこで、本発明は多種なネットワークプロトコルと印刷設定を統一し、各コンピュータにプリンタドライバをインストールする必要をなくした印刷装置を提供することを目的とする。

【０００４】

【課題を解決するための手段】請求項１記載の発明では、ネットワークを通して、単数または複数のコンピュータと通信するネットワーク接続手段と、このネットワーク接続手段を介して、前記単数または複数のコンピュータから取得した画像データを出力する画像出力手段と、前記ネットワーク接続手段で通信を行う際、ワールド・ワイド・ウェブの通信プロトコルで用いられているＨＴＴＰプロトコルで通信を制御するＨＴＴＰ処理装置と、を備えたことにより前記目的を達成する。

【０００５】請求項２記載の発明では、請求項１記載の発明において、各コンピュータに対応した印刷設定値の保存、取り出しを行うための補助記憶装置をさらに設けたことにより前記目的を達成する。

【０００６】請求項３記載の発明では、請求項１または請求項２記載の発明において、前記ＨＴＴＰ処理装置を介して、他のコンピュータで動作するアプリケーションから、印刷条件設定や画像データの送受信を前記ネットワーク接続手段により行うことにより前記目的を達成する。

【０００７】

【発明の実施の形態】以下、本発明の好適な実施の形態を、図１ないし図３を参照して詳細に説明する。図１は本発明の実施の形態に係るネットワークに接続された印刷装置を示した構成図である。印刷装置１は、画像データを出力する画像出力装置１１、ネットワークと印刷装置１を接続するネットワークインターフェイス装置（ＩＦ）１２、ＨＴＴＰ処理装置１３を内部に備えている。そして、この印刷装置１を利用するコンピュータ２、コンピュータ３およびコンピュータ４は、印刷装置１とネットワーク接続されている。

【０００８】また、印刷装置１は、ネットワークインターフェイス装置（Ｉ／Ｆ）１２とＨＴＴＰ（ハイパー・テクスト・トランスポート・プロトコル）処理装置１３からネットワークアドレスとＨＴＴＰ用のＵＲＬ（ユニフォーム・リソース・ロケータ）を備え、ネットワークに接続した時点でコンピュータ２、コンピュータ３、およびコンピュータ４より、それらをクライアントのＷＷＷ（ワールド・ワイド・ウェブ）ブラウザなどで識別し、そして制御を行う。このブラウザは、ＨＴＭＬ（Hyper Text Markup Language）を表示できるものであり、ＭｏｓａｉｃやＮｅｔｓｃａｐｅに限定されない。なお、ＨＴＴＰは、ＷＷＷサーバーとＷＷＷブラウザがファイルなどの情報を送受するのに用いるプロトコルである。

【０００９】コンピュータ２、コンピュータ３およびコンピュータ４は、ＷＷＷブラウザを通して印刷装置１を制御するので、自分がどのようなコンピュータか、使用しているＯＳ（オペレーションシステム）が何かということは一切関係なく、ＨＴＴＰ処理装置１３で制御できるＨＴＴＰであれば制御が可能となる。

【００１０】図２はＨＴＴＰ処理装置１３の内部構造を

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表したブロック図である。文書アプリケーション５は、文書を作成するアプリケーションであり、印刷設定用WWWブラウザモジュール５２、データ転送モジュール５１からなる。この文書アプリケーション５は、動作しているコンピュータ内のプリンタドライバと交信するのではなく、そのアプリケーション内部のＨＴＴＰ処理モジュールで、直接印刷装置１と交信する。

【００１１】ＨＴＴＰ処理装置１３は、文書アプリケーション５の印刷データ転送モジュール５１より送信されてくる印刷イメージを制御する印刷データ制御モジュール１３１、印刷設定値に関して文書アプリケーション５の印刷設定用WWWモジュール５２と交信する印刷設定制御モジュール１３２および補助記憶装置１３３から構成されている。補助記憶装置１３３は、各コンピュータに対応した印刷設定値を保存したり、これを取り出したりできるようになっている。

【００１２】印刷データ制御モジュール１３１は、印刷設定制御モジュール１３２で設定された値を用いて、文書アプリケーション５よりＨＴＴＰを用いて印刷イメージを受け取り、その印刷イメージを加工（余白制御、印刷部数、拡大縮小など）し、印刷装置１に転送する。最近のコンピュータは、機能的にも、価格的にも優れていて、印刷イメージはアプリケーションが動作しているアプリケーションで作成しても全く問題ない。これを利用し、今まではコンピュータ個々に印刷装置専用の印刷言語対応プリンタドライバを用意しなければならなかったが、このＨＴＴＰによるネットワーク通信で、イメージ転送のみのシンプルな制御になり、コンピュータ側にプリンタドライバは必要なくなる。

【００１３】印刷設定制御モジュール１３２はプリンタドライバのユーザーインターフェイスの代わりをする装置であり、内部処理は図３のようになっている。特徴として、文書アプリケーション５より接続されると、そのアプリケーションが動作しているコンピュータの識別番号を取得し（ＩＰアドレスなど）、補助記憶装置１３３に構成されているデータベースよりそのコンピュータ用設定値を取得し、文書アプリケーションに返信する機能がある。これは、ネットワークで接続されているコンピュータ個々の印刷設定を保持することによって、接続したコンピュータ間で設定値を独立して利用できるものにしている。

【００１４】設定情報はすべてＨＴＴＰを用いてＨＴＭＬでグラフィカルに文書アプリケーション５（文書アプリケーションはこの仕様を満足していると仮定）に表示

される。これは不統一だったコンピュータやアプリケーションによる印刷設定ユーザーインターフェイスに、統一した操作性、外観を与えることができ、コンピュータ側に必要だったプリンタドライバユーザーインターフェイスは必要なくなる。

【００１５】

【発明の効果】請求項１記載の発明によれば、ＨＴＴＰ処理装置を印刷装置に備えたことにより、各コンピュータ特有のネットワークプロトコルが統一でき、コンピュータ自身にプリンタドライバをインストールする必要はなくなる。

【００１６】請求項２記載の発明によれば、各コンピュータの設定を補助記憶装置で管理することにより、ネットワークプリンタとしての本来の共有性を実現することができる。

【００１７】請求項３記載の発明によれば、ネットワークのコンピュータ上のアプリケーションより印刷装置を制御させる方式によって、統一したユーザーインターフェイス、共通な操作方法を提供でき、そしてコンピュータの機種に依存せず、該印刷装置に印刷条件設定や画像データをネットワーク接続手段により転送することが可能となる。

【図面の簡単な説明】

【図１】本発明の実施の形態に係る印刷装置の構成を示した図である。

【図２】ＨＴＴＰ処理装置の内部構造を表した図である。

【図３】印刷設定制御モジュールの内部処理の方法を示した図である。

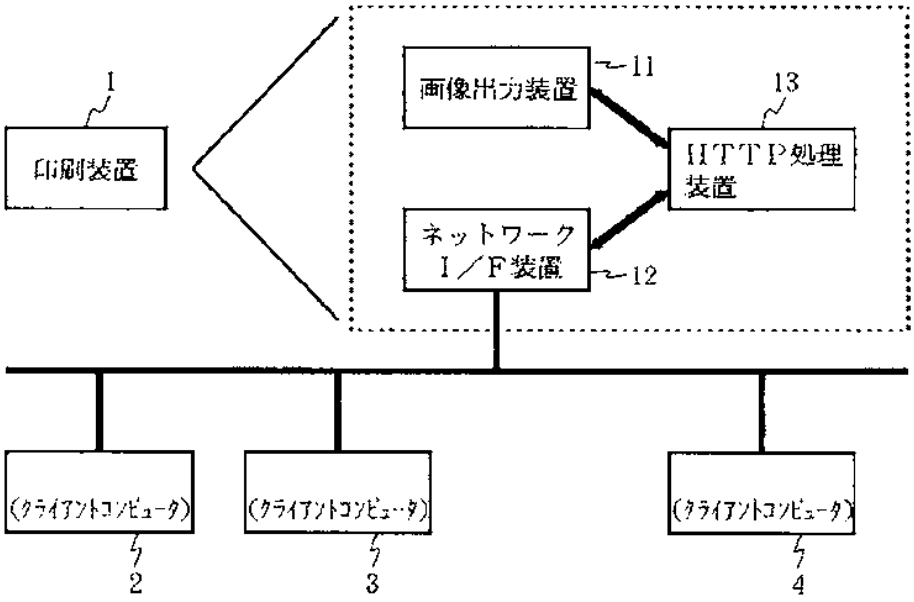
【図４】印刷装置を共用するコンピュータネットワークの構成概略図である。

【符号の説明】

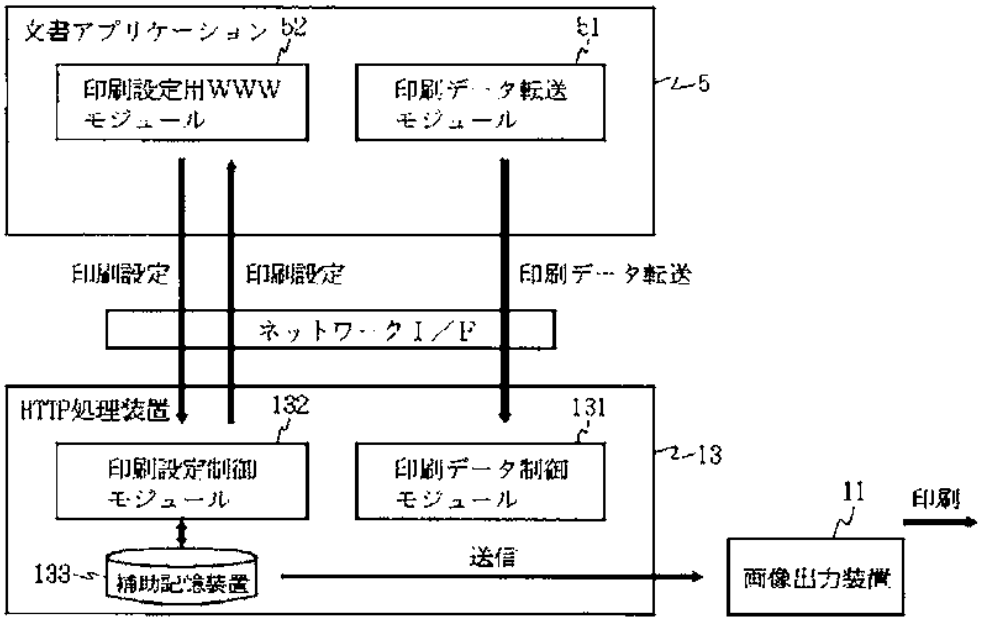
１　印刷装置
２、３、４　コンピュータ
５　文書アプリケーション
１１　画像出力装置
１２　ネットワークインターフェイス装置
１３　ＨＴＴＰ処理装置
５１　印刷データ転送モジュール
５２　印刷設定用WWWモジュール
１３１　印刷データ制御モジュール
１３２　印刷設定制御モジュール
１３３　補助記憶装置

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【図１】

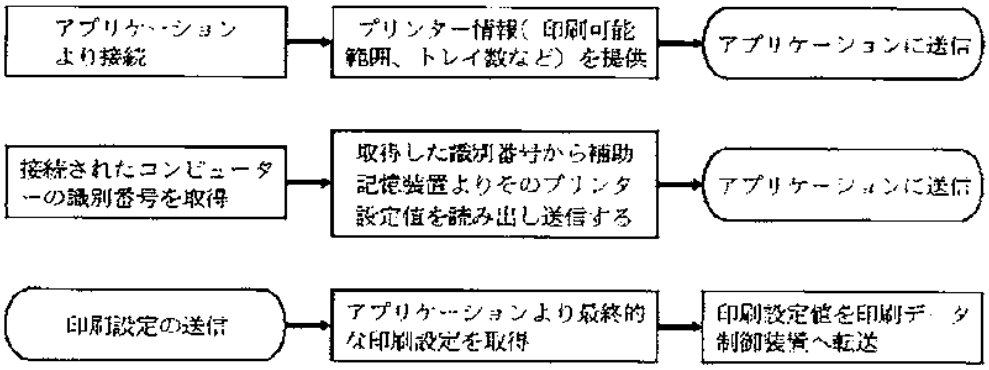


【図２】

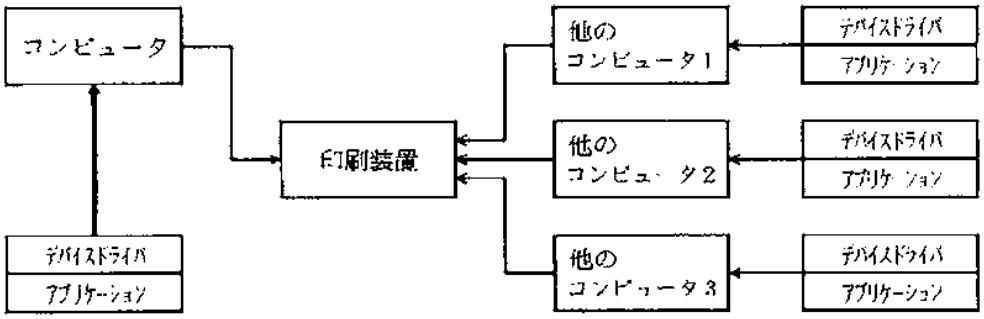


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【図３】



【図４】



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PAT-NO: JP411316658A
DOCUMENT-IDENTIFIER: JP 11316658 A
TITLE: PRINTER
PUBN-DATE: November 16, 1999

INVENTOR-INFORMATION:

NAME	COUNTRY
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APPL-NO: JP10137684
APPL-DATE: May 2, 1998

INT-CL (IPC): G06F003/12, B41J029/38, H04N001/00

ABSTRACT:

PROBLEM TO BE SOLVED: To provide a printer with which various settings of printing and network protocols are standardized and installation of a printer driver in each computer is not required.

SOLUTION: A printer 1 provides a network address and a URL for HTTP from a network interface device 12 and an HTTP processor 13, identifies them from computers 2, 3 and 4 through a WWW browser of a client or the like when connected to a network and

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controls them. This browser can display the HTML and is not limited to Mosaic or Netscape. Since the computers 2, 3 and 4 control the printer 1 through the WWW browser any type of HTTP can be controlled in so far as it is controlled by the HTTP processor 13 independently of the type of its own computer or so to be used.

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Electronic Acknowledgement Receipt

EFS ID:	14884323
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
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Application Type:	Utility under 35 USC 111(a)

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	20130205_Supp_IDS_FXT312.pdf	612492	no	4
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2	Foreign Reference	FP1_JP11316658A_FXT312.pdf	613546	no	13
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(Not for submission under 37 CFR 1.99)

Application Number	09992413
Filing Date	2001-11-18
First Named Inventor	William Ho Chang
Art Unit	2453
Examiner Name	Esther Benoit
Attorney Docket Number	FXT312

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	1	0738949	EP	A1	1996-10-23	Fuji Xerox Co. Ltd.		☐

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	Art Unit	2453
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	Application Number	09992413
	Filing Date	2001-11-18
	First Named Inventor	William Ho Chang
	Art Unit	2453
	Examiner Name	Esther Benoit
	Attorney Docket Number	FXT312

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☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

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☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Peter D. Sabido/	Date (YYYY-MM-DD)	2012-07-10
Name/Print	Peter D. Sabido	Registration Number	50,353

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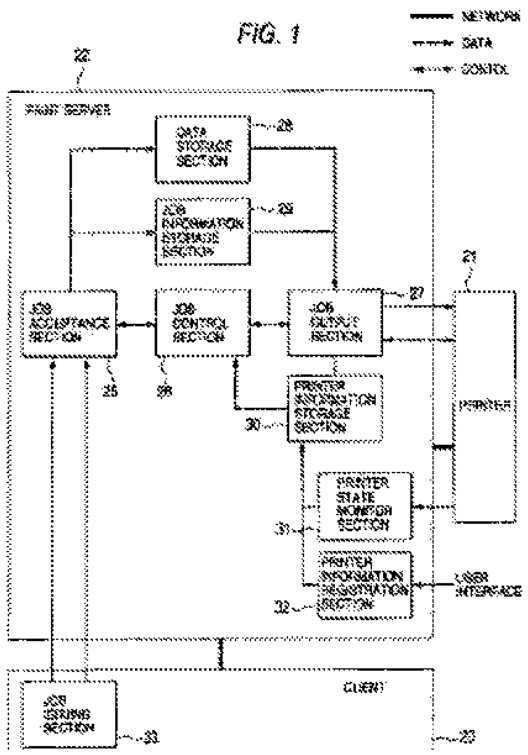
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Reconstruction of print job in print system

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Classification:	**- international:**	***B41J29/38; B41J5/30; G06F3/12; G06F11/34;*** (IPC1-7): G06F3/00; G06F3/12
	- European:	G06F3/12C
Application number:	EP19950116568 19951020	
Priority number (s):	JP19950117984 19950419	
Also published as:	EP0738949 (B1) JP8286857 (A) DE69525330 (T2)	

Abstract of EP0738949 (A1)

In a network environment in which a print server, one or more clients, and one or more printers are connected via a network, a print server absorbs the function differences among the printers. The print server supports the printers via the network and if a client user specifies a function not inherent in the printer, reconstructs the print job so as to replace the function specification with a procedure that can be executed on the printer and sends the resultant print job to the printer



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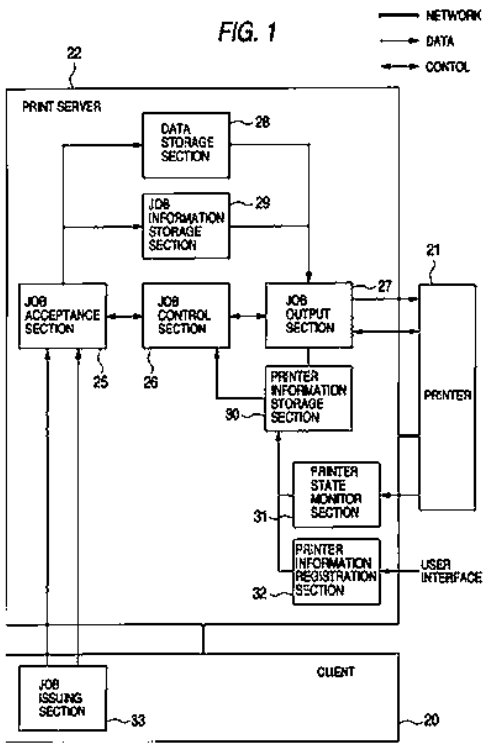
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(54) Reconstruction of print job in print system

(57) In a network environment in which a print server, one or more clients, and one or more printers are connected via a network, a print server absorbs the function differences among the printers. The print server supports the printers via the network and if a client user specifies a function not inherent in the printer, reconstructs the print job so as to replace the function specification with a procedure that can be executed on the printer and sends the resultant print job to the printer.

FIG. 1



EP 0 738 949 A1

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a print system comprising a print server, one or more clients, and one or more printers connected via a network and in particular to a print system which executes a print request issued from each client to each printer through the print server and enables the printer to provide a function that the printer itself does not originally have by support of the print server.

2. Description of the Related Art

Various types of printers often coexist in a network environment in which a plurality of clients and a plurality of printers are connected to a network. Thus, if the client user requests a given printer to print by a given print method, the print method does not match print service of the printer and the print result as desired by the client user cannot be provided. For example, although the user specifies enlargement, reduction, or so-called n-up (a function of printing n-page print data on a sheet of paper), if the printer cannot provide the specified print service, the print result as desired by the user cannot be provided. To select a printer, the user must know which printer executes what print service by what method for selecting the printer fitted to the print job; printer selection is troublesome. Further, printer selection flexibility also lessens.

Patent documents related to the invention are Japanese Patent Unexamined Publication Nos. Sho. 62-191917, Hei. 3-252748, and Hei. 4-130919.

In the art disclosed in Japanese Patent Unexamined Publication No. Sho. 62-191917, when a given file is printed on a given printer, if control code not used with the printer is contained in the file, the control section gets control code that can be used with the printer in place of that control code. However, this document does not mention print in a network environment in which a print server supports printers via a network, and does not cope with the situation that occurs when the specified printer does not support the print method specified by the user.

Japanese Patent Unexamined Publication No. Hei. 3-252748 discloses a remote output unit connected to a central electronic computer system over a circuit. However, this document only discloses that the processing result of the central computer system are output on the remote output unit; this document does not mention print in a network environment in which a print server supports printers via a network, and does not cope with the situation that occurs when the specified printer does not support the print method specified by the user.

Japanese Patent Unexamined Publication No. Hei. 4-130919 discloses that a host computer inquires of a unit if it has necessary resources of a font, etc., and that if it does not have the resources, the host computer transfers the resources to the unit. However, this document does not mention print in a network environment in which a print server supports printers via a network, and does not cope with the situation that occurs when the specified printer does not support the print method specified by the user.

SUMMARY OF THE INVENTION

It is therefore an object of the invention to provide a print system which even if a printer does not support a print method specification of a client in an environment in which a print server, one or more clients, and one or more printers are connected via a network, enables the printer to print by the print method under support of the print server.

According to a first aspect of the invention, there is provided a print system comprising a print server, one or more clients, and one or more printers connected on a network, the print server comprising: means for accepting a print job having job information containing execution printer specification information and print method specification information and a print file, sent from the client; means for reconstructing the print job so that, of the print methods specified in the print method specification information of the job information, a print method with which the printer specified in the execution printer specification information of the job information is not provided is provided as a method available with the printer; and means for sending the reconstructed print job to the printer specified in the execution printer specification information of the job information.

According to a second aspect of the invention, there is provided a print server connected to one or more clients and one or more printers via a network, the print server comprising: means for accepting a print job having job information containing print execution printer specification information and print method specification information and a print file, sent from the client; means for reconstructing the print job so that, of the print methods specified in the print method specification information of the job information, a print method with which the printer specified in the execution printer specification information of the job information is not provided is provided as a method available with the printer; and means for sending the reconstructed print job to the printer specified in the execution printer specification information of the job information.

According to a third aspect of the invention, there is provided a print method using a print server, one or more clients, and one or more printers connected on a network, the print server executing the steps of: accepting a print job having job information containing print execution printer specification information and print method specification information and a print file, sent from the client; reconstructing the print job so that, of the print methods specified in the print method specifi-

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cation information of the job information, a print method with which the printer specified in the execution printer specification information of the job information is not provided is provided as a method available with the printer; and sending the reconstructed print job to the printer specified in the execution printer specification information of the job information.

According to a fourth aspect of the invention, there is provided a print method using a print server, one or more clients, and one or more printers connected on a network, the method comprising the steps of: sending by the client a print job including at least a print file and job information containing execution printer specification information and print page specification information to the print server; sending by the print server, data contained in the print file and specified in the print page specification information to the printer specified in the execution printer specification information; and printing the data by the specified printer.

According to a fifth aspect of the invention, there is provided a print system comprising a print server, one or more clients, and one or more printers connected on a network, the print server comprising: means for accepting a print job including at least a print file and job information containing execution printer specification information and print page specification information, sent from the client; and means for sending data contained in the print file and specified in the print page specification information to the printer specified in the execution printer specification information.

According to a sixth aspect of the invention, there is provided a computer program product that can be executed by a computer for controlling the computer for executing the steps of: accepting a print job having job information containing execution printer specification information and print method specification information and a print file; reconstructing the print job so that, of the print methods specified in the print method specification information of the job information, a print method with which the printer specified in the execution printer specification information of the job information is not provided is provided as a method available with the printer; and sending the reconstructed print job to the printer specified in the execution printer specification information of the job information.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

Figure 1 is a block diagram showing the main part of an embodiment of the invention;
Figure 2 is a block diagram showing a network system to which the embodiment of the invention is applied;
Figure 3 is a block diagram showing the configuration of a job output section in the main part of the embodiment of the invention;
Figure 4 is a general flowchart showing the operation of the embodiment of the invention;
Figure 5 is a flowchart showing the printer registration operation of the embodiment of the invention;
Figure 6 is a general flowchart showing a print job process of the embodiment of the invention;
Figure 7 is a flowchart explaining the operation of the job output section of the embodiment of the invention;
Figure 8 is a flowchart explaining the operation of a job reconstruction section of the job output section of the embodiment of the invention;
Figure 9 is an illustration showing an example of job information according to the embodiment of the invention;
Figure 10 is an illustration explaining the result of print executed according to the job information in Figure 9;
Figure 11 is an illustration showing an example of print information of the embodiment of the invention;
Figure 12 is an illustration showing simplified definition of the print information in Figure 11;
Figure 13 is an illustration showing a job reconstruction example in the embodiment of the invention;
Figure 14 is a flowchart explaining the job correction operation of the embodiment of the invention; and
Figure 15 is a flowchart explaining the job cancellation operation of the embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the accompanying drawings, there is shown a preferred embodiment of the invention.

Figure 2 is a whole block diagram showing a network system formed by the embodiment, wherein a plurality of clients 20, a plurality of printers 21, and a print server 22 are connected to a network 23. A plurality of printers 24 are connected directly to the print server 22. Each client 20 sends a print job to the print server 22 via the network 23. The print server 22 uses the printer 21 or 24 specified by the client 20 for printing. That is, when the printer 24 is specified, the print job is sent directly to the printer 24; when the printer 21 is specified, the print job is redirected to the printer 21 via the network 23. When the print job passes through the print server, it is reconstructed if necessary. This topic will be described later in detail.

Figure 1 is a block diagram centering on the configuration of the print server 22, wherein the print server 22 has a job acceptance section 25, a job control section 26, a job output section 27, a data storage section 28, a job information storage section 29, a printer information storage section 30, a printer state monitor section 31, and a printer information registration section 32. The client 20 has a job issuing section 33.

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The job issuing section 33 of the client 20 sends a printer job consisting of a print file and job information to the print server 22. The job information contains user-specified information, such as information concerning the number of copies, paper size, enlargement or reduction, page specification, and n-up.

The job information is described, for example, in a format as shown in Figure 9. In this example, portrait as the Print direction, 4-up, forward page order, pages 1-8, equal scaling, and A4-size paper are specified. If normal print is executed based on the job information, the print result as shown in Figure 10 is provided.

The printer information registration section 32 in Figure 1 has a predetermined user interface function through which supported printers 21 and 24 and printer attributes can be specified. Various specifications are held in the printer information storage section 30. The printer information registration section 32 will be discussed later in detail. The printer state monitor section 31 communicates with the printer periodically in accordance with a protocol described below, detects an abnormal condition in the printer 24 or a communication path, and notifies the job control section 26 of a normal or abnormal condition.

When the job issuing section 33 of the client 20 issues a print job, the job acceptance section 25 of the print server 22 accepts it, supplies the print file and job information contained in the print job to the data storage section 28 and the job information storage section 29 respectively, and notifies the job control section 26 of acceptance of the print job. The job control section 26 schedules print job execution and rejects sending the print job to an abnormal printer based on detection of the printer state monitor section 31. The job control section 26 supplies the print job to the job output section 27 according to the scheduling. The job output section 27, which is provided for each of the printers 21 and 24, executes job reconstruction described below, if necessary, before transferring the print job to the printer 21 or 24.

Figure 3 is a block diagram showing the configuration of the job output section 27, which has a request acceptance section 34, a job reconstruction section 35, a file transfer section 36, a job information acquisition section 37, a printer information acquisition section 38, a printer state monitor section 31, and a result transfer section 39. The request acceptance section 34 sends a job accepted from the job control section 26 (Figure 1) to the job reconstruction section 35, which then reconstructs the job, if necessary, based on printer information provided from the printer information acquisition section 38 and job information provided from the job information acquisition section 37, and transfers it to the file transfer section 36, which then transfers the job to the printer. In Figure 3, the printer state monitor section 31 is provided in the job output section 27, because the printer state is detected using the print protocol executed by the job output section 27, as described below. Of course, the printer state monitor section 31 may be provided independently of the job output section 27, as shown in Figure 1.

Next, the operation of the embodiment will be discussed.

Figure 4 is a general flowchart showing the operation of the embodiment of the invention. In the figure, first the print server 20 is started at step S1. Next, printers are registered in the print server 20 at step S2, wherein printers 24 connected directly to the print server 20 and the printers 21 connected via the network are registered together with printer information. Registration of the printer information will be described later in detail. Upon completion of the printer registration, the print server 22 enters the print job wait state at step S3. When a print job is sent from the client 20, it is accepted and stored at step S4. The job output section 27 of the print server 22 takes out printer information and job information from the print job at step S5, and checks whether or not the print job is within the support range at step S6 based on a list of the printer type names and services supported by the job reconstruction section 35 in the printer information, as described below in detail. If the print job is outside the support range, the client 20 is notified of an error and the process terminates at step S12. On the other hand, if the print job is in the support range, further a check is made to see if job reconstruction is required at step S7 based on a list of reconstruction support services in the print information, as described below in detail. If reconstruction is not required, the job is sent directly to the printer at step S9; if reconstruction is required, the job is reconstructed at step S8, then the resultant job is sent to the printer at step S9. If the job is sent normally at step S10, the client is notified of the transmission result at step S11 and the process is terminated; if the job is not sent normally at step S10, the client is notified of an error at step S12 and the process is terminated.

Figure 5 is a flowchart showing the registration process of printers supported by the print server 22 (step S2 in Figure 4). The printers are registered using a predetermined user interface, whereby printer information as shown in Figures 11 and 12 is created for each supported printer. Figure 11 shows an actual definition example and Figure 12 shows what is defined in Figure 11. As shown in the figures, the printer model name and various services supported by the job reconstruction section 35 are defined in the printer information. Upon completion of the registration for each printer, the job output section 27 providing services for each printer in accordance with the registered services is generated. For convenience of the description, only one job output section 27 is shown in the figure.

When the printer information is created for each printer and the corresponding job output sections 27 are generated, each job output section 27 notifies the job control section 26 of the location of the printer information on the assigned printer (location in the printer information storage section 30) and the name of the job output section, and the job control section 26 reads and

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registers them as internal data at step S21 in Figure 5. When the registration results in failure at step S22, the registration of the printer is canceled at step S24. When the registration results in success at step S22, a check is made to see if the printer and the path to the printer operate normally at step S23. That is, a print request file listing command lpq of a print protocol lpd (Line Printer Deamon Protocol) is sent to the printer to which the job is to be redirected. If the lpq command results in success at step S25, the printer to which the job is to be redirected and the path are normal, then the job output section 27 enters the job wait state from the job control section 26 at step S26. On the other hand, when lpq results in failure at step S25, the job output section 27 notifies the job control section 26 of an error at step S27. Later, lpq is again issued at step S28 and if lpq results in success at step S29, the job output section 27 enters the job wait state from the job control section 26 at step S26. After this, error detection using the lpq is repeated for the job control section 26 to hold the most recent printer and path state information. The printers 24 connected directly to the print server 22 and the related paths are monitored according to the usual procedures proper to the printers.

Figure 6 is a flowchart mainly showing the detailed operation of the job issuing section 33 of the client 20 and the job acceptance section 25 and the job control section 26 of the print server 22. In the figure, first the job issuing section 33 of the client 20 sends a print file and job information to the print server 22 at step S31. The job acceptance section 25 of the print server 22 accepts the print file and job information and stores them in the print file storage section 28 and the job information storage section 29 at step S32 and notifies the job control section 26 of acceptance of the job at step S33. Based on the job information, the job control section 26 determines the job output section 27 as the destination at step S34 and checks whether or not the page description language of the print job matches the page description language supported by the job output section 27 at step S35. If they match, the job control section 26 goes to the following step S36; if they do not match, the page description language is converted at step S37. After this, the job control section 26 schedules the job at step S38 and if the job can be executed immediately, the job control section 26 sends it to the job output section 27 at step S39; if the job cannot immediately be executed, the job control section 26 waits until the output timing and then sends the job to the job output section 27 at step S40.

Figure 7 is a flowchart showing the operation of the job output section 27, wherein the job output section 27 accepts a job number and print instruction from the job control section 26 at step S41. The job output section 27 takes out job information and print file from the job based on the job number at step S42 and further gets the corresponding printer information at step S43. After this, the job output section 27 checks whether or not the instruction specified in the job information is within the range supported by the printer (also containing services supported by the job reconstruction section 35 of the job output section 27) at step S44. If it is not in the support range at step S45, the job output section 27 notifies the job control section 26 of an error at step S51; if it is in the support range at step S45, the job output section 27 further checks whether or not reconstruction of the job is required at step S46. If reconstruction of the job is required, the job reconstruction section 35 is called for performing necessary processing for reconstructing the job at step S47. After this, a print request command lpr of the lpd protocol is used to send the job to the printer to which the job is to be redirected at step S48. The job is sent directly to the printer 24 connected directly to the print server 22. If reconstruction of the job is not required, the reconstruction process is skipped and the job is sent. When the job is sent normally at step S49, the job output section 27 notifies the job control section 26 of the normal end at step S50; if the job is not normally sent at step S49, the job output section 27 notifies the job control section of an error at step S51.

Figure 8 is a flowchart showing the operation of the job reconstruction section 35. In this example in the figure, paper size specification, page specification, n-up specification, and scaling specification are supported by the print server. That is, since a paper size change procedure varies from one printer to another, if paper size specification is contained, the paper size change procedure needs to be embedded in the file. In the example, since the execution printer does not have the n-up, page specification, or scaling function, the print server needs to support the services. Of course, to add other services to the printer, the job needs to be reconstructed in response to the services. For example, the job can be reconstructed so as to print the printer installation place and a message to the user.

In Figure 8, first the print file is taken out in page units at step S61. Next, whether or not paper size specification exists is checked at step S62 and if it exists, a paper size change procedure is embedded in the job at step S63. Next, whether or not page specification exists is checked at step S64. If it exists, only the specified page is taken out for processing at step S66; if not, all pages are taken out for processing at step S65.

Next, whether or not n-up specification exists is checked at step S67. If it exists, a reduction process and a page relocation process are embedded in the job at step S68, as described later in detail. Next, whether or not scaling specification exists is checked at step S69 and if it exists, scale factor specification is embedded in the job at step S70. These steps are executed for all pages and the process is terminated at step S71.

Figure 13 is an illustration explaining the process of the job reconstruction section 35. In this example in Figure 13, the job information contains specification of paper size A4, 2-up, pages 2-5, and 0.5 scaling. The left is an original file and the right is a print file of the job reconstructed. In Figure 13, first the paper size change procedure and the scale factor change procedure are

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embedded in the leading section of the reconstructed file, next the page end code position is changed. Further, coordinate conversion and scale factor conversion are executed in response to the 2-up (not shown).

Next, job correction and cancel by the user will be discussed with reference to Figures 14 and 15.

Figure 14 is a flowchart showing job correction by the user. In the figure, if the user specifies job correction, the job issuing section 33 of the corresponding client 20 sends the job number of the job to be corrected and the job information correction contents to the print server 22 at step S81. The job acceptance section 25 of the print server 22 accepts the correction information and sends it to the job control section 26 at step S82. The job control section 26 checks whether or not print is executed for the job to be corrected at step S83 and if print is not executed at step S84, corrects the job information at step S85. If print has been executed, the job control section 26 notifies the job acceptance section 25 that the job cannot be corrected at step S86. The job acceptance section 25 notifies the client 20 that the job cannot be corrected at step S87. In the embodiment, execution pages can be specified in the job information sent together with the print file, in which data other than the execution pages is also contained in the print file; although the page specification is changed with the correction instruction, the print server can cope with it without difficulty.

Figure 15 is a flowchart showing job cancel by the user. In the figure, the client 20 sends the job number of the job to be canceled and a request for canceling the job to the print server 22 at step S91. The job acceptance section 25 accepts the job number and the job cancel request at step S92 and sends them to the job control section 26 at step S93. The job control section 26 checks whether or not print is being executed for the job at step S94. If print is being executed at step S95, the job output section 27 notifies the job control section 26 of an error at step S99. If print is not being executed at step S95, the job control section 26 notifies the job output section 27 of cancel of the job at step S96 and the job output section 27 cancels transmission specified by the print request command lpr of the print protocol at step S97. When the transmission is canceled normally at step S98, the job output section 27 notifies the job control section 26 of the normal cancel at step S100; when the transmission cannot normally be canceled, the job output section 27 notifies the job control section 26 of an error at step S99.

In the actual implementation of the embodiment, the respective sections are provided by software executed in the print server 22, the client 20, and the printers 21 and 24, but some or all of the sections can also be provided by hardware.

As described above, according to the invention, the print server supports the printers connected to the network and if the user specifies a function not inherent in the printer, reconstructs the job so as to replace the function specification with a procedure that can be executed on the printer; the print result as specified by the user can be provided on the printer. Therefore, the printers can be used by the clients as if they were high-function printers, remarkably improving the print environment and also lessening the situation in which the printer for which a job is destined does not have a sufficient function and the job is not executed.

Claims

1. A print system comprising a print server, one or more clients, and one or more printers connected on a network, said print server comprising:

   means for accepting a print job having job information containing execution printer specification information and print method specification information and a print file, sent from said client;
   means for reconstructing the print job so that, of the print methods specified in the print method specification information of the job information, a print method with which the printer specified in the execution printer specification information of the job information is not provided is provided as a method available with the printer; and
   means for sending the reconstructed print job to the printer specified in the execution printer specification information of the job information.

2. The print system as claimed in claim 1, wherein said print server further comprises printer registration means for specifying a printer supported by said print server and a print method supported by said print server for the supported printer, and wherein said job reconstructing means provides a procedure for providing the supported print method as a method available with the supported printer.

3. The print system as claimed in claim 2, wherein said print server further comprises means for monitoring an operation state of the supported printer and a path on the network from said print server to the supported printer.

4. The print system as claimed in claim 3, wherein said monitoring means sends a print request list acquisition command to the printer being monitored.

5. The print system as claimed in claim 1, wherein when the print method specification information of the print job contains paper size specification information, said reconstructing means reconstructs the print job with a paper size specification method proper to the printer specified in the execution printer specification information.

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6. The print system as claimed in claim 1, wherein when the print information specification information of the print job contains print page specification information, said reconstructing means deletes data on an unspecified page for reconstructing the print job.

7. The print system as claimed in claim 1, wherein when the print information specification information of the print job contains page relocation specification information, said reconstructing means reconstructs the print job so as to relocate a page by a method available with the printer specified in the execution printer specification information.

8. The print system as claimed in claim 1, wherein when the print information specification information of the print job contains scaling specification information, said reconstructing means reconstructs the print job so as to execute scaling by a method available with the printer specified in the execution printer specification information.

9. The print system as claimed in claim 1, wherein when accepting a job cancel command, said print server disconnects network connection between said print server and the printer specified in the execution printer specification information.

10. The print system as claimed in claim 1, wherein when accepting a job correction command, said print server corrects the job information based on the job correction command.

11. A print server connected to one or more clients and one or more printers via a network, said print server comprising:

means for accepting a print job having job information containing print execution printer specification information and print method specification information and a print file, sent from said client;
means for reconstructing the print job so that, of the print methods specified in the print method specification information of the job information, a print method with which the printer specified in the execution printer specification information of the job information is not provided is provided as a method available with the printer; and
means for sending the reconstructed print job to the printer specified in the execution printer specification information of the job information.

12. A print method using a print server, one or more clients, and one or more printers connected on a network, said print server executing the steps of:

accepting a print job having job information containing print execution printer specification information and print method specification information and a print file, sent from said client;
reconstructing the print job so that, of the print methods specified in the print method specification information of the job information, a print method with which the printer specified in the execution printer specification information of the job information is not provided is provided as a method available with the printer; and
sending the reconstructed print job to the printer specified in the execution printer specification information of the job information.

13. A print method using a print server, one or more clients, and one or more printers connected on a network, said method comprising the steps of:

sending by said client a print job including at least a print file and job information containing execution printer specification information and print page specification information to said print server;
sending by said print server, data contained in the print file and specified in the print page specification information to the printer specified in the execution printer specification information; and
printing the data by the specified printer.

14. A print system comprising a print server, one or more clients, and one or more printers connected on a network, said print server comprising:

means for accepting a print job including at least a print file and job information containing execution printer specification information and print page specification information, sent from said client; and
means for sending data contained in the print file and specified in the print page specification information to the printer specified in the execution printer specification information.

15. A computer program product that can be executed by a computer for controlling said computer for executing the steps of:

accepting a print job having job information containing execution printer specification information and print method specification information and a print file;
reconstructing the print job so that, of the print methods specified in the print method specification information of the job information, a print method with which the printer specified in the execution printer specification information of

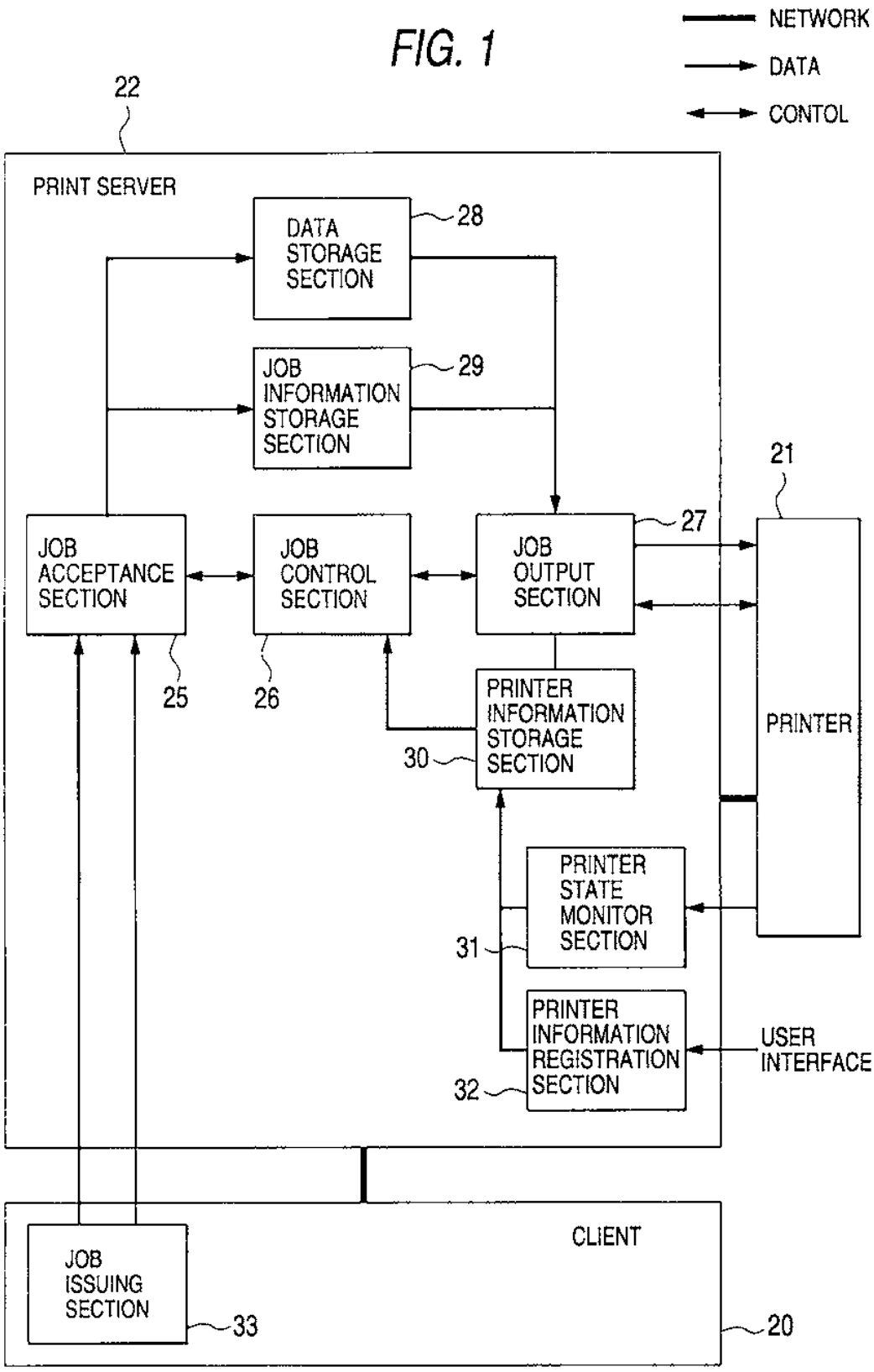
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the job information is not provided is provided as a method available with the printer; and

sending the reconstructed print job to the printer specified in the execution printer specification information of the job information.

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FIG. 1



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FIG. 2

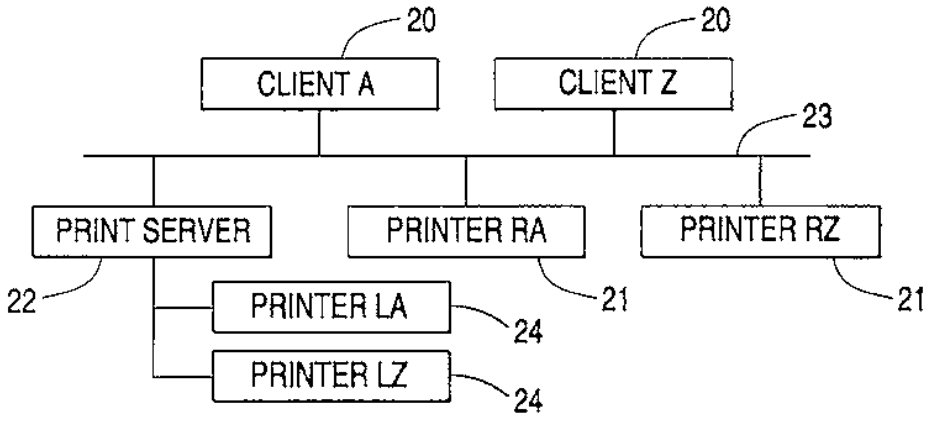
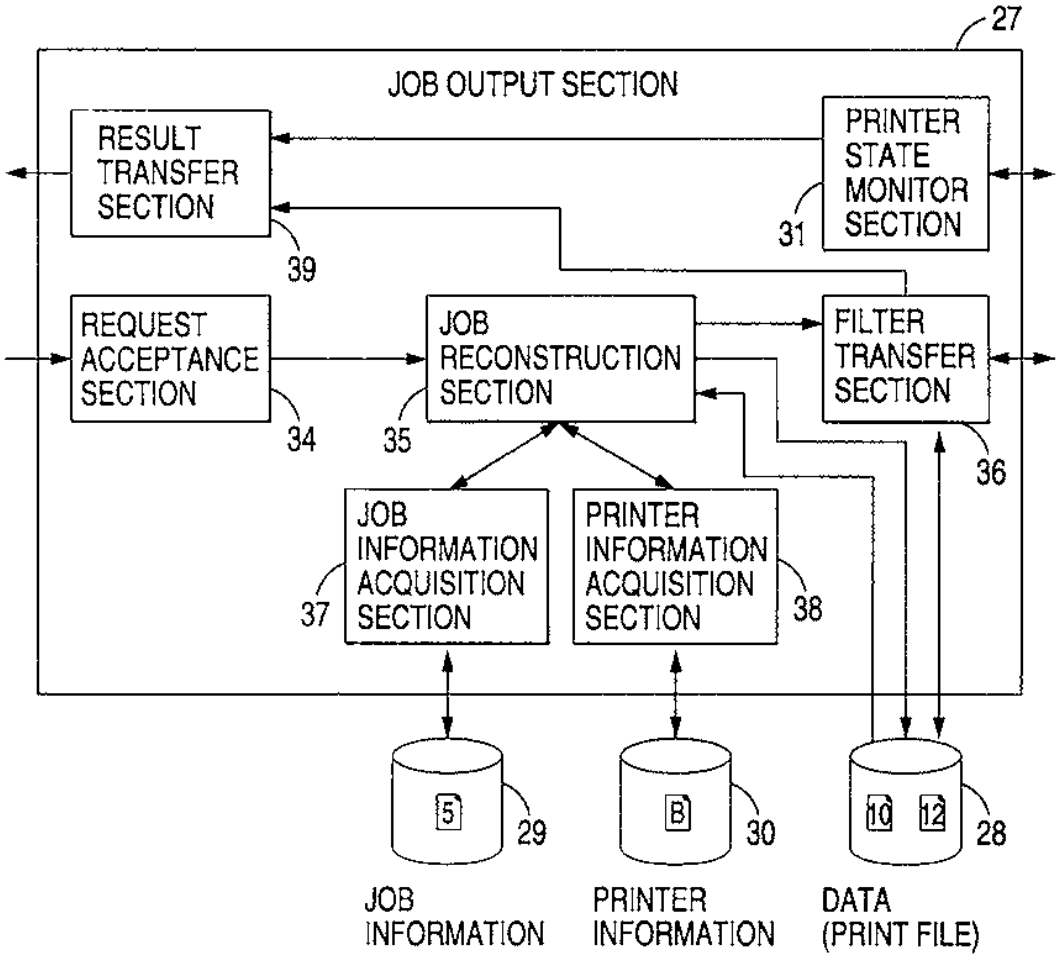
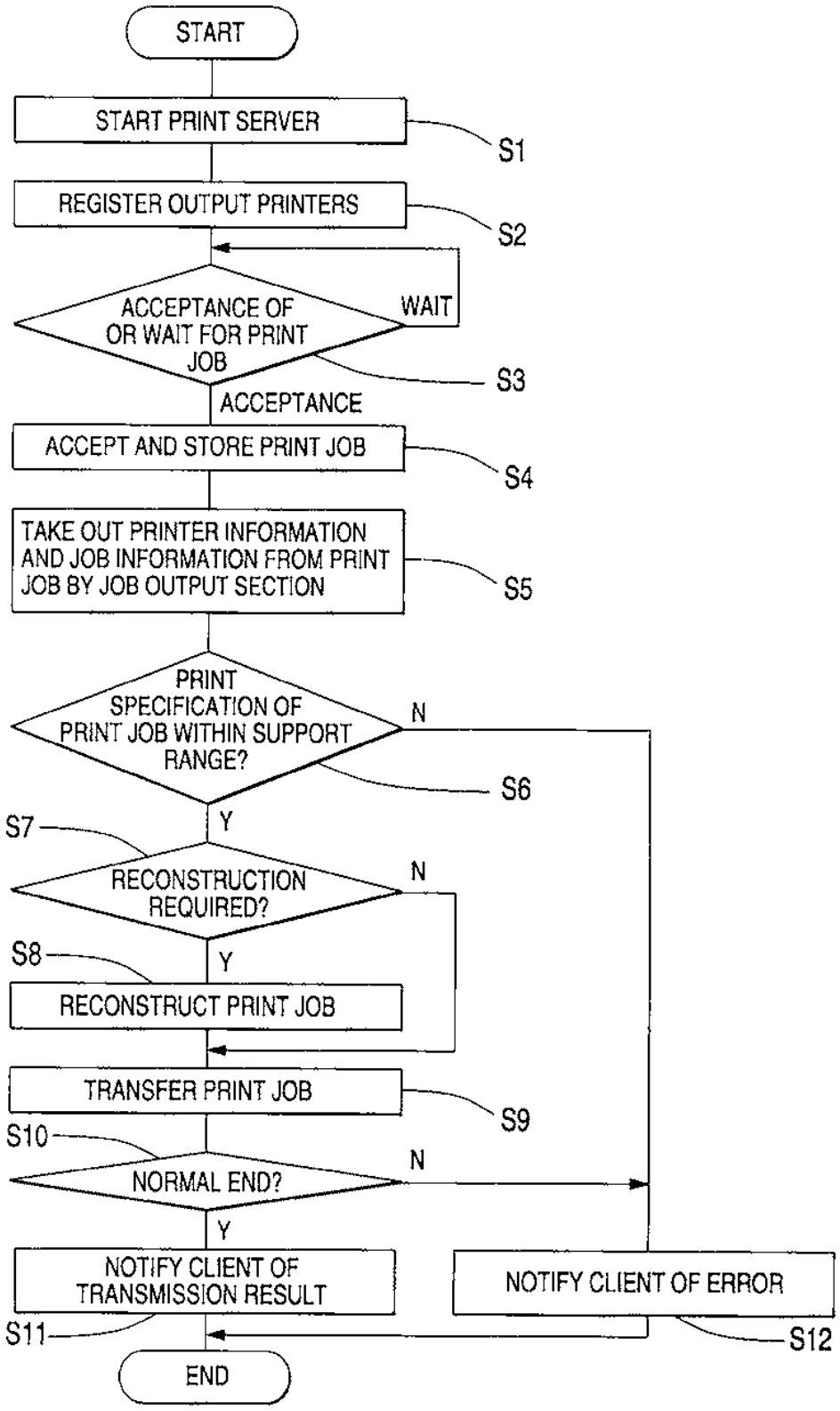


FIG. 3



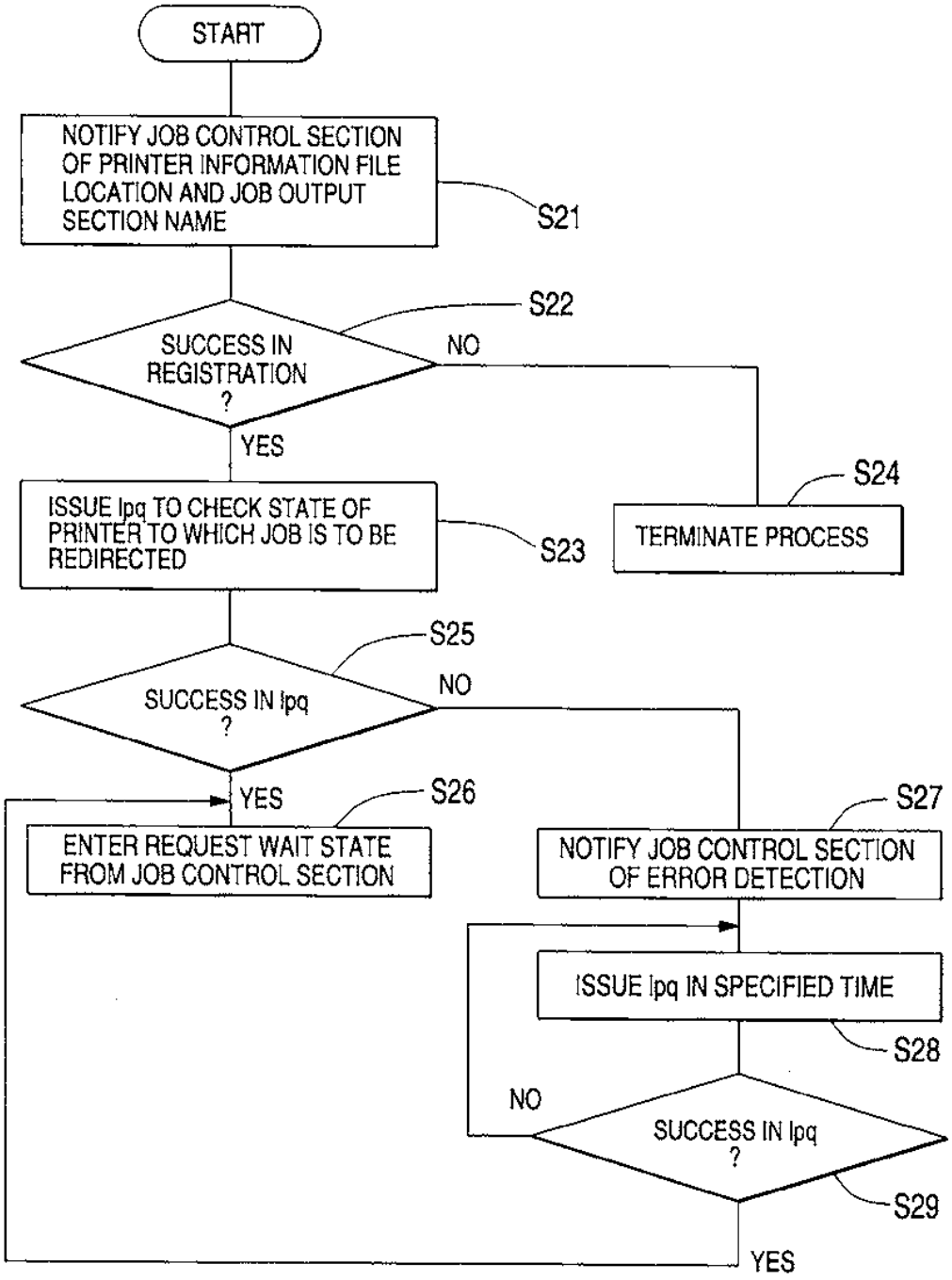
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FIG. 4



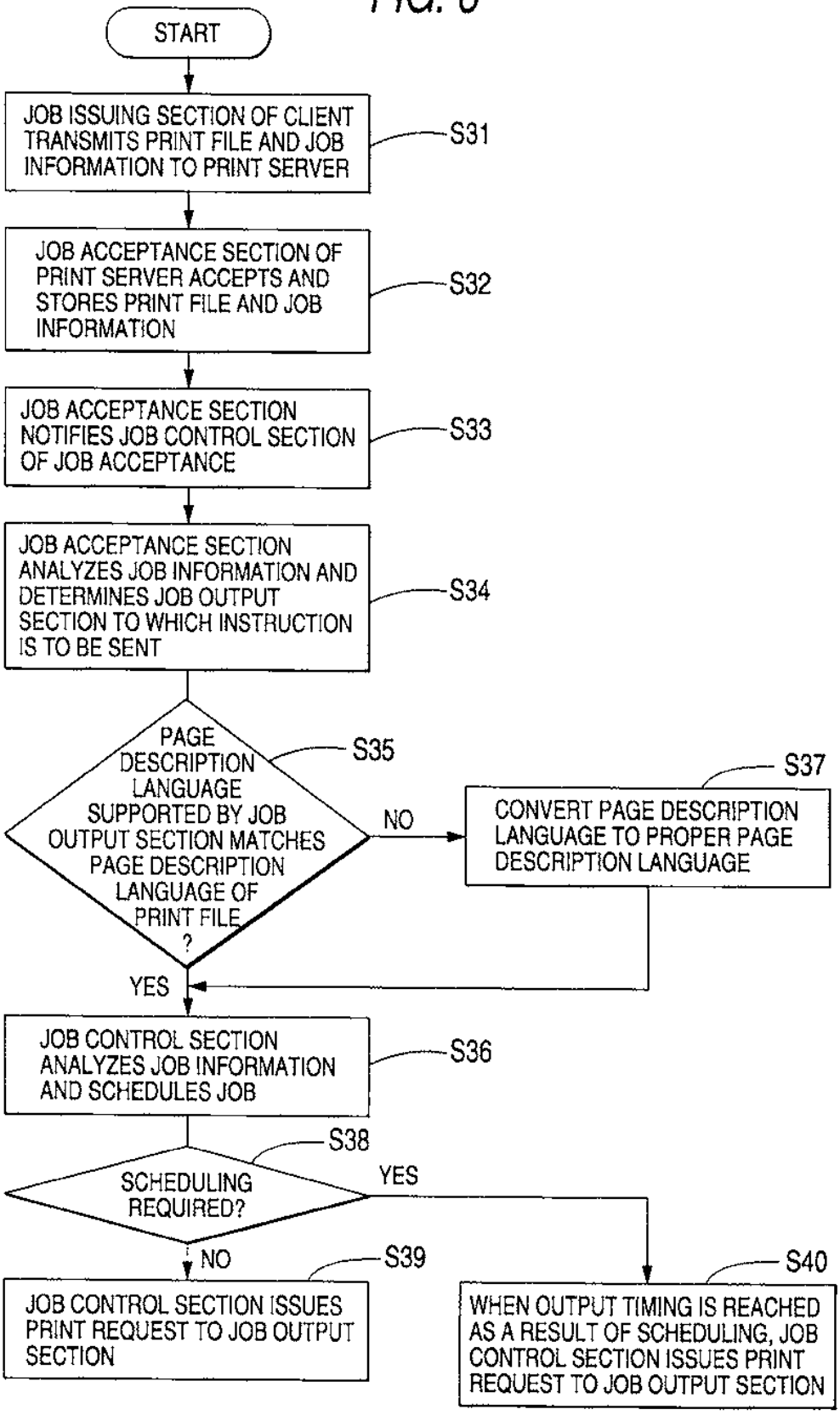
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FIG. 5



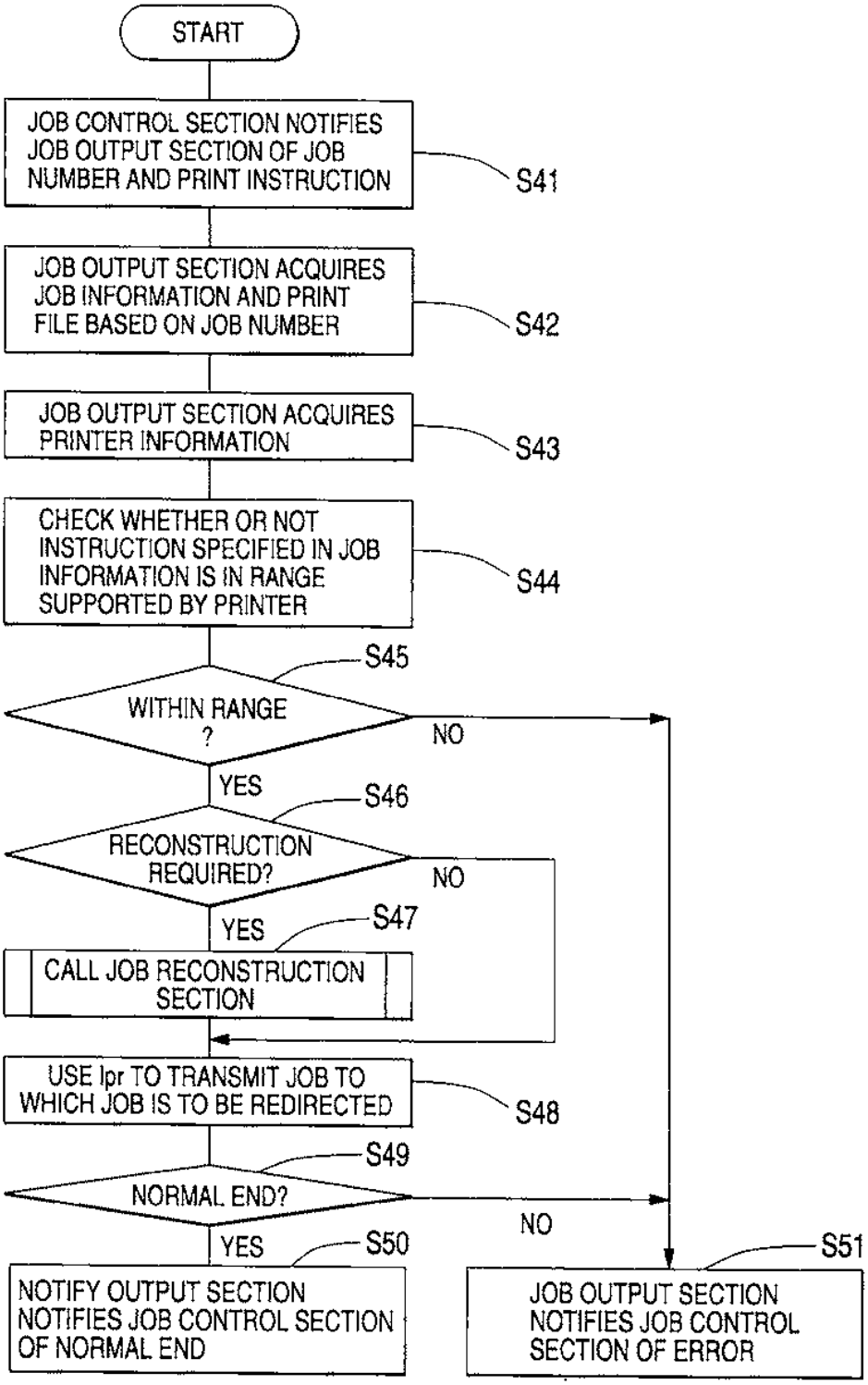
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FIG. 6



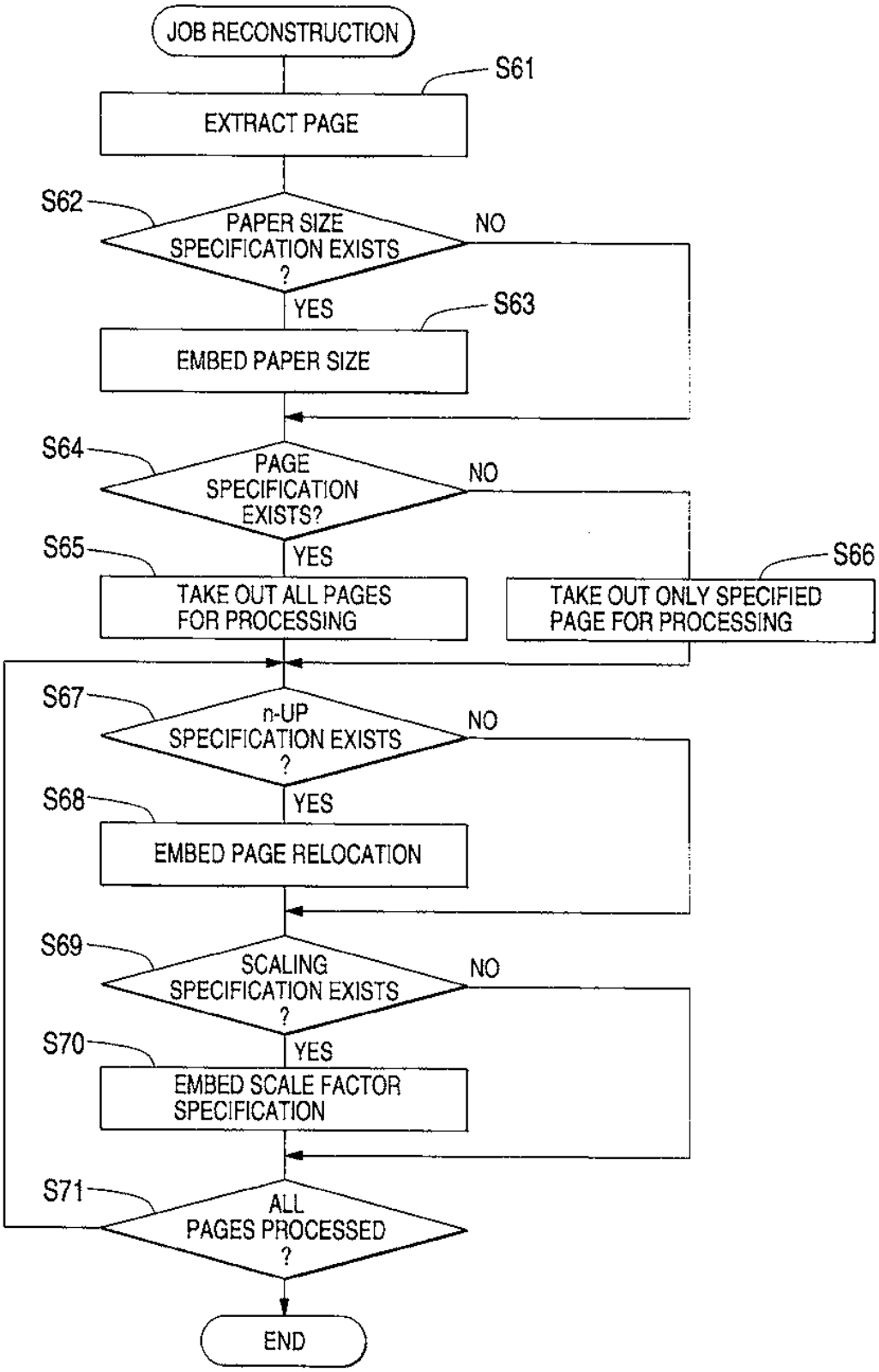
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FIG. 7



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FIG. 8

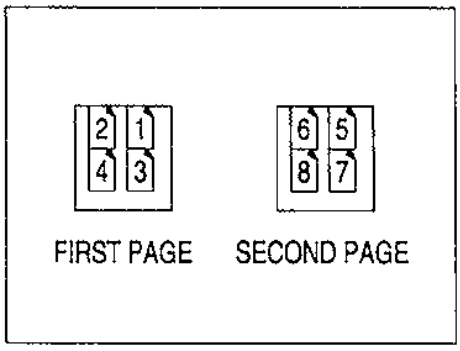


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FIG. 9

-att-content-orientation	-id-val-content-orientation-portrait
-att-imposition	-id-val-imposition-left-down-4-up
-att-page-order	-id-val-page-order-forward
-att-page-select	1 8
-att-logical-page-origin	-id-val-logical-page-origin-lower-left
-att-logical-page-scaling	1.0
-att-media-used	-id-val-medium-iso-a4-white

FIG. 10



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FIG. 11

```
-printer-model              "FX415P2"
-media-supported id         -val-medium-iso-a4-white,\
                            id-val-medium-jis-b4-white,\
                            id-val-medium-jis-b5-white,\
                            id-val-medium-na-letter-white,\
                            id-val-medium-na-legal-white,\
                            id-val-medium-iso-a5-white,\
                            id-val-medium-iso-a3-white,\

-page-sizes-supported {id-val-medium-iso-a4-white," ", "3 dict dup/PageSize [595 842]
put dup/imagingBBox null put dup/inputAttributes 1 dict dup/Priority [0 1 2] put put
setpagedevice"},\
        {id-val-medium-jis-b4-white," ", "3 dict dup/PageSize [729 1032] put dup
/imagingBBox null put dup/inputAttributes 1 dict dup/Priority [0 1 2] put put
setpagedevice"},\
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setpagedevice"},\
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        {id-val-medium-na-legal-white," ", "3 dict dup/PageSize [612 1008] put dup
/imagingBBox null put dup/inputAttributes 1 dict dup/Priority [0 1 2] put put
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        {id-val-medium-iso-a5 -white," ", "3 dict dup/PageSize [420 595] put dup
/imagingBBox null put dup/inputAttributes 1 dict dup/Priority [0 1 2] put put
setpagedevice"},\
        {id-val-medium-iso-a3-white," ", "3 dict dup/PageSize [842 1191] put dup
/imagingBBox null put dup/inputAttributes 1 dict dup/Priority [0 1 2] put put
setpagedevice"}

-orientations-supported     {id-val-content-orientation-portrait," "," "},\
                            {id-val-content-orientation-reverse-portrait," "," "},\
                            {id-val-content-orientation-landscape," "," "},\
                            {id-val-content-orientation-reverse-landscape," "," "}

-impositions-supported      {id-val-imposition-none,\
                            {id-val-imposition-simple-2-up,\
                            {id-val-imposition-reverse-2-up,\
                            {id-val-imposition-simple-4-up,\
                            {id-val-imposition-left-down-4-up,\
                            {id-val-imposition-down-right-4-up,\
                            {id-val-imposition-down-left-4-up

-document-formats-supported {id-val-document-format-PS, "PostScript", postScript\t12"}

-page-orders-supported      {id-val-page-order-forward," "," "},\
                            {id-val-page-order-reverse," "," "}

-logical-page-origins-supported      {id-val-logical-page-origin-lower-left," "," "}
-logical-page-scaling-range-supported {0, 100}
```


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FIG. 12

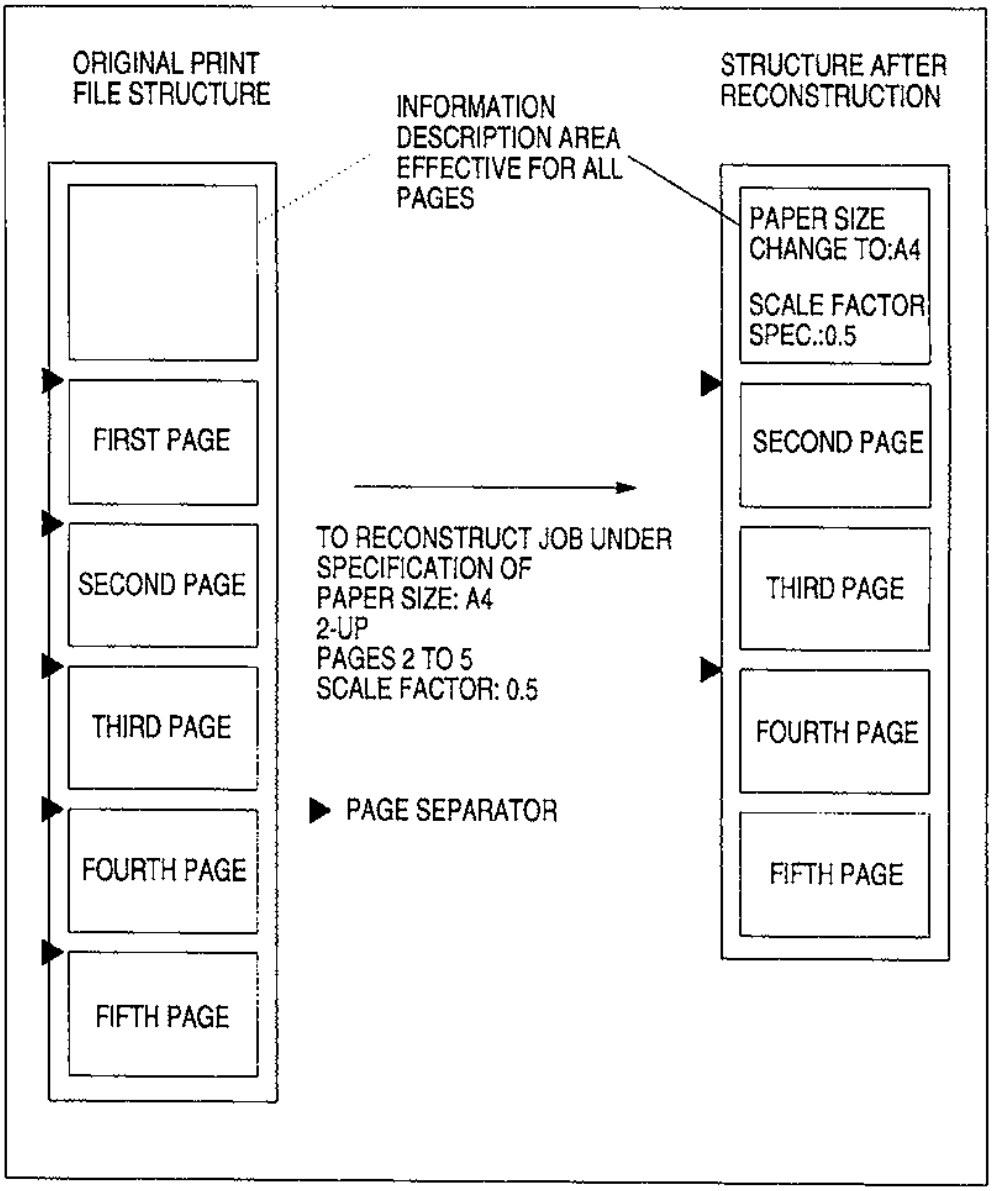
PRINTER MODEL NAME FX415P2

TYPES OF PAPER SUPPORTED BY JOB RECONSTRUCTION SECTION
A4, B4, B5, LETTER, LEGAL, A5, A3
SIZES OF PAPER SUPPORTED BY JOB RECONSTRUCTION SECTION AND POSTSCRIPT SPECIFICATION METHOD
DOCUMENT ORIENTATIONS THAT CAN BE RECOGNIZED BY JOB RECONSTRUCTION SECTION
NORMAL TRANSVERSE, TRANSVERSE TURNED UPSIDE DOWN, NORMAL LENGTH, LENGTH TURNED UPSIDE DOWN
n-UP SUPPORTED BY JOB RECONSTRUCTION SECTION
NONE, 2-UP OF 1, 2 FROM TOP TO BOTTOM, 2-UP OF 2, 1 FROM TOP TO BOTTOM, 4-UP OF 1, 2, 4, 3 CLOCKWISE, 4-UP OF 2, 1, 3, 4 CLOCKWISE, 4-UP OF 1, 3, 4, 2 CLOCKWISE, 4-UP OF 3, 1, 2, 4 CLOCKWISE

TYPES OF PAGE DESCRIPTION LANGUAGE SUPPORTED BY JOB RECONSTRUCTION SECTION
POSTSCRIPT
PAGE ORDERS SUPPORTED BY JOB RECONSTRUCTION SECTION
FORWARD, REVERSE
SCALING ORGINS SUPPORTED BY JOB RECONTRUCTION SECTION
LOWER LEFT CORNER
SCALING RANGE SUPPORTED BY JOB RECONSTRUCTION SECTION
0 TO 100

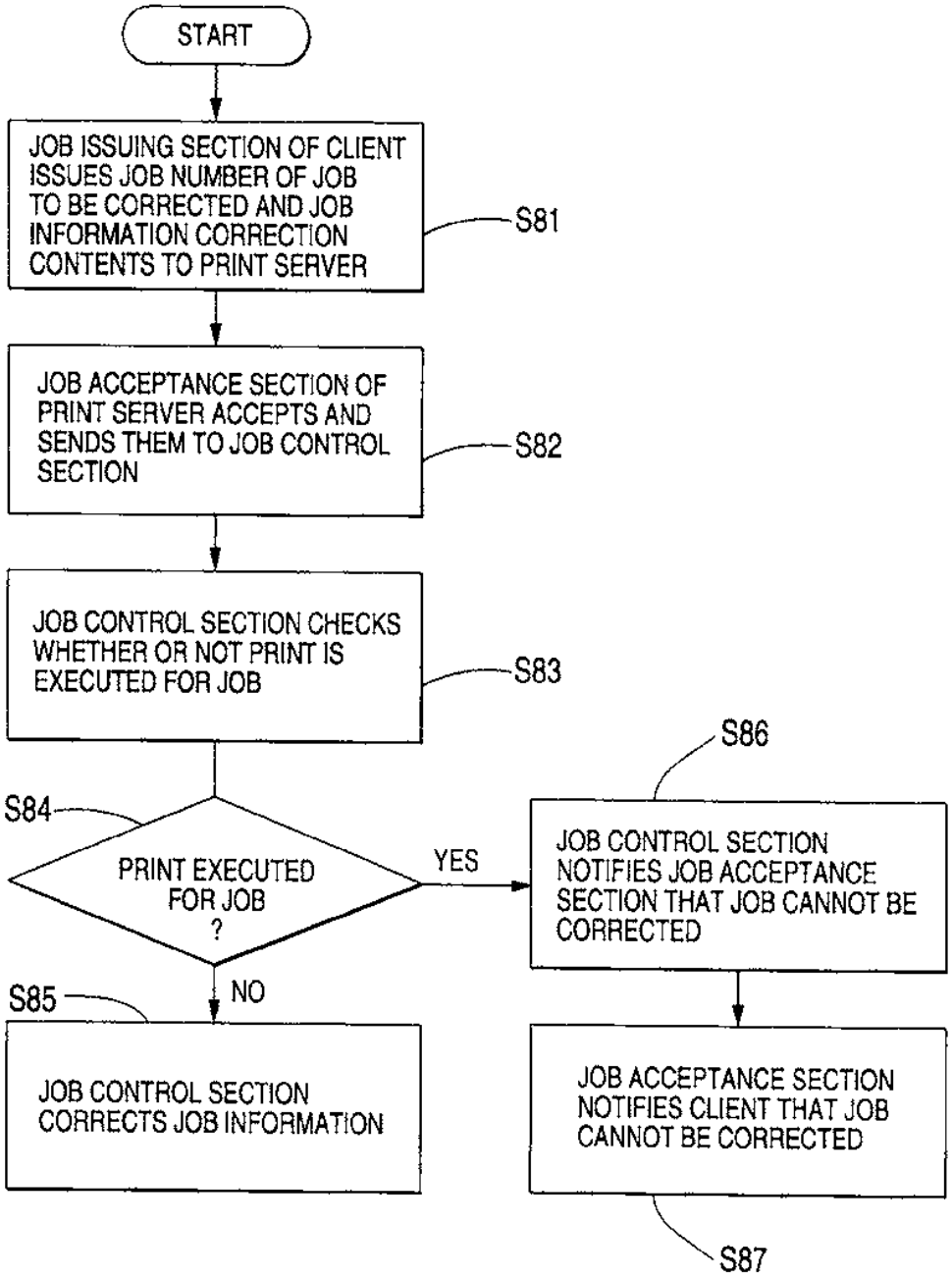
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FIG. 13



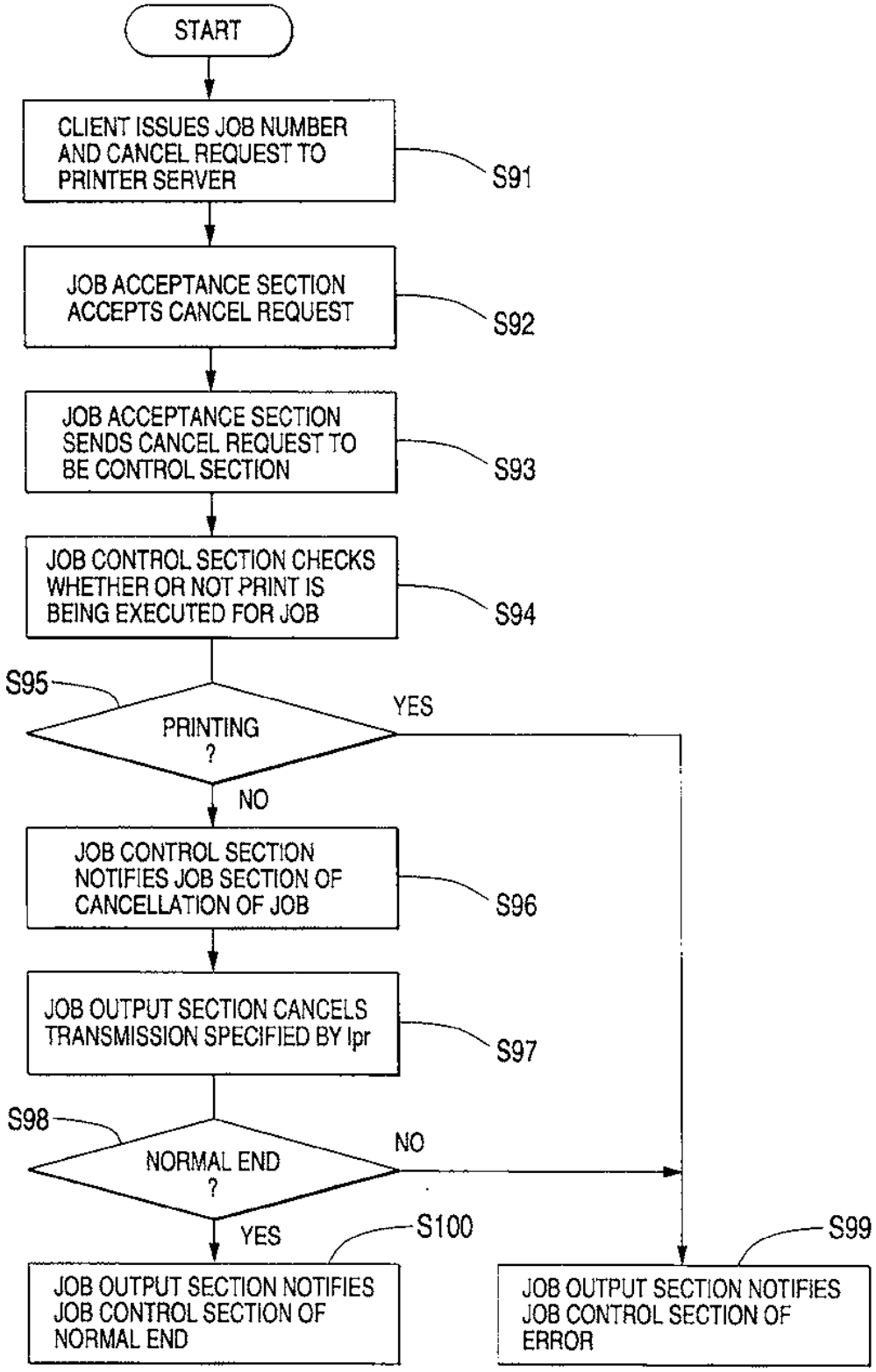
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FIG. 14



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FIG. 15



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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 11 6568

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP-A-0 618 529 (XEROX CORP) 5 October 1994 * the whole document *	1-3,5,8, 11-15	G06F3/00 G06F3/12
A	EP-A-0 588 513 (XEROX CORP) 23 March 1994 * the whole document *	1-5, 11-15	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

G06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	6 August 1996	Weiss, P

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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Electronic Acknowledgement Receipt

EFS ID:	13216621
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Correspondence Address:	Edward B. Anderson Kolisch Hartwell, P.C. 200 Pacific Building 520 S.W. Yamhill Street Portland OR 97204 US 503-224-6655 docketing@khpatent.com
Filer:	Peter D. Sabido./Veronica Gotelli
Filer Authorized By:	Peter D. Sabido.
Attorney Docket Number:	FXT312
Receipt Date:	10-JUL-2012
Filing Date:	18-NOV-2001
Time Stamp:	16:25:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	20120710_IDS_FXT312.pdf	612365 [illegible]	no	4

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2	Foreign Reference	EP0738949.pdf	1638485 [illegible]	no	24

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Lexmark, Exhibit 1003
Lexmark v. Flexiworld

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	09992413
Filing Date	2001-11-18
First Named Inventor	William Ho Chang
Art Unit	2453
Examiner Name	Esther Benoit
Attorney Docket Number	FXT.312

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	Examiner Name	Esther Benoit
	Attorney Docket Number	FXT.312

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	Filing Date	2001-11-18
	First Named Inventor	William Ho Chang
	Art Unit	2453
	Examiner Name	Esther Benoit
	Attorney Docket Number	FXT.312

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First Named Inventor	William Ho Chang
Art Unit	2453
Examiner Name	Esther Benoit
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☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

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☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

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Signature	/Peter D. Sabido/	Date (YYYY-MM-DD)	2012-04-09
Name/Print	Peter D. Sabido	Registration Number	50,353

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(11) EP 0 691 619 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
10.01.1996 Bulletin 1996/02

(51) Int. Cl.[6]: **G06F 15/02**

(21) Application number: **95304515.0**

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(84) Designated Contracting States:
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(30) Priority: **27.06.1994 GB 9412871**
12.12.1994 GB 9425184

(71) Applicant: **RANK XEROX LIMITED**
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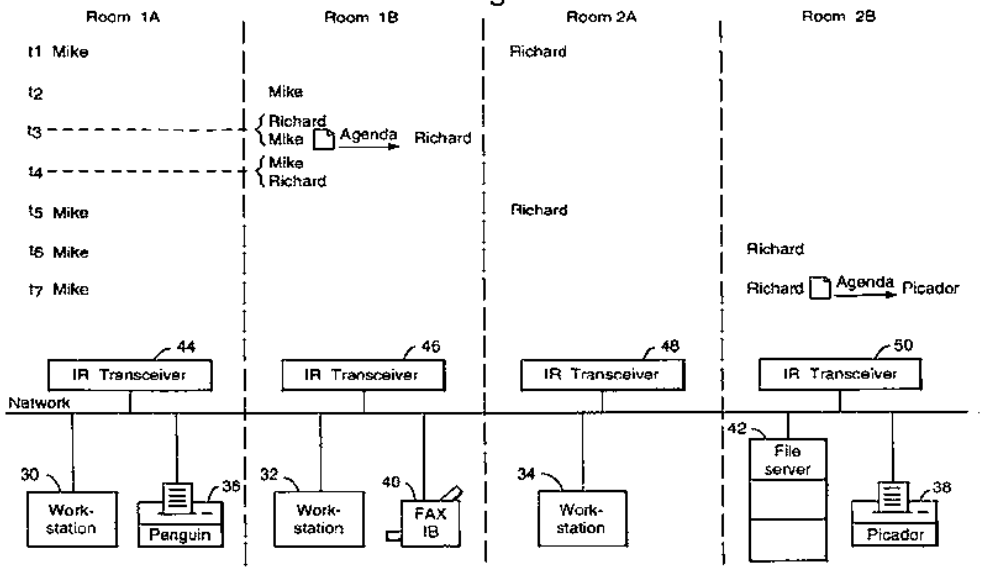
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Cambridge, CB2 2RN (GB)

(74) Representative: **Reynolds, Julian David et al**
Marlow Buckinghamshire SL7 1YL (GB)

(54) System for accessing and distributing electronic documents

(57) A system including any number workstations, file servers, printers and other fixed devices coupled in a network, and a number of portable devices carried by users and coupled to the network by infrared (IR) link. Each portable device emulates its user's personal satchel for documents: the device is programmed to receive transmit and store document references or tokens, each of which is associated with an electronic document stored in the database. Documents are distributed from one person to another by transmission of document references or tokens, and a document is sent to a printer by beaming that document's reference or token to an IR transceiver associated with that printer. The portable device is preferably a handheld or wristwatch computer with a graphical display for enabling the user to transfer documents, and the fixed devices preferably include a scanner/copier/printer having its own IR transceiver.

Fig.3.



EP 0 691 619 A2

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Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Description

This invention relates generally to data access and distribution, and more particularly to a system for transferring electronic documents between portable computer devices, and between such devices and various forms of office equipment.

Electronic documents play an increasing role in our lives. Indeed nowadays many, if not most, documents are created electronically; and we take it for granted that electronic documents are easier to store, retrieve, copy, print, update and distribute than paper documents.

For desk-bound, document-intensive workers this may indeed be the situation, but for people whose jobs require them to be more mobile, existing technology does not greatly assist in such tasks. For a mobile worker, electronic documents are significantly less convenient to *locate, read and distribute*, and yet these activities appear to be the dominant document-intensive activities outside the office. When away from his office or workstation (e.g., for a meeting), a worker is rarely able to access all or most of his electronic documents, and he will often resort to carrying a bulky set of paper documents as a precaution, even though they may not in fact be needed for the meeting.

There are many situations in which a paper document is clearly the most effective medium for exchanging information. Sometimes the intended recipient has no immediate need for the information, but they see a potential need for it in the future. In this situation it seems preferable to exchange the document electronically. Nevertheless they are forced to carry the document back to their office or home (perhaps having first stopped off at a copier or printer to obtain it), and contribute to their stack of paper documents.

Although many documents are created electronically, a relatively small proportion is distributed in that way. For example, if a person (the sender) wants to give an electronic document to someone (the recipient) they are currently talking to, the process essentially requires that the sender must break off the conversation, go to a workstation, and search for the document they wish to hand over; find out the recipient's electronic address; check how best to encode the data for the recipient's machine; and then transfer the document. Compared with simply handing over a paper document this process is disruptive, time-consuming and unreliable. Furthermore, rarely can the sender or the recipient immediately confirm that the document has been successfully transferred between them. To do so requires the recipient to go to his workstation, search for the document and explicitly acknowledge to the sender that the document was received.

Another problem arises even when a person decides to hand over a paper copy to the recipient. If he doesn't have a paper copy to hand, to avoid disruption he will often promise to print the document later and hand it over after the meeting has concluded, a task he may simply forget to do. If it is decided to print out the document there and then, the person must break off from the conversation, find the electronic document, find a printer that isn't in use, send the document to the printer, and then *remember* to go and pick it up when printing is complete. However, people often forget to pick up their output; and if a confidential document has been printed on a shared (network) printer, the sender must ensure that he is on hand to collect it immediately.

A further problem exists for workers who are unable to gain access to their workstation or network: it is now commonplace for members of a committee to travel long distances to attend important meetings. For example, standards committees convene experts from all over the world; and participants try to arrive prepared with all the information they might need to present to their colleagues, respond to questions, or take decisions. Often the committee meets at one of several different locations each time: the European Parliament, for example, regularly moves between Brussels, Luxembourg and Strasbourg. It may be impossible for the attendees to anticipate the document needs, or they may not be able to afford to carry printed versions of everything. When a missing document is needed urgently, the situation can be remedied by a telephone call back to the office to someone who has access to the electronic document and can print it out or fax it to the meeting. At best this disrupts the flow of the meeting, and there is a risk that the document will not be received at all.

It is known to use infrared (IR) communication to transfer electronic documents from one portable computer to another during a meeting - e.g. the Apple® Newton. However, compared with existing electronic communications devices, the (IR) data transfer rate between such machines is very slow: to beam a simple electronic document from one to another, users may need to stand within a few feet of each other and point the IR transmitters of their machines at each other for several minutes.

A further problem is that it is not possible to store large numbers of electronic documents on a portable, hand-held or wristwatch computer. This is the case with documents in, e.g., PostScript, but may be an even greater problem with scanned (bitmapped) documents.

The present invention provides a system for accessing or distributing electronic documents, including: a database of electronic documents and corresponding document references, and a plurality of objects, at least one of said objects preferably being portable or mobile, each object including means for communicating with the or each other object and with a user interface, and means for receiving, storing or transmitting a document reference corresponding to one of said electronic documents.

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The present invention further provides a portable device for accessing or distributing electronic documents, including: means for communicating with fixed or mobile electronic devices and with a user interface, at least one of said devices including a database of electronic documents and corresponding document references, and means for receiving, storing or transmitting a document reference corresponding to one of said electronic documents.

The present invention further provides an apparatus for scanning, copying and/or printing documents, including: means for accessing a database electronic documents, each electronic document having a corresponding document reference, means for communicating with one or more of a plurality of objects, at least one of said objects preferably being portable or mobile, and with a user interface, and means for receiving, storing or transmitting a document reference corresponding to one of said electronic documents.

Each document reference corresponds to a single electronic document, and a document may have any number (e.g., originating from different users) of corresponding document references. For a very small electronic document, the document reference may include the electronic document itself. However, as an example, the document reference suitably comprises a universal resource locator (URL) as defined in the Worldwide Web Information system (see Berners-Lee T.J., Cailliau R., & Groff J.-F., *The Worldwide Web, Computer Networks and ISDN Systems* 25 (1992), pp. 454-459. North-Holland; and Mangers J.J, *World-Wide Web, Mosaic and More* (1995), MGraw-Hill, London).

Each electronic document or document reference has a corresponding user interface (UI) representation. The UI representation of the electronic document may comprise in particular an icon or text on a graphical display, a sound, any combination of these, or, boadly, any real or ephemeral object capable of being selected by means of the user interface. The UI command language may be text- or menu-based, or natural language or direct interaction (as in the embodiment described herein), or may use any other suitable method (see Preece J., *Human Computer Interaction* (1994). Addison Wesley).

Alternatively, according to the invention, the or each document reference for an electronic document may be invalidated or even absent (e.g. through deletion): the electronic document remains in the database, but remote access to it using document references/document satchel technology described herein is precluded.

The invention is particularly advantageous in that document references take up a comparatively small amount of storage space in memory, and their transmission from one (fixed or mobile) device to another may be accomplished very quickly.

The invention is advantageous, for example, for the worker who visits numerous sites where documents are to be given to him: instead of collecting a bundle of papers, he collects a string of documenst references in his portable device.

The present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a view of the portable device according to one embodiment of the invention;

Figure 2 shows diagramatically the user interface and icons employed in one embodiment of the invention (a) for a user's workstation, and (b) for the user's portable device;

Figure 3 is a schematic illustration of an embodiment of the networked system according to the invention;

Figure 4 shows successive displays on the portable device of each user corresponding to the sequence in Fig. 3;

Figure 5 is a flow chart of the process (a) carried out in a portable device in exchanging a document token, (b) carried out in a portable device in updating the display thereof, and (c) carried out in a fixed object such as a printer or multifunction machine when a nearby user prints out a document; and

Figure 6 shows schematic representations of various procedures for distributing documents which are may be performed using the present invention.

The present invention is based upon PARCTab technology; and the system hardware is described in detail in: (1) Adams N., Gold R., Schilit B.N., Tso M. & Want R., (1993), An Infrared Network for Mobile Computers, in *Proc. USENIX Symposium on Mobile & Location-independent Computing*, pp. 41-52, Cambridge, MA:USENIX; and (2) Schilit B.N., Adams N., Gold R., Tso M., Want R., (1993), The PARCTab Mobile Computing System, in *Proc. 4th Workshop on Workstation Operating Systems (WWOS-IV)*, pp.34-39, Napa, CA:IEEE.

The Tab is a form of personal digital assistant (PDA) - a small lightweight portable computer that can be attached to the belt, or carried in a handbag. In the following, the invention is described in particular in relation to the use of such Tabs; however, it will be appreciated that any suitable form of portable computer may be used, and the computer may take the form, for example and subject to design constraints, of a conventional wristwatch. An exemplary system, for transferring data such as document references to and from a wristwatch computer, is disclosed in British patent application No. 9425184.0.

As can be seen in Fig. 1, the Tab 2 is equipped with a small bitmap screen 4 which is touch sensitive, enabling user inputs by means of finger tip or pointer 6. The Tab is also provided with 19.2 Kb/s bi-directional IR communications facilities (diode transmitter/receiver) 8, and three buttons 10. It will be appreciated that the wireless communication may alternatively be implemented by means of suitable radio technology well known in the art (see, e.g., Weiser M., The Computer for the 21st Century, *Scientific American*, September 1991, pp. 66-75). As a further alternative, any of the

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communications links referred to in the present disclosure which are provide by IR links may, where appropriate, be implemented by wired links. The Tab further includes a tone generator 12 for use, for example, in giving audible signals to the user. Within a building, users can carry their Tabs 2 from room to room while moving into and out of contact, or maintaining contact, with a network of stationary servers which provide a wide variety of services. As part of the Tab user interface, various icons 14 are displayed on the screen 4 to provide to the user access to such services, as is well known in the art (see Smith et al., Designing the Star User Interface, *Byte* 7(4) (1982), pp. 242-282).

The invention is implemented by employing a user interface (for example, on each Tab, and elsewhere) whereby the Tab emulates a document satchel. The notion of a satchel is that of a portable holder of documents, enabling transport of the documents to a remote location for later use, distribution, etc. Although in the following an electronic document will be said to be stored in a satchel, a feature of the present invention is that it is an document reference, which identifies the electronic document, which is received by, stored on, and transmitted by the Tab. In the following description, the document reference takes the form of an electronic token which uniquely corresponds to a document. The documents themselves may be stored on a file server, or on the user's personal workstation, on the network. In some cases the token may contain the document, e.g. when the document is very tiny. A typical database of stored documents and respective tokens is illustrated in Table 1. The tokens are shown as 8-bit codes for the purpose of illustration only; and it will be appreciated that the tokens may have any suitable format to suit a desired application.

Document	Token
5000 Series machine specifications	01011010
5045 Maintenance Manual	01101001
Agenda	00101011
...	...
ODP sales pie charts	00010111
5053 Production schedule	01011110

Table 1: Typical documents and tokens in a database.

In any event, the token contains sufficient information for the system to locate the relevant document, as in the case of the above-mentioned URLs. A URL (uniform resource locator) is essentially a way for the World-Wide Webto specify where a particular resouce (e.g. document) is located on the Internet, while at the same time describing the tool that is required to access it and specifying the actual file's location on a particular internet host. The situation whereby files on a local machine may be embedded with subdirectories and may exists on different physical disk drives is true the Web also, except that all of this applies to a particular machine on the internet, of which there are hundreds of thousands. Since each machine's file locations differ widely, URLs are used to identify where they reside. In general URLs take the form:

http://www.ncsa.uiuc.edu/Mosaic/Demo/demo.html

Many resouce types are now available, including in particular ftp: for a FTP (File Transfer Protocol) server - the main method of moving files around on the internet. URLs allow a document to link with other services and documents on the internet.

As an alternative, the user interface may be fully or partially omitted from the PDAs, the PDAs in that case being designed, e.g., to reproduce a suitable user interface when in the vicinity of, and in communication with, a suitable device (e.g., workstation, printer, copier, fax machine, etc) having its own display. In such a case, the PDA may be programmed to emit a 'beep' from its tone generator to indicate transmission and/or receipt of a document; although here the person who has had an electronic 'document' sent to his PDA is unable immediately to determine what the document is.

Figure 2 shows diagramatically the user interface and icons employed in one embodiment of the invention (a) on the display of a user's workstation, and (b) on the display the user's portable device, so as to represent the contents of his satchel. It will be appreciated by a person skilled in the art that any user interface, icons and/or process for transferring documents from the electronic desktop over the IR link may be employed.

Electronic documents may placed into the user's satchel using his personal workstation, e.g. a Macintosh. Satchel owners have on their electronic desktop (Fig. 2(a)) a special small folder icon 16 called the Satchel folder, and this preferably has a special icon to distinguish it from other folders on the desktop. The satchel folder behaves just like any

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other folder, and the open Satchel window is shown at 18, including the user's name and a list of items in the satchel. An exception compared with other folders is that any document 20 dragged into the folder 18 by a user (e.g. using a conventional mouse to move a pointer 19) automatically initiates a data transfer operation (between the workstation and the user's Tab, e.g. by means of IR communication as discussed above) which results in the icon 22 of the document appearing in the satchel display 24 on the Tab. The information transmitted over the IR link includes the icon type, document name, and the corresponding token, the token being stored in the satchel's (Tab's) memory. It will be appreciated that such a data transfer operation may be accomplished in many other ways, e.g. by simply typing in a command on a keyboard. In one embodiment, a reference to a whole folder, filesystem or network of URLs may be transferred.

The satchel's user interface is implemented in such a way that the satchel contents are displayed on the screen (Fig. 2(b)) as a series of one line entries, each line corresponding to a document token and including a small icon and the name of the document. Down the right hand edge of the display is a scroll bar 26 enabling a user to scroll up or down by pressing (e.g. a pen) on the appropriate arrow 28 of the scroll bar, until the desired entry is found.

In a similar manner, any document appearing on the Tab satchel screen 24 automatically appears in the satchel folder 18 on the the user's desktop, provided the Tab has been within range of an IR transceiver coupled to his workstation, so as to enable the relevant satchel contents data to be downloaded to the workstation. From there, documents in the satchel folder can be opened and edited *in situ*, or they can be dragged out of the the satchel folder and onto the desktop.

Because the satchel (Tab) uses an IR wireless communications system it is easy to discover which other IR-linked devices are within its line of sight. The PARCtab network disclosed in the above-mentioned references (1) & (2) includes IR gateways, one per room, that provide the satchels with a link to the cable network services upon which they rely. However, any suitable location technique can be used to determine where the satchel is. Consequently, each satchel is context-sensitive: each one knows which room it is in at any instant, and which other satchels or IR-linked devices (e.g. printers) are there with it.

Each satchel (Tab) presents this context information to the user, and it takes the form of additional entries on the satchel screen. These entries are not input by the user, but pop up automatically as the user moves around the building carrying his satchel. So, for example, when Mike meets Richard, an entry representing Richard appears in Mike's satchel, and a corresponding entry representing Mike appears on Richard's. Similarly, when Mike is in the same room as a printer, an entry (icon 25 + name) showing the name of the printer appears in his satchel (see Fig. 2(b)). These pop-up entries provide a streamlined way for users to pass documents to eachother, or to exchange them with nearby devices.

Referring to Fig. 3, there is shown schematically a networked system for implementing the present invention, and a sequential procedure by which a document is distributed using document satchels. Connected on a conventional network (e.g. ethernet) are a number of electronic devices, such as workstations 30, 32, 34, printers, 36, 38, fax machine 40, and file server 42, these devices being referred to generally as "objects". For the purpose of illustration, that part of the network connecting four rooms is shown; and, for example, rooms 1A, 1B may be in a first building, while rooms 2A, 2B may be in a second building, remote from the first.

In each room 1A-2B at least one IR transceiver 44,46,48,50 is used to provide communication between any Tabs present in the room and the network (see the above-mentioned Schilit *et al.* references). Alternatively, any of the objects 30-42 may be provided with its own IR transceiver for communication with Tabs. Consequently, room 1A contains workstation 30, printer 36 and transceiver 44; room 2B contains file server 42, printer 38 and transceiver 50, and so on.

In Fig. 3, the document distribution process is illustrated by showing the positions of the Tabs of two people, Mike and Richard, and the operations which are performed, at intervals before and after their meeting in one of the rooms. The displays on Mike and Richard's Tabs at the instants t_1-t_7 during the process of Fig. 3 are shown in Fig. 4.

At time t_1, Mike is in room 1A (his office) and Richard is in room 2a. As shown in Fig. 4, Mikes satchel contains the (icon for the) document "Agenda" (and therefore has its token stored in its memory), and the icon for his printer (called "Penguin") 36, which appears automatically since printer 36 is located in room 1A. Next, at time t_2, Mike and Richard meet in room 1B: the icon for the Penguin printer has automatically disappeared from his satchel display; and the icon for Richard's satchel appears in Mike's satchel, and the icon for Mike's satchel appears in Richard's satchel. In addition, the icon for the fax machine 40 automatically appears in both satchels.

At time t_3, Mike decides to pass a copy of the electronic document "Agenda" to Richard. (If, say, Mike does not have the document he wants to pass on in his satchel, he may employ a memory aid and information retrieval system provided on his Tab, as disclosed in published European patent application EP-A-637,807, corresponding to U.S. application S.N. 08/279,961, in order to locate the document he wants and retrieve it's token.) To pass a copy of the electronic document "Agenda" to Richard, Mike simply selects the document icon on the touch screen of his tab using a pen or the like, and copies the icon onto Richard's satchel icon. This initiates a process wherein the digital token (see Table 1) for "Agenda" is beamed over the IR link from Mike's Tab to Richard's Tab. (The time taken for this will depend on the communication protocol used, the use of security encryption, and the size of the token, but in any event is likely to be a very small fraction of the time which would be needed to transfer the entire document via the same link, and typically the time taken will be a fraction of a second.) Thus the token for "Agenda" is stored on Richard's Tab for later distribution or use. When this operation is completed (t_4), the icon for "Agenda" also appears on the screen of Richard's Tab: it is now in his personal satchel.

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Next (t_5), Mike returns to room 1A and his satchel display reverts to that existing at t_1, which is described above. At the same time (say), Richard returns to room 2A: the icons for Mike's satchel and Fax 1B have automatically disappeared from his Tab screen, so that the only item left in his satchel is the document "Agenda" (Fig. 4). Richard now decides that he would like to print out "Agenda", but doesn't have a printer in his office. At t_6, therefore, he walks into room 2B in the same building which houses the printer 38 called "Picador". The icon for Picador automatically appears as an entry on Richard's Tab screen as a result of the IR communication and object sensing procedure discussed above.

To print out "Agenda", Richard, at time t_7, simply moves (using a pen to move the pointer on his touch screen) a copy of the icon for "Agenda" onto the Picador icon. As a result, an IR signal is beamed from Richard's Tab to the transceiver 50, or to Picador's own IR transceiver, the signal including the digital token for "Agenda". Using the token, the electronic document "Agenda" is fetched from the database in which is stored (e.g. file server 42; but it may be from any location on the network), or is accessed from Mike's workstation 30, and then printed out on Picador. In one embodiment, Picador may be a "confidential" printer, in which case the document is not printed straight away, but the print operation is deferred. Then, the next time Richard is in the vicinity of Picador, Richard's TAB and Picador sense this (via IR communication); the print operation is commenced by Picador; and Richard's TAB emits an audible 'beep' to tell him to collect the freshly printed document immediately upon printing.

In an alternative embodiment, Richard may submit the document "Agenda" for a third party service (e.g. OCR, summarising, and/or translation service) available on the network; and suitably this is achieved by dragging and dropping the icon for "Agenda" onto a corresponding icon for that service on the TAB screen.

Figure 5 shows a flow chart of the processing carried out in each Tab during an encounter with another Tab or IR-linked object. In step S1 the Tab broadcasts, or initiates the broadcast of, the tab user's identity code to the environment. (This code may be encrypted using shared key technology which is known in the art.) Next, at step S2, the software checks for a legal (valid) user input (in this example, the user copying a document icon to another satchel, or other object, using the touchscreen). If such a legal input is made, the document token is transmitted by IR to the recipient at step S3, and the processing returns to step S1. (The token transmission may include encryption using shared key technology which is known in the art, i.e. anything which has been encrypted with a user's private key can only be decrypted using the public key corresponding to that private key.)

If no such legal input is entered, the software checks at step S4 to see whether any IR signal (e.g. satchel or printer ID, or document token) has been received. If none has been received the processing returns to step S1.

If an IR signal has been received, the software then checks (step S5) to see whether it is an ID (e.g., another satchel). If so, then the received ID is displayed on the tab screen, at step S6, i.e. satchel icon + that satchel user's name. (Again this ID code may need to be decrypted using shared key technology which is known in the art.). The processing then returns to step S1.

If the signal is not an ID, then the software next checks at step S7 whether the received IR signal is a document token. If not, then there is a system error, and this is indicated on the Tab screen. If the received IR signal is a document token, then the document corresponding to the token (i.e. icon + document name) are displayed (step S8) on the tab screen. (Again this ID code may need to be decrypted using shared key technology which is known in the art.). The processing then returns to step S1.

Figure 5(b) is a schematic flow chart of the process carried out in a portable device, in one embodiment of the invention, in updating the display thereof. Figure 5(c) is a schematic flow chart of the process carried out in a fixed object such as a printer or multifunction machine, in one embodiment of the invention, when a nearby user prints out a document.

Figure 6 shows schematic representations of various procedures for distributing documents which may be performed using the present invention. In Fig. 6, item 60 is a multifunction machine equipped with IR communication facilities for wirelessly communicating with tabs, base stations in rooms, and any of the other objects mentioned above which are within range of its IR transmitter at a given time, the machine 60 also being hooked up to the network (see Fig. 3) so as to facilitate rapid transfer of electronic documents between itself and any number of other similar machines 60 or other objects on the network. The machine 60 may for example provide any combination of the functions of scanning, copying, faxing and printing, as is known in the art.

As can be seen in Fig. 6(a), document A is initially scanned by the multifunction machine 60 and its corresponding token is beamed by IR to Ann's Tab, and the relevant icon entry appears in her satchel. Some time later (e.g. when document A is not available), Ann beams the token to the machine 60 (by means of the icon-dragging process described above in relation to Figs 3 and 4, and the machine automatically prints out document A.

In Fig. 6(b), the document A has been created on a user's conventional workstation 62. The user then sends the electronic document to the multifunction machine 60, which then beams by IR the corresponding token to Ann's Tab.

Referring to Fig. 6(c), here two multifunction machines 60, 60' are coupled on a network. Initially document A is scanned in on machine 60 which beams the token to Ann's tab, as in Fig. 6(a). Some time later and, for example at a remote location, Ann decides she wants a hard copy of document A. She simply beams the token to nearby machine 60' (as described with reference to Fig. 6(a)); machine 60' thereupon retrieves the electronic document A over the network from machine 60 or an associated file server (not shown), and then prints out the document.

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The distribution and printing of a document (A) is again illustrated in Fig. 6(d). The process is the same as in Fig. 6 (c), except that the token is beamed from Ann to Bob for the latter to print out the document A on the second machine 60'. In an alternative embodiment, the token for document A may be characterised such that A nn is able to receive and transmit it, but not to obtain access to the document itself, e.g. by printing. In this way, Ann is able to 'trade' in a document which is inaccessable to her: she can thus act as a courier for confidential documents.

In Fig. 6(e), the case where the Tab owner is not in the vicinity of a multifunction machine is illustrated: here the machine is linked to a fax machine 66 over the telephone network 64. The document A has been scanned in and stored electronically in a database by machine 60. Later, Ann is at a location where she needs a hard copy of document A and has access to fax machine 66. Using the fax machine she dials up the multifunction machine 60 and, upon gaining access, she operates her Tab to transmit a tone signal down the telephone representing the token for document A and commanding the machine 60 to transmit document A to the fax machine 66. The machine promptly accesses the electronic document A and sends it down the telephone line to the fax machine 66 where it is printed out.

The same operation is illustrated in Fig. 6(f), with the exception that in this case the fax machine 66' is equipped with its own IR transceiver 68, enabling the token for document A'to be beamed by IR from Ann's Tab to the transceiver 68 and then electronically conveyed from the fax machine 66' to the multifunction machine 60.

The embodiment illustrated in Fig. 6(g) makes use of radiopaging technology. Bob is equipped with a radiopager, or a Tab which emulates a radiopager, and while away from his office contacts Ann to let her know that he requires a copy of document A. Ann scans in document A in the multifunction machine 60, and then commands the machine to transmit the token for document A over the pager network 70 to Bob's pager (Tab). Bob is then able to go to any printer, fax, etc adapted to receive such tokens, and to print out a copy of document A.

Numerous futher embodiments will be apparent to persons skilled in the art. For example, the satchel may be implemented using a (GSM) portable telephone coupled to a PCMCIA cellular data card which can be plugged into a palmtop or notebook computer. Alternatively, the satchel functionality may be incorporated into a pager or mobile phone.

Claims

1. A system for accessing or distributing electronic documents, including: a database of electronic documents and corresponding document references, and a plurality of objects, at least one of said objects preferably being portable or mobile, each object including means for communicating with the or each other object and with a user interface, and means for receiving, storing or transmitting a document reference corresponding to one of said electronic documents.

2. A portable device for accessing or distributing electronic documents, including: means for communicating with fixed or mobile electronic devices and with a user interface, at least one of said devices including a database of electronic documents and corresponding document references, and means for receiving, storing or transmitting a document reference corresponding to one of said electronic documents.

3. The device according to claim 2, wherein said user interface is integral with the device.

4. The device according to claim 2 or 3, further including means for displaying a representation of the or each document whose reference is stored in the device.

5. An apparatus for scanning, copying and/or printing documents, including: means for accessing a database of electronic documents, each electronic document having a corresponding document reference, means for communicating with one or more of a plurality of objects, at least one of said objects preferably being portable or mobile, and with a user interface, and means for receiving, storing or transmitting a document reference corresponding to one of said electronic documents.

6. The system, device or apparatus of any of the preceding claims, wherein the means for communicating includes an infrared transceiver.

7. The system, device or apparatus of any of the preceding claims, further including means for determining whether one or more other objects in located in the vicinity thereof.

8. The system, device or apparatus of claim 7, wherein the determining means includes means for identifying the or each object found to be in the vicinity thereof.

9. The system, device or apparatus of claim 8, further including means for displaying a representation of the or each object found to be in the vicinity thereof.

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10. The device of claim 9 when dependent on claim 4, wherein said user interface is adapted to highlight the representation of one of said documents upon its selection by a user, and the device further includes means for initiating transmission of the document reference corresponding to said one document to another object upon the user copying the representation of said document onto the representation of said object.

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Fig.1.

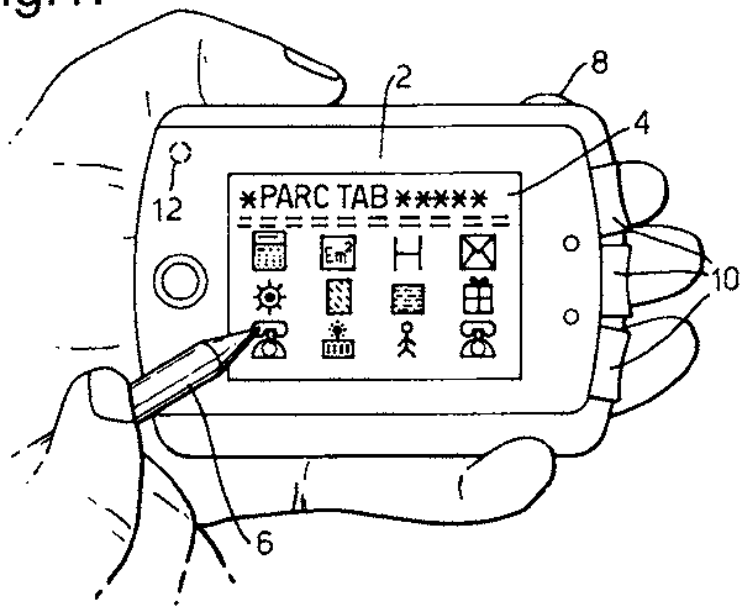


Fig.2(a).

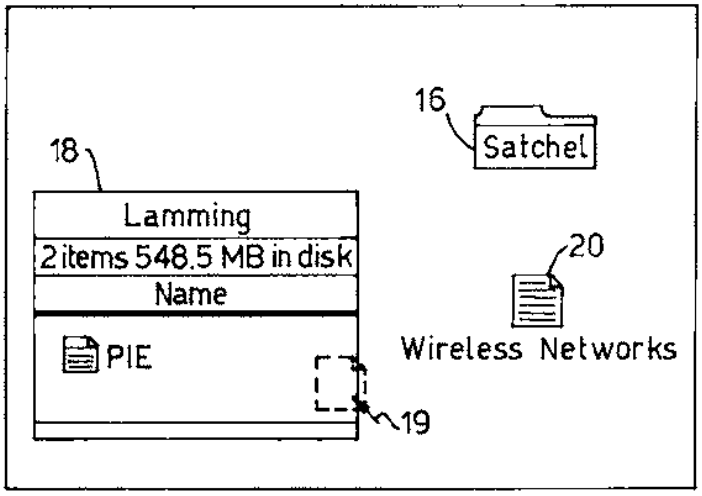
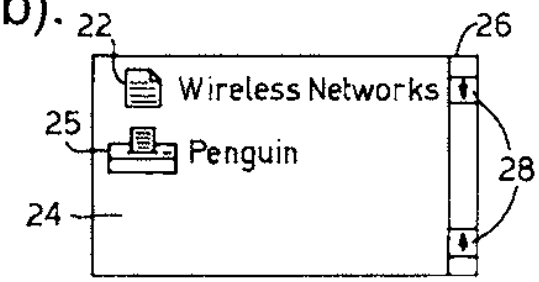
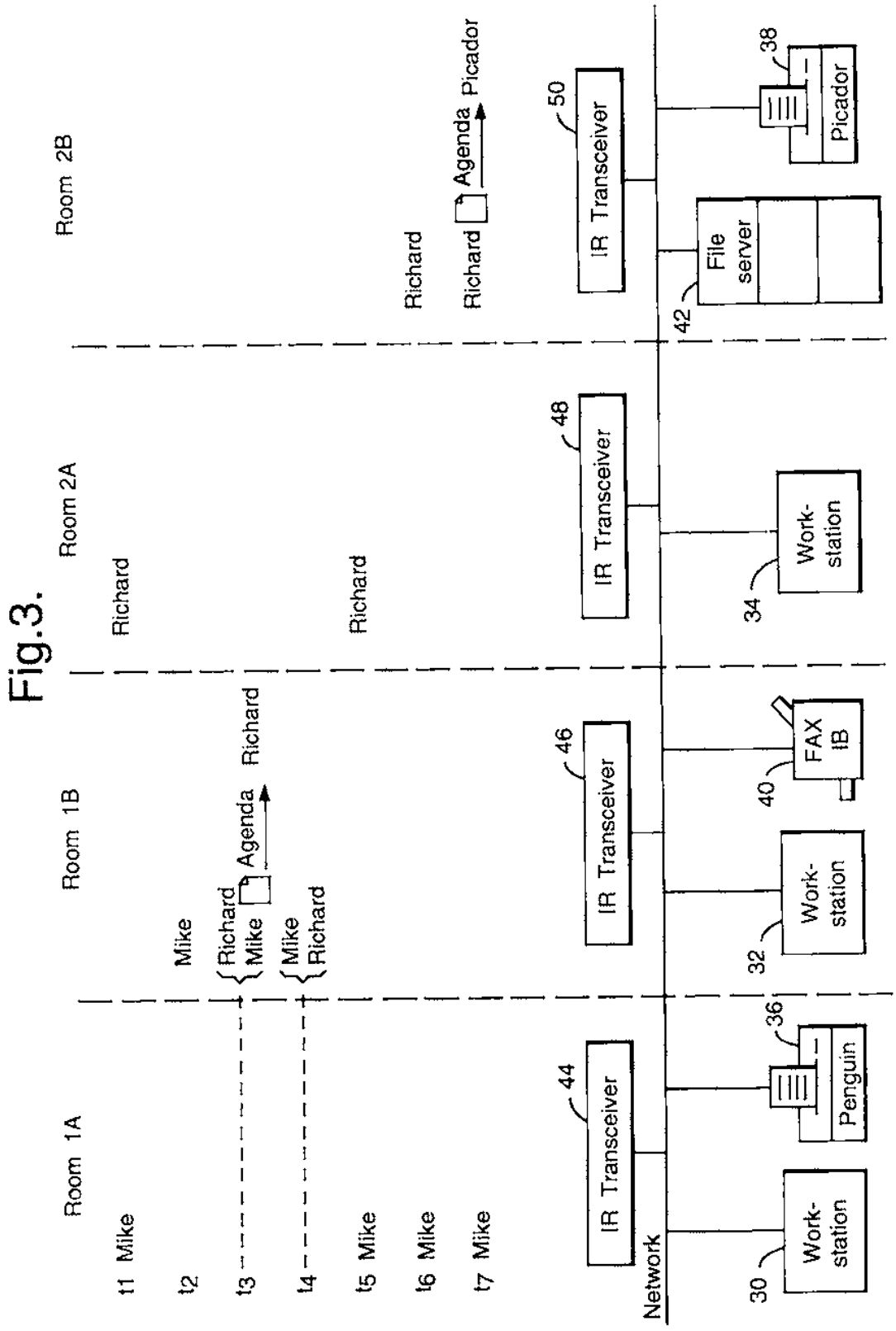


Fig.2(b).



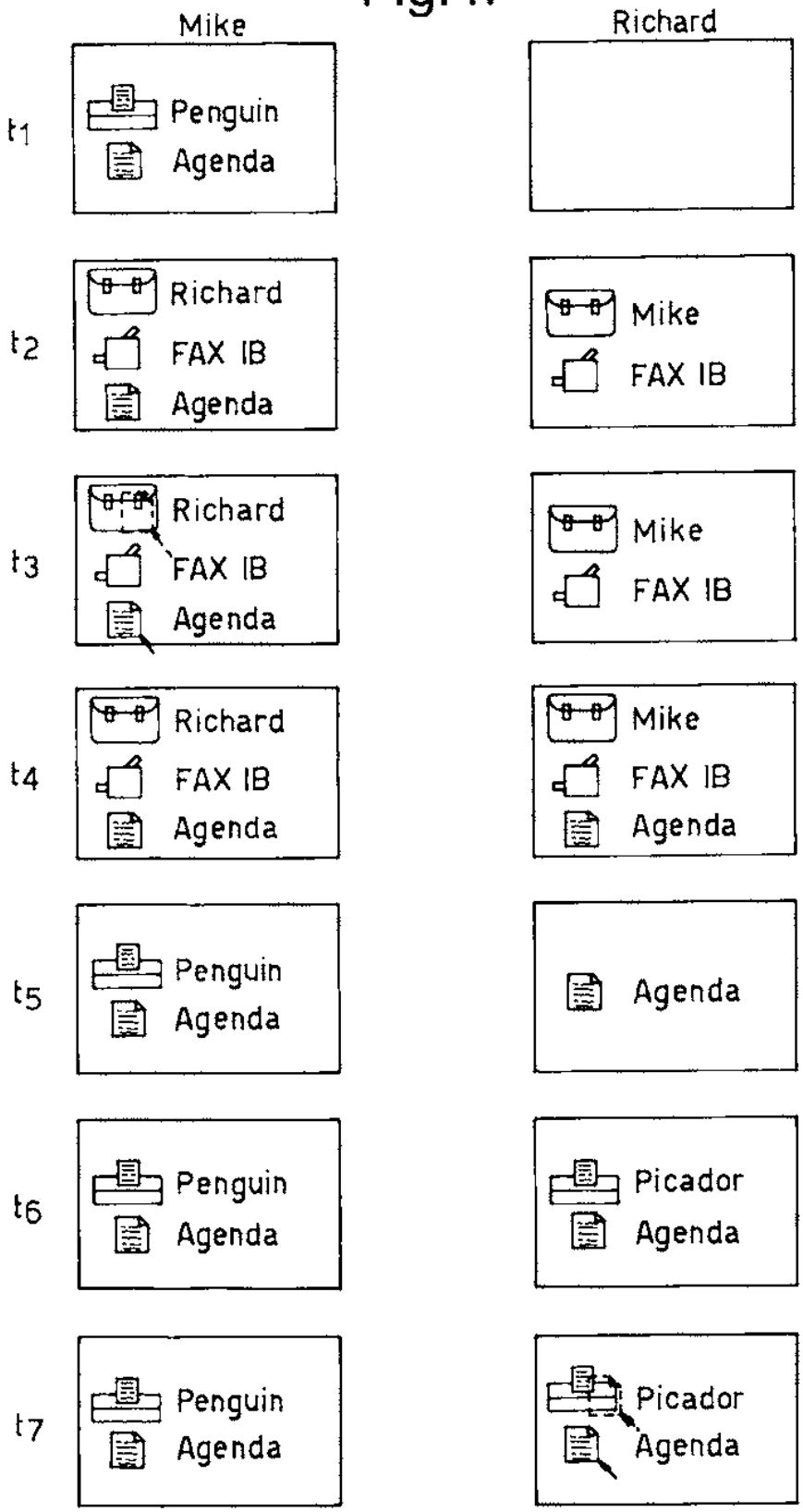
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Fig.3.



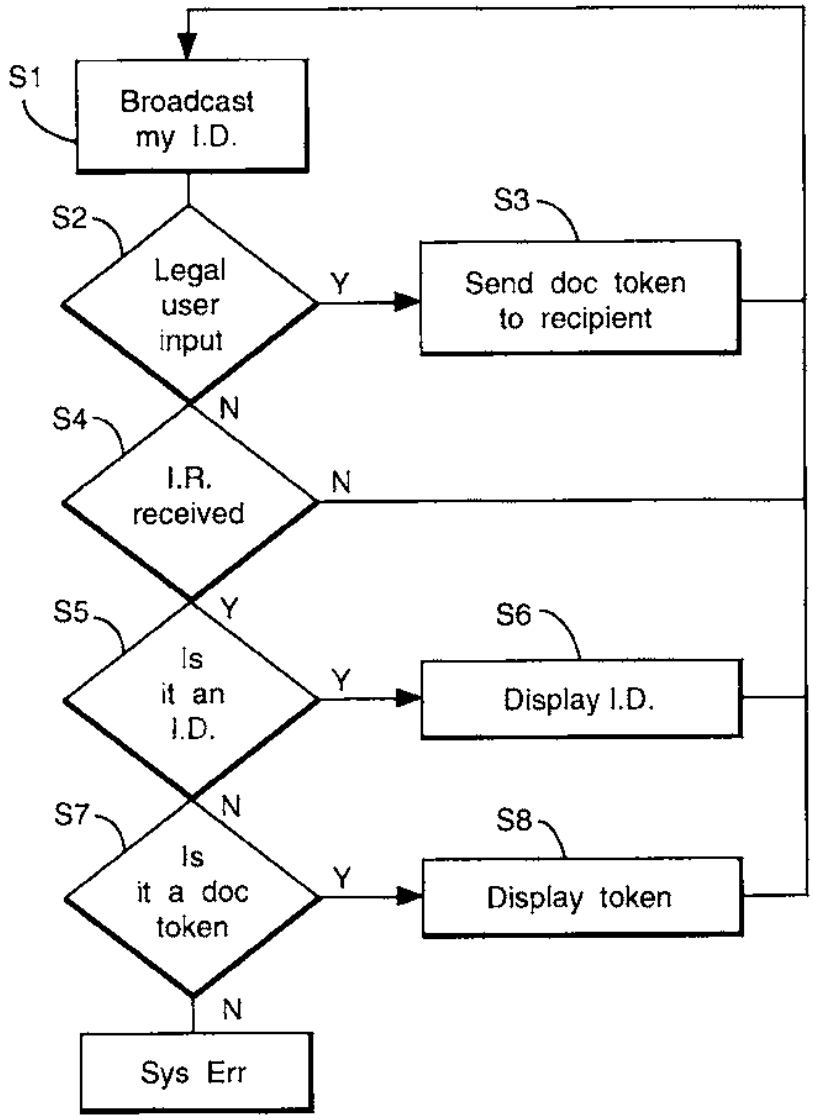
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Fig.4.



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Fig.5(a).



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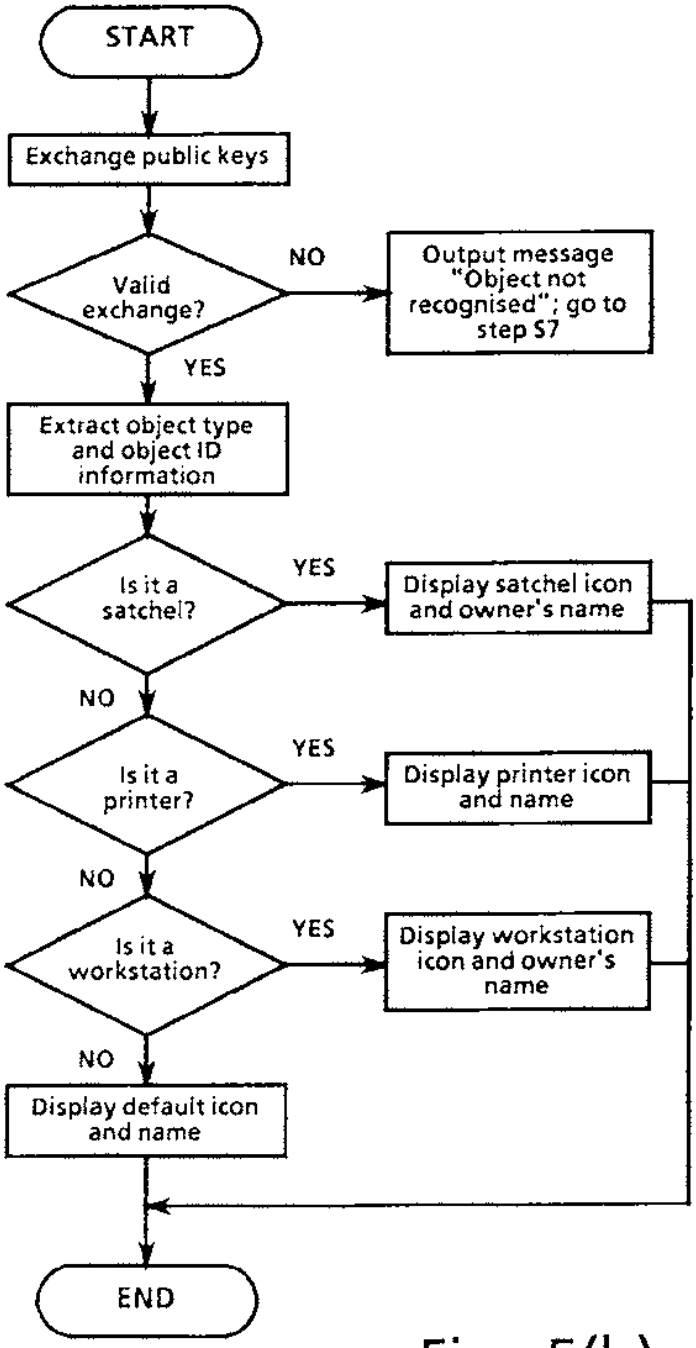


Fig. 5(b)

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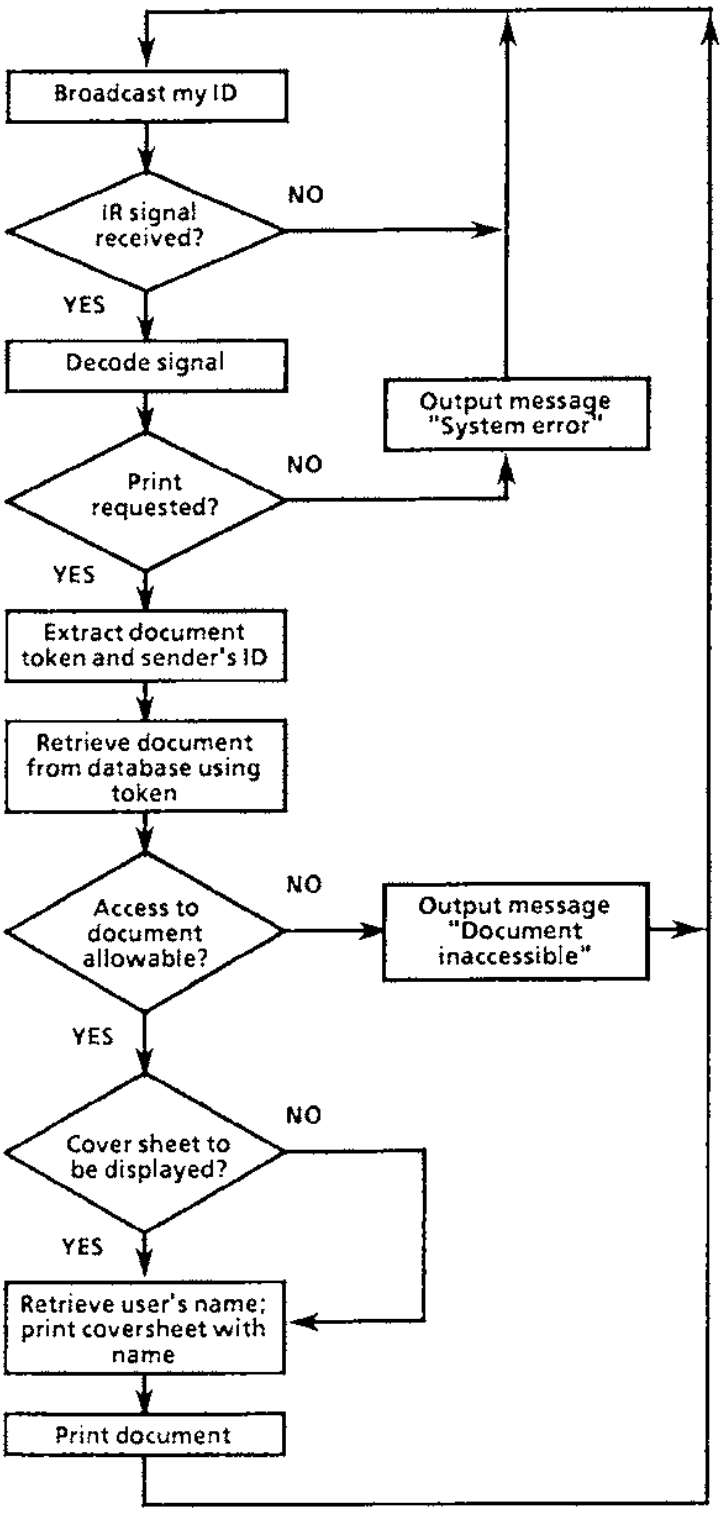


Fig. 5(c)

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Fig.6(a).

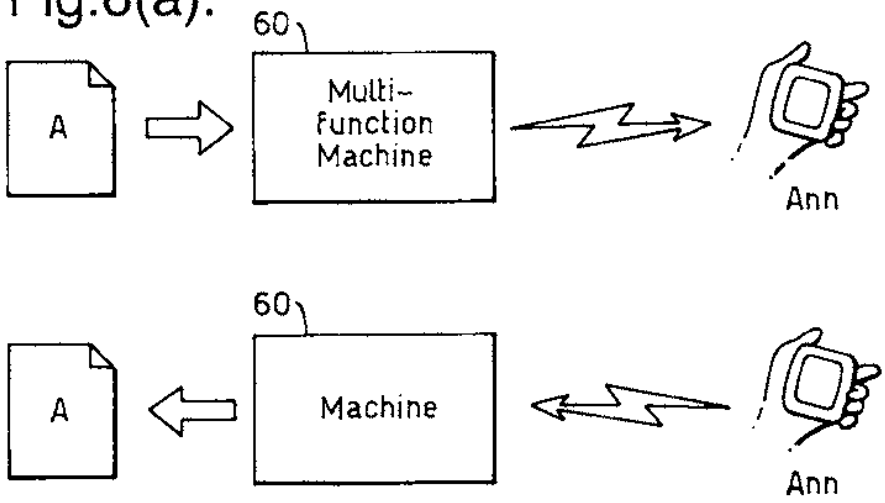


Fig.6(b).

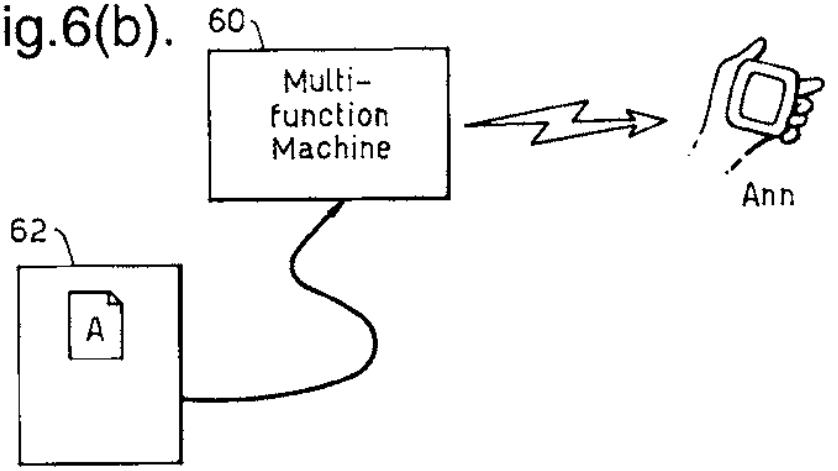
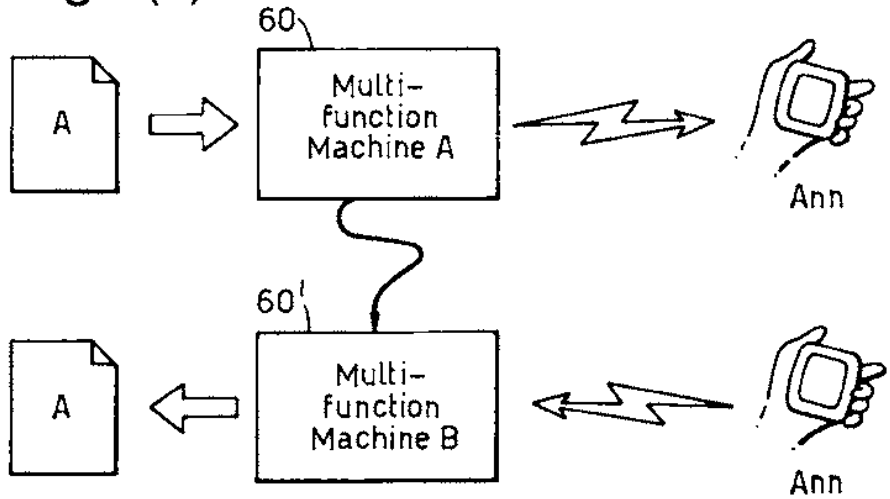


Fig.6(c).



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Fig.6(d).

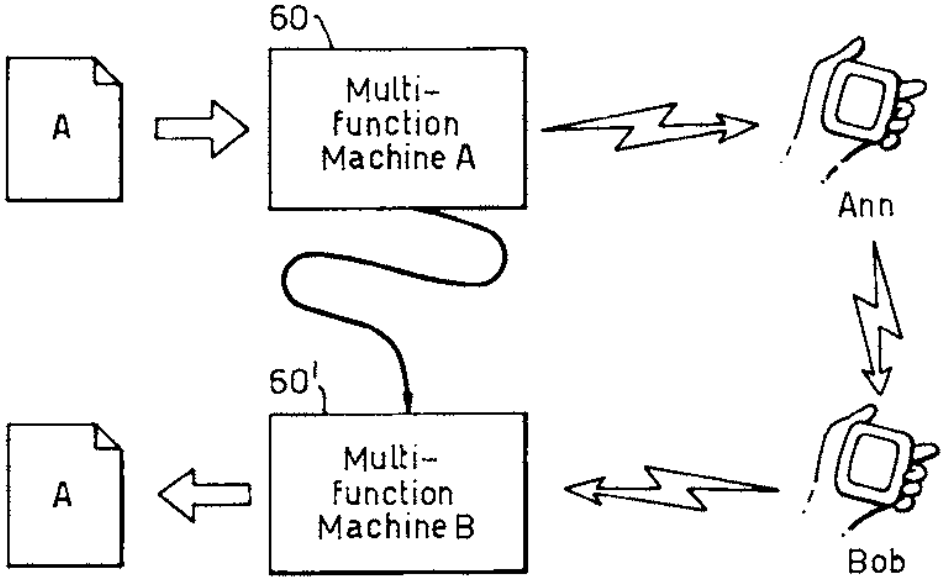
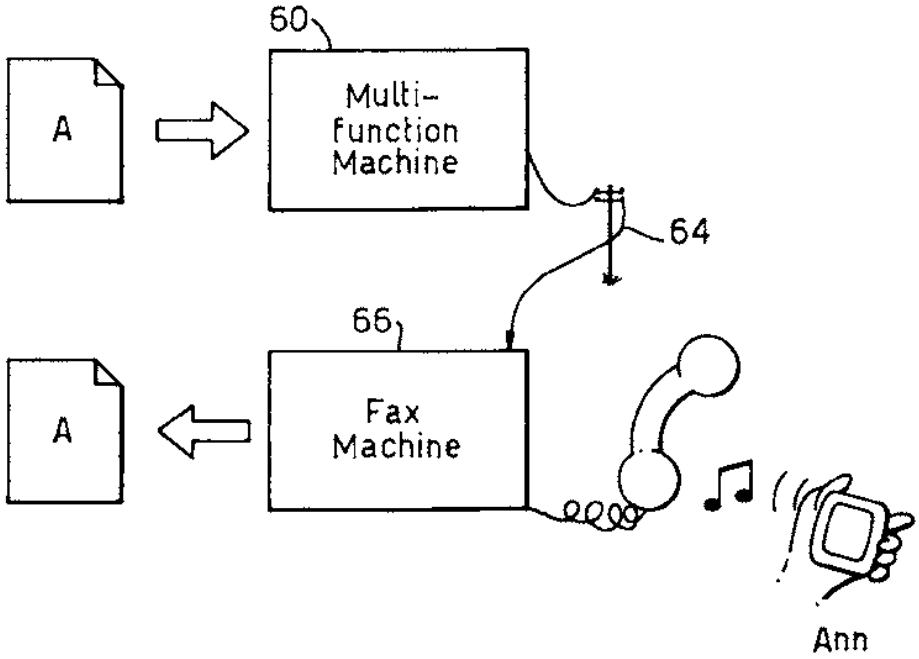


Fig.6(e).



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Fig.6(f).

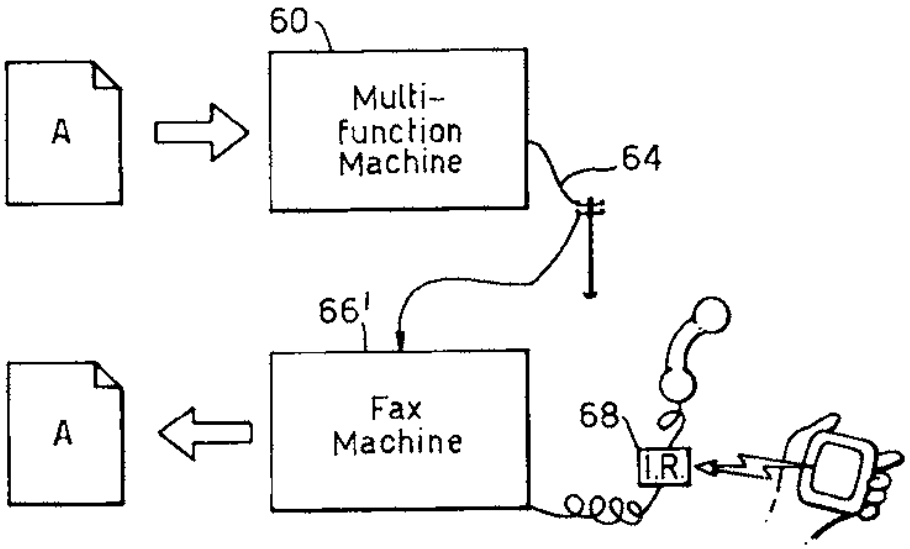
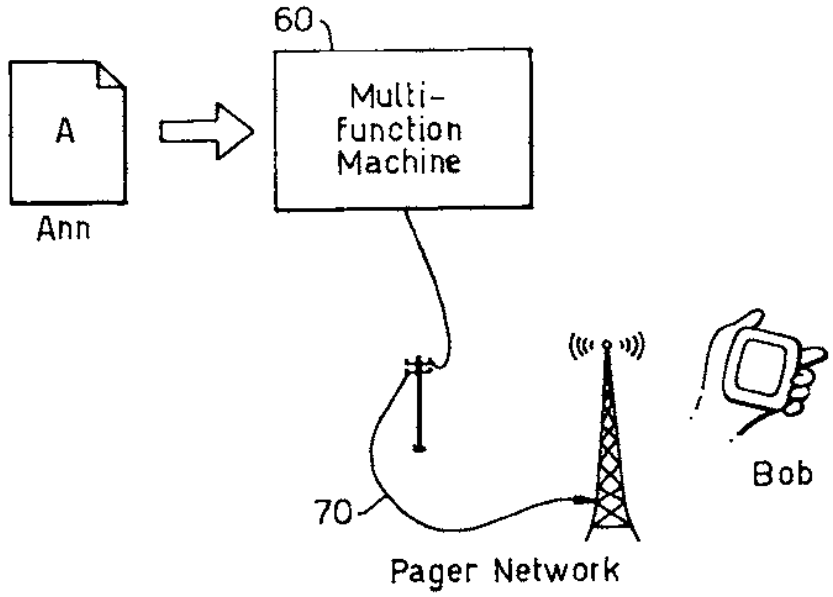


Fig.6(g).



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(19) Europäisches Patentamt
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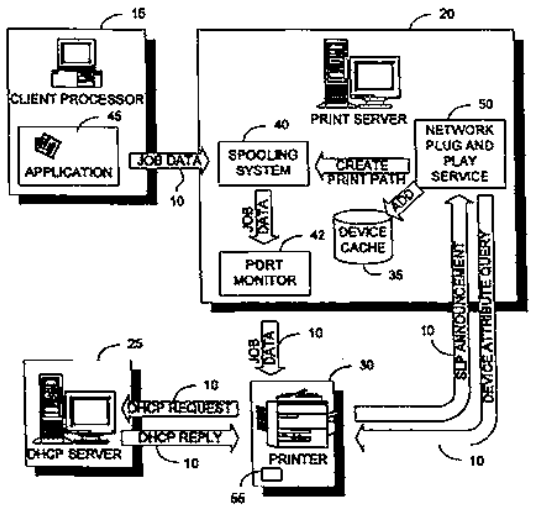
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(54) Automatic configuration of a network printer

(57) A method of configuring a peripheral device (30) on a network (10) without user intervention includes a server node (20) receiving identification data (130) for identifying the peripheral device on the network and, if the peripheral device is a new device (135) on the network or a driver for the peripheral device is not registered (145) on the server node, the server node self-installing the driver (160) for the peripheral device. As such, newly connected peripheral devices are automatically seen on a network and a driver for the peripheral device is automatically configured on a print server without any user intervention. Additionally, a communication port and queue for the device are also automatically created (175,185). Moreover, device configurations are dynamically and automatically updated (190,192,195) on the print server for consistent, accurate network information.

FIG. 1



EP 0 952 513 A1

Printed by Xerox (UK) Business Services
2.16.7/3.6

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Description

FIELD OF THE INVENTION

[0001] This invention relates in general to network communications and, more particularly, to enabling network peripheral devices such as printers to be automatically configured without user intervention upon connection to a network.

BACKGROUND OF THE INVENTION

[0002] Enabling a user to employ a newly added printer over a network is often a complex task. At an overview level, initial set-up in current network environments generally requires the creation of print queues, printer objects and print servers. Then, such queues, objects and print servers must be properly linked and configured. Then, to send a print job to the network printer, the client processor usually directs the print job to a network queue on the print server, and then the print server processes the job from the queue and sends it to the printer.

[0003] More specifically, adding a printer to a network environment is, conventionally, no small task. It requires a series of installation and configuration steps that are generally performed either by a user or a network administrator or both in cooperation with each other. Namely, the printer requires specific configuration steps to be performed and parameters to be applied for successful operation on the network, as also does any computer (client processor) on the network that will be sending data to the printer. For example, typically, a vendor's configuration application program must be executed on a client computer to identify the new printer (device) to be used on the network. Once the new printer is identified from a list of devices presented by the vendor's configuration application, then the configuration application provides proper configuration parameters for that new device. The configuration parameters are very specific to the device being added and to the client computer and network over which communication occurs.

[0004] Additionally, a print server must be configured to enable use of the newly added printer on the network. Conventionally, the print server manages and monitors use of the printer relative to all client computers on the network, and all client computers access the printer via the print server. Accordingly, the print server must also be configured, in addition to the client computer, to enable use of the printer over the network. This includes, typically, a vendor's configuration application also being executed on the print server for that printer.

[0005] In addition to a vendor's configuration application being executed to install and configure the printer on the print server, the network operating system must also execute its configuration routines on the print server in order to configure and enable the printer for the network via the print server. This often includes identifying appropriate printer files, registering the printer with the spooling system, establishing printer queues and printer ports, and defining client processor network share-access rights to the printer. Unfortunately, the vendor configuration application and the network operating system configuration routines are generally not integrated, and must also be accessed directly from the print server itself. Thus, a network administrator conventionally manually initiates this software configuration process for the newly added printer from the print server itself.

[0006] While such a conventional network printer configuration system and method works well, when properly configured, it is more complex and cumbersome than what most users care to engage in. In addition, if the installation or configuration doesn't work quite right, troubleshooting can be both difficult and time-consuming.

[0007] Accordingly, an object of the present invention is to enable a peripheral device, such as a printer, to be automatically configured without user intervention upon connection to a network.

SUMMARY OF THE INVENTION

[0008] According to principles of the present invention in a preferred embodiment, a method of configuring a peripheral device on a network without user intervention includes the server node receiving identification data for identifying the peripheral device on the network and, if the peripheral device is a new device on the network or a driver for the peripheral device is not registered on the server node, the server node self-installing the driver for the peripheral device.

[0009] Thus, newly connected peripheral devices are automatically seen on a network and a driver for the peripheral device is automatically configured on a server node without any user intervention. Additionally, a communication port and queue for the device are also automatically created. Moreover, device configurations are dynamically and automatically updated on the server for consistent, accurate network information.

[0010] Other objects, advantages, and capabilities of the present invention will become more apparent as the description proceeds.

DESCRIPTION OF THE DRAWINGS

[0011]

FIG. 1 is a block diagram of a communication network and attached devices and includes the present invention for automatically configuring a network printer.

FIGs. 2-3 are flow charts depicting a preferred method of the present invention.

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DETAILED DESCRIPTION OF THE INVENTION

[0012] FIG. 1 is a high level block diagram of a communication network 10 and attached devices including a client processor 15, print server 20, DHCP server 25, and network printer 30. The present invention is described in the context of communication network 10 being a conventional TCP/IP network. In the diagram, network 10 is illustrated as directional arrows to represent the TCP/IP communication links and data flow paths between each of the devices over the network in association with the present invention. The present invention is further described herein in the context of client processor 15, print server 20 and DHCP server 25 employing the Windows® or Windows NT® operating system produced by Microsoft Corporation. However, the present invention is also applicable to other networking environments and operating systems. Additionally, although a laser printer 30 is disclosed herein for purposes of discussion, it is understood that it is merely exemplary and that the present invention is equally applicable to other network peripheral devices, including ink jet printers, digital copiers, facsimile machines, etc. Moreover, each device 15, 20 and 25 includes a conventional network input/output (I/O) card for enabling communications with network 10. Printer 30 also includes a "conventional" network I/O card for general network communications purposes, but it is modified per the present invention as will be discussed hereafter.

[0013] Print server 20 includes device cache memory 35, spooling system 40, and port monitor 42 as conventional in the art. Client processor 15 includes application software 45 as conventional in the art for sending a print job to printer 30. DHCP server 25 is a Dynamic Host Configuration Protocol (DHCP) server that holds TCP/IP configuration parameters available for printer 30 and/or other devices to be configured on network 10. DHCP server 25 is shown and discussed as a device that is physically separate from print server 20 for clarity of discussion and illustration. However, DHCP server 25 and print server 20 may be a single device having the separate functionalities combined therein.

[0014] Overall, the present invention enables printer 30 to be automatically configured on network 10 for use by client processor 15 after it (the printer) is physically connected to the network by a user. Specifically, "network plug and play" software 50 depicts a key component of the present invention and resides in a memory on print server 20. A coexisting "network plug and play" module 55 resides (as firmware) on the network I/O card in printer 30. Thus, the network I/O card on printer 30 is modified from a conventional network I/O card in that it includes the "network plug and play" module 55 of the present invention. These software routines (50,55) execute and interact to enable the automatic configuration of printer 20 without any user intervention after the printer is connected to the network.

[0015] Referring now to FIGs. 2-3 (in conjunction with FIG. 1), a flow chart describes the functionality and a preferred method of the present invention. First, 105 (FIG. 2), printer 30 is connected to the network 10 and turned on. Upon power up, printer 30 (module 55) issues a DHCP request packet 110 over network 10. DHCP server 25 responds with a DHCP reply packet 115 that contains the available TCP/IP configuration parameters for printer 30. Upon receiving those TCP/IP configuration parameters 120, printer 30 sets its memory configuration to reflect the parameters received. The printer now has its TCP/IP address.

[0016] Next, 125, module 55 of printer 30 sends a Service Location Protocol (SLP) reply packet using IP multicast over network 10. This SLP reply packet serves as an announcement that the printer is up and running on the network. The SLP reply packet contains information specific to printer 30, including the printer's hardware (network I/O card) address, TCP/IP address, printer model name, network I/O card name, and TCP/IP hostname.

[0017] When "network plug and play" service 50 receives the SLP packet data 130, it initiates a search of device cache 35 on print server 20 to determine whether printer 30 (as identified in the SLP reply packet data) is a new device on the network. If printer 30 is a new device 135 on the network (i.e., there is not an entry for printer 30 in cache 35), then it is added as a new entry 140 to cache 35. Additionally, and importantly, after adding printer 30 as a new entry to cache 35, "network plug and play" service 50 then installs the appropriate print driver for printer 35 onto printer server 20 based on the printer model provided in the SLP reply packet.

[0018] Automatically installing the appropriate print driver includes communicating 145 (FIG. 3) with spooling system 40 to see if the appropriate print driver is already registered therein. If it is not, the installation source (location) of the network operating system is determined 150 (i.e., from a saved location in the Windows and Windows NT operating systems) and then that installation source (ie., local or remote disk drive) is accessed in an attempt to automatically obtain the print driver. If the original disk that was used to install the network operating system is available at the source location 155 (i.e., in the drive), then the appropriate print driver for printer 30 is accessed 160 and registered with spooling system 40. Thus, the print driver installation is completely automated by "network plug and play" software 50, 55 of the present invention.

[0019] Only if the original disk does not exist at the determined source location 150, 155 will a user be prompted for input 165 to identify the location of the installation disk. However, this prompting only occurs once because the "network plug and play" module subsequently stores 170 the user input source location. As such, upon a next attempt to install another printer, the newly identified installation location is automatically accessed for obtaining the appropriate print driver.

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Then, only if the installation disk is not in that location will another prompt occur for user input to identify a new installation location.

[0020] Subsequent to accessing the print driver 150, 155, 160 and registering it with spooling system 40, "network plug and play" software 50 then creates a communication port 175 on print server 20 using the hostname from the SLP reply packet or a generated port name based on the hardware address of the device. Additionally, a print queue is created 180 on print server 20 using a unique name based on the model name of printer 30 (supplied in the SLP reply packet). The print queue is then designated with network share access rights 180 so client processor 15 can use printer 30 over network 10.

[0021] Finally, after basic communication and configuration parameters have been established, "network plug and play" software 50 then queries printer 30 for additional attribute information 185, such as how much memory the printer has, text describing the printer, number of trays, print resolution, etc. This information is then sent to spooling system 40 to allow client processor 15 to locate printer 30 based on such attributes. At this point, client processor 15 is now able to send print data to printer 30 via print server 20.

[0022] Referring back now for a moment to the determination 130, 135 (FIG. 2) of whether an entry already exists for printer 30 in cache 35, if an entry exists (i.e., the printer is not a new device on the network), then no change is made in cache 35. However, if some configuration parameters have changed 190 for printer 30 (as detected in the SLP reply packet information), but the printer model has not changed 192, then the spooler 40 configuration parameters are adjusted accordingly 195. For example, if an I/P address for printer 30 has changed, then the port address in spooling system 40 is modified accordingly.

[0023] On the other hand, if the printer model has changed 192, then a determination is made 145 (FIG. 3) as to whether the print driver for that new (changed) model is already registered in the spooler. If the driver for the changed model is not already registered 145, then steps are taken 150, 155, 160 to access and install the appropriate driver (as previously discussed). If the driver is already registered 145, then we simply ensure that a proper communication port 175 and print queue 180 are created, and we verify attribute information 185.

[0024] In either case, whether certain printer parameters are noted to have changed, or whether the printer model itself has changed, these processes discussed for capturing the changes represent a unique, dynamic updating capability of the present invention for automatically maintaining accurate network information for printer 30 on print server 20 without any user intervention.

[0025] Advantageously, the present invention enables new peripheral devices (such as printer 30) to be automatically seen on a network with the only user input requirement being to physically connect the printer to the network. Importantly, the printer driver is automatically configured on print server 20 without any user intervention, the port and queue for the printer are likewise automatically created, and printer configurations are dynamically and automatically updated for consistent, accurate network information.

[0026] In summary, the present invention provides an automatic configuration of a network peripheral device without user intervention. It will be obvious to one of ordinary skill in the art that the present invention is easily implemented utilizing any of a variety of components and tools existing in the art. Moreover, while the present invention has been described by reference to specific embodiments, it will be apparent that other alternative embodiments and methods of implementation or modification may be employed without departing from the true spirit and scope of the invention.

Claims

1. A method of configuring a peripheral device (30) on a network (10) without user intervention, the network having a server node (20) connected thereto, the method comprising:

   (a) the server node (20) receiving identification data (130) for identifying the peripheral device (30) on the network (10); and,
   (b) upon detecting the received identification data, the server node self-installing a driver (160) for the peripheral device if the driver is not already installed (145) on the server node (20).

2. The method of claim 1 wherein the peripheral device (30) is selected from a printing device, digital copying device, or facsimile device.

3. The method of claim 1 or 2 wherein the step of self-installing the driver (160) includes accessing a driver file for the peripheral device and registering the driver file with the server node.

4. The method of claim 3 wherein accessing the driver file includes accessing a storage device (150,155) identified from a memory location in the server node (20), the storage device being identified as a source from which the server node was network enabled.

5. The method of claim 1, 2, 3 or 4 wherein the peripheral device is a printer (30) and wherein the step of self-installing the driver (160) includes registering the peripheral device with a spooling system associated with the server node.

6. The method of claim 1, 2, 3, 4 or 5 further including,

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upon detecting the received identification data, the server node (20) self-creating a communication line (175,180) to the peripheral device.

7. The method of claim 1, 2, 3, 4, 5 or 6 wherein the identification data is received (130) by the peripheral device (30) having broadcast (125) the identification data over the network (10).

8. The method of claim 1, 2, 3, 4, 5, 6 or 7 further including the server node (20) self-modifying (190,192,195) to embody changed configuration parameters of the peripheral device as identified from the received identification data.

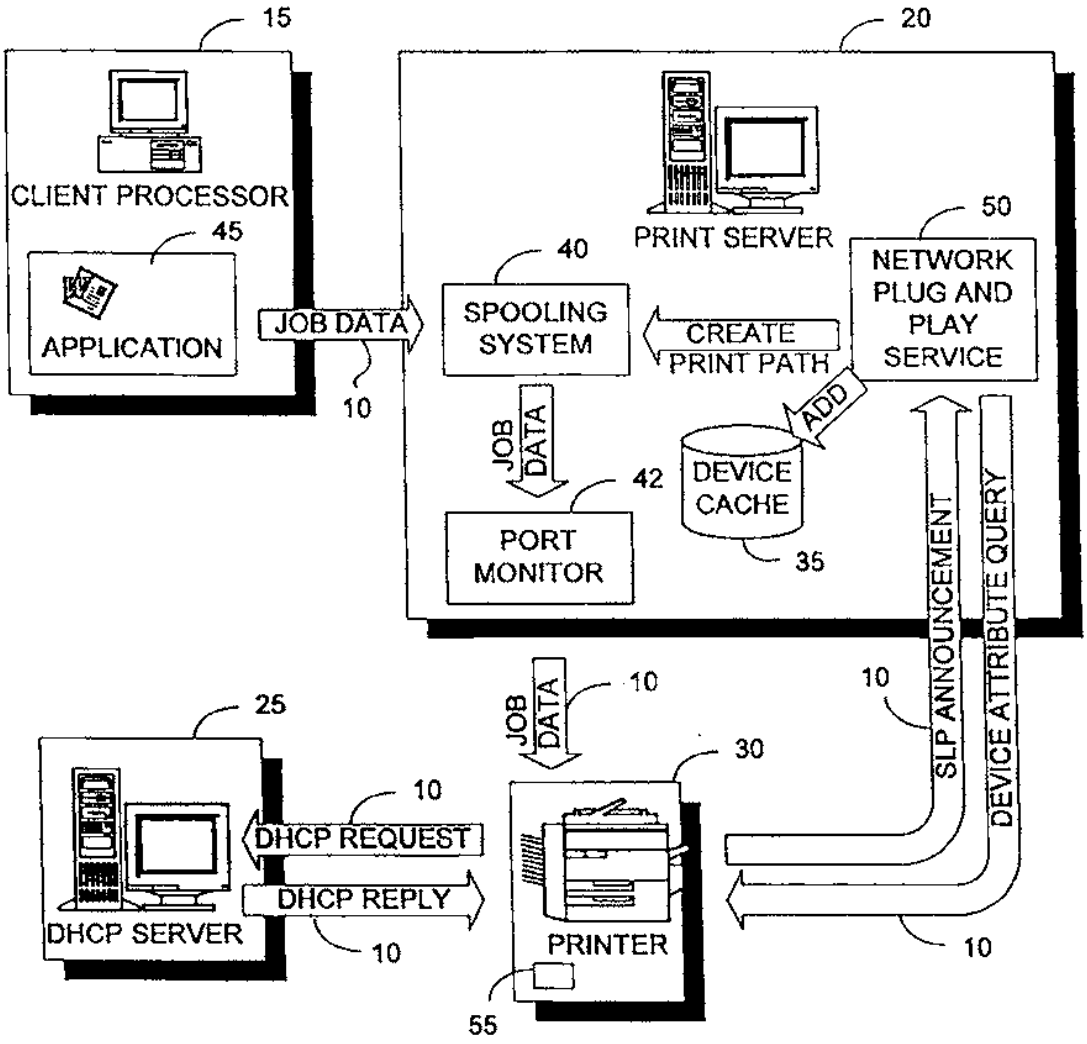
9. An apparatus (50,55) for configuring a peripheral device (30) on a network (10) without user intervention, the network having a server node (20) connected thereto, the apparatus comprising:

(a) means (50,55) for enabling the server node (20) to receive identification data (130) for identifying the peripheral device (30) on the network (10); and,
(b) means (50,55) for enabling the server node (20) to self-install a driver (160) for the peripheral device (30) upon detecting the received identification data.

10. The apparatus of claim 9 further including means for enabling the server node (20) to self-modify (190,192,195) to embody changed configuration parameters of the peripheral device (30) as identified from the received identification data.

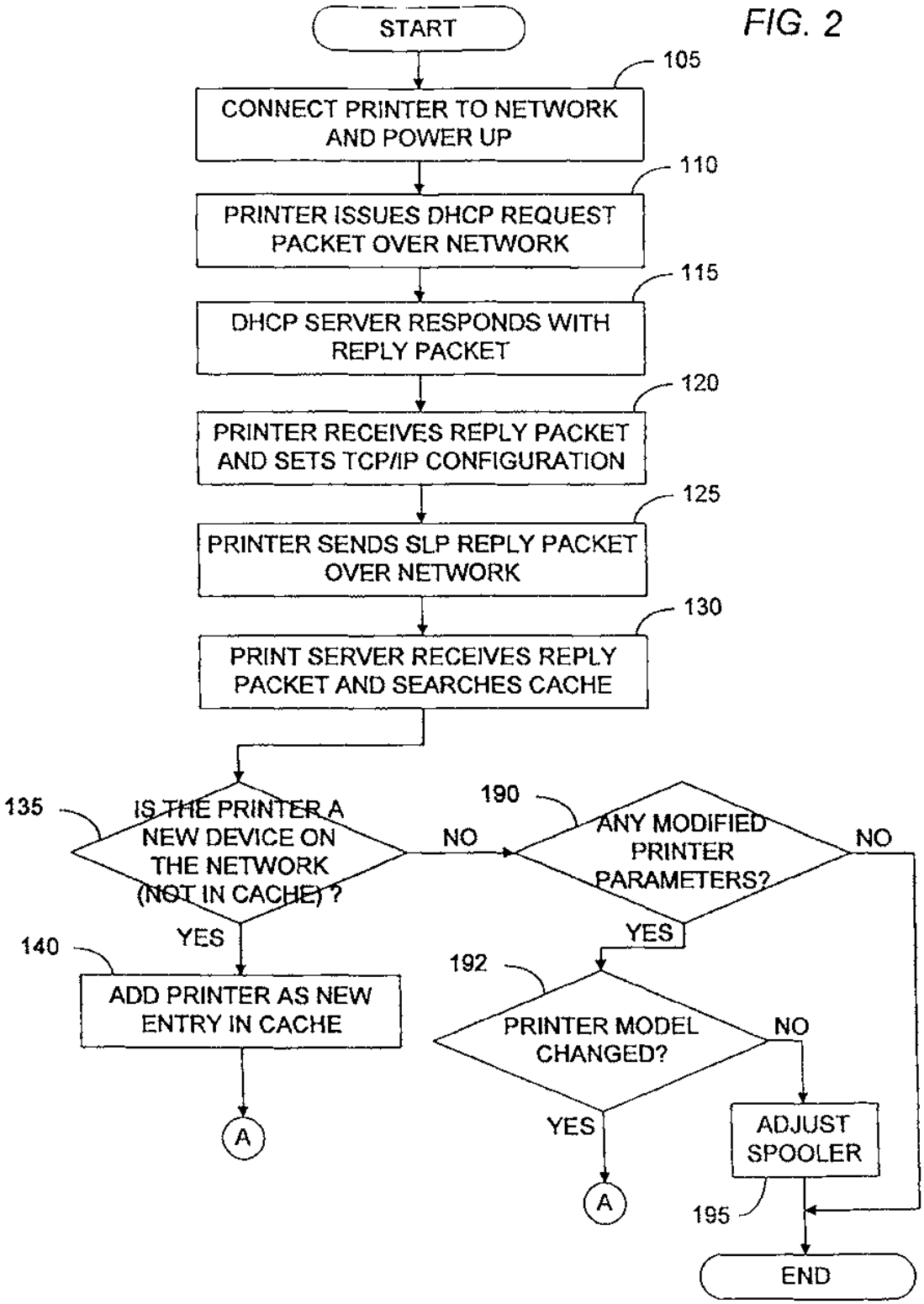
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FIG. 1



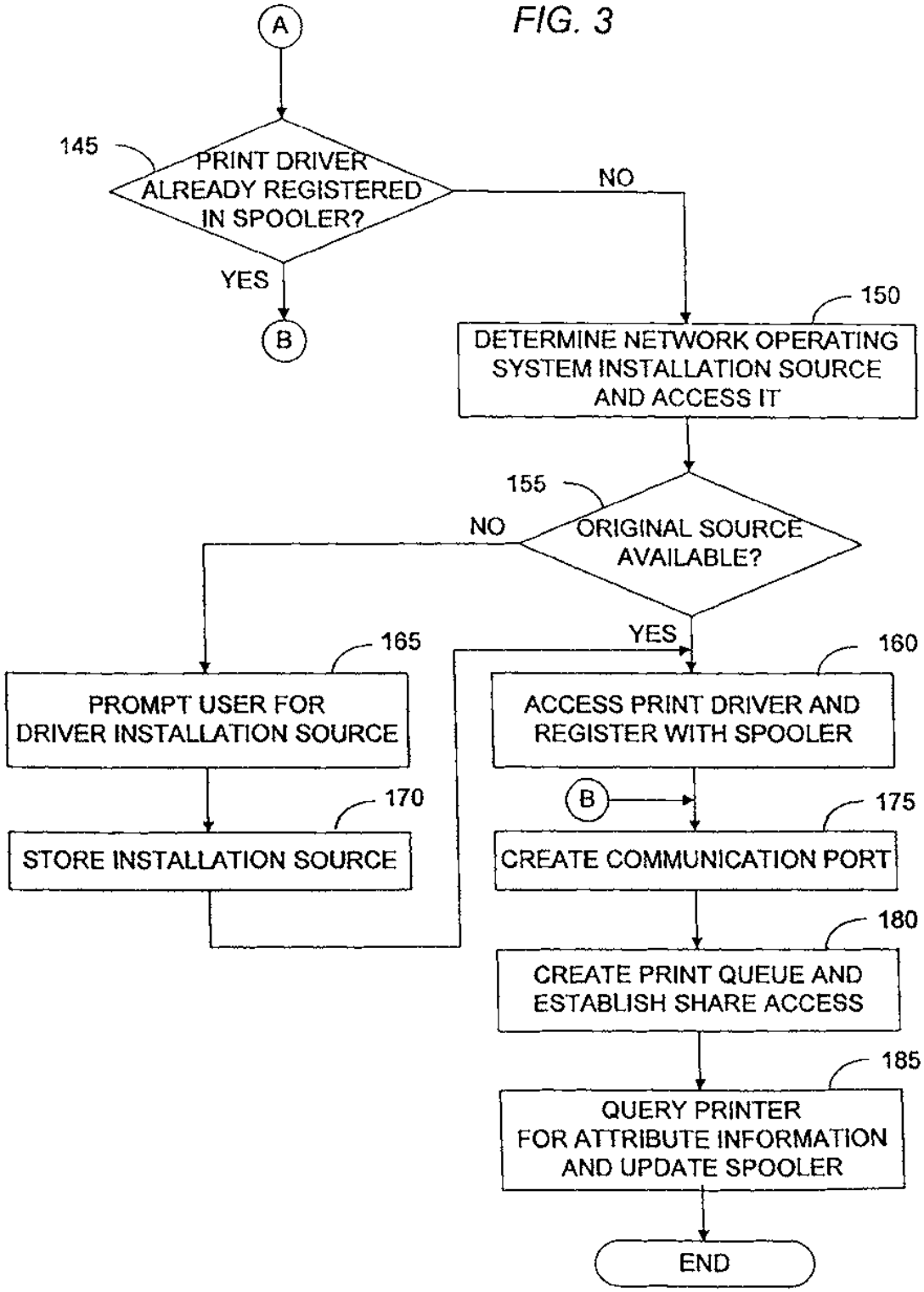
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FIG. 2



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FIG. 3



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EUROPEAN SEARCH REPORT

Application Number
EP 98 11 8576

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 5 655 148 A (RICHMAN DARRYL STEVEN ET AL) 5 August 1997 (1997-08-05) * figures 1-7 * * column 12, line 20 - column 34, line 41 * ---	1,3-6, 8-10	G06F3/12
A	US 5 564 109 A (SALES MILTON S ET AL) 8 October 1996 (1996-10-08) * figures 1,2 * * column 2, line 38 - column 3, line 64 * -----	1,2,5-7, 9,10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			G06F G06K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	6 August 1999	Weiss, P

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 98 11 8576

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

06-08-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5655148 A	05-08-1997	US 5787246 A	28-07-1998
		US 5748980 A	05-05-1998
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		US 5819107 A	06-10-1998
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US 5564109 A	08-10-1996	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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(51) Int Cl[7]: **G06F** 3/12

(21) Application No: **9824937.8**

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(43) Date A Publication: **30.06.1999**

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(56) Documents Cited:
EP 0738956 A2 **EP 0738949 A1**
US 5580177 A **US 5220674 A**

(58) Field of Search:
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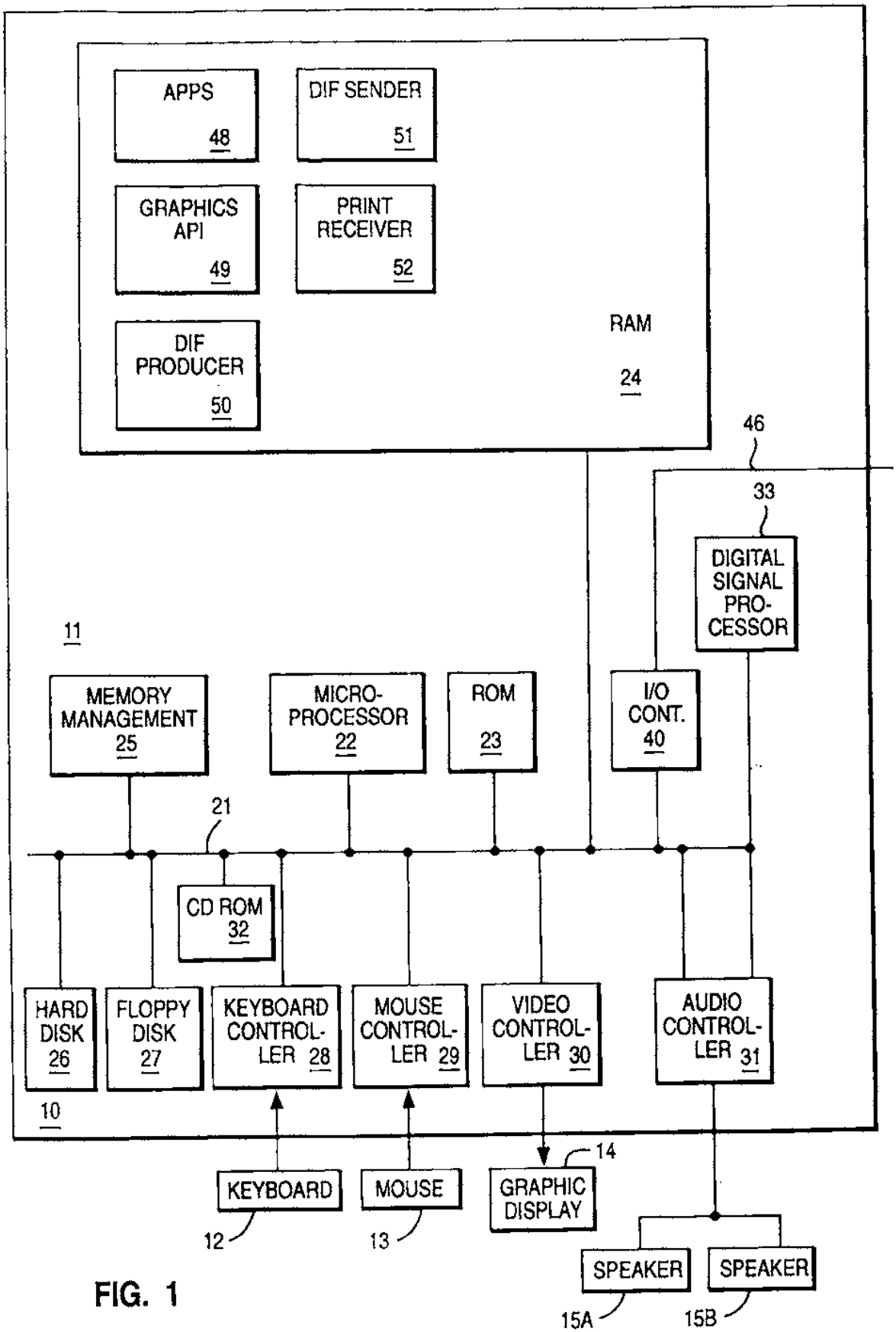


FIG. 1

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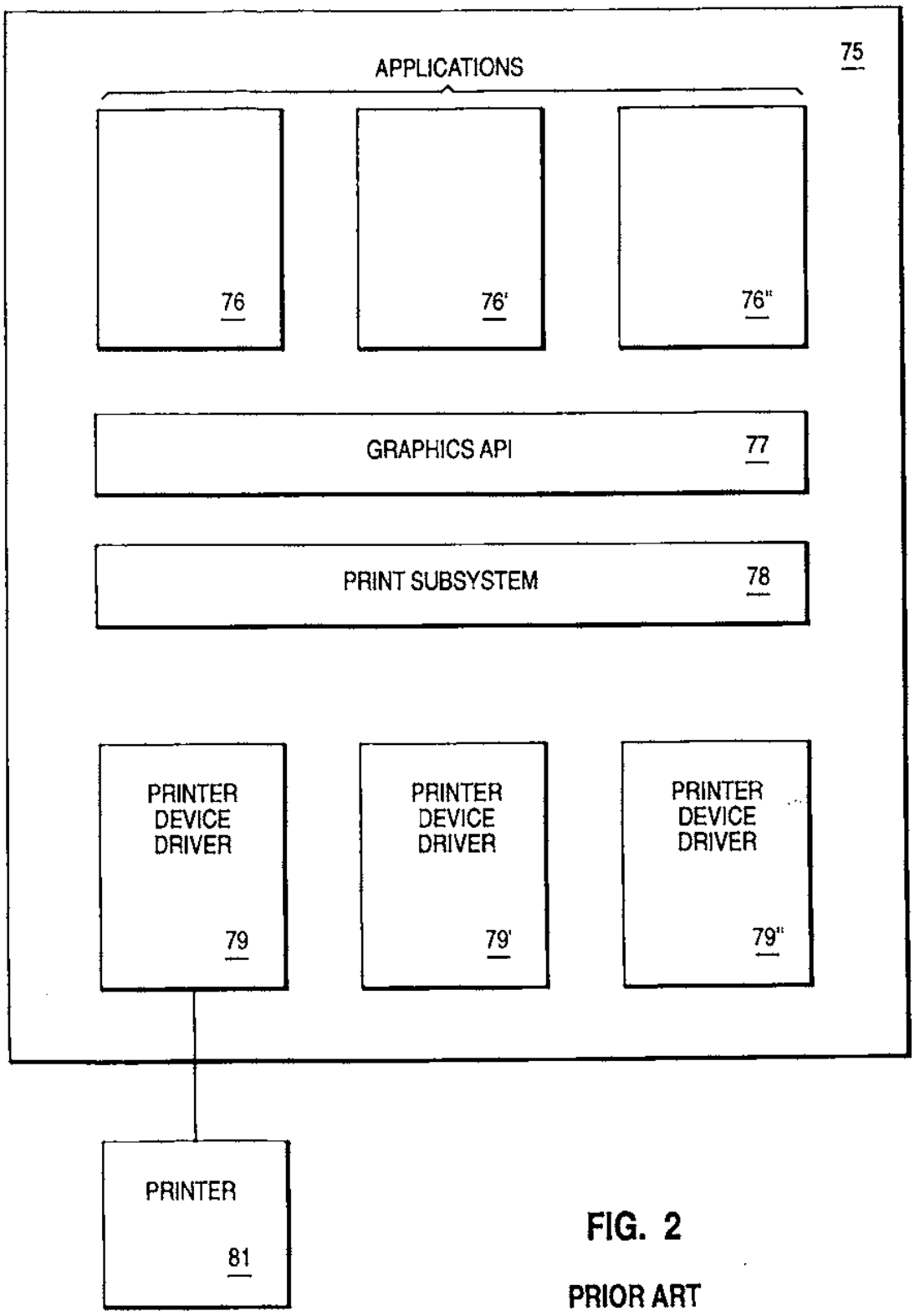


FIG. 2

PRIOR ART

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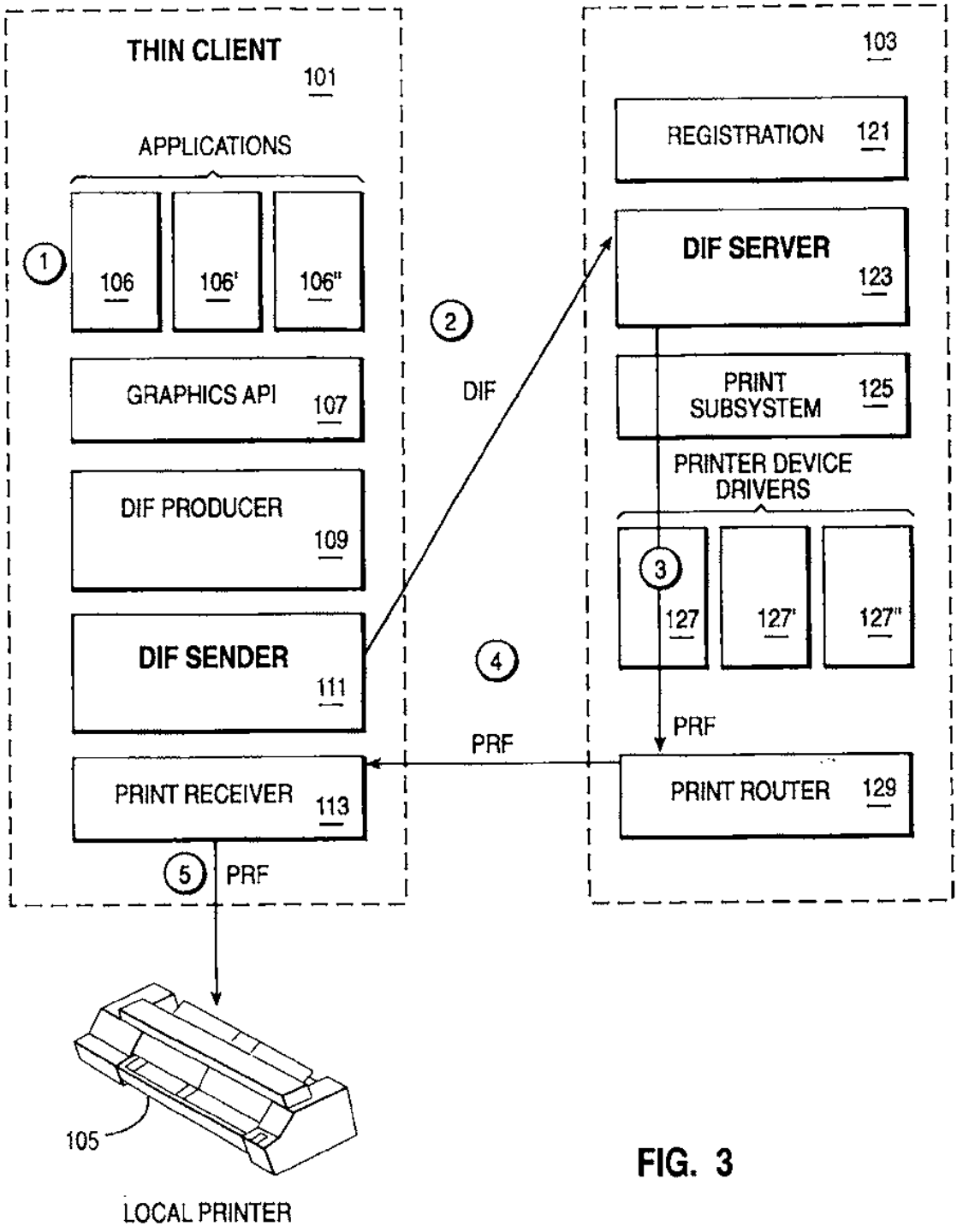


FIG. 3

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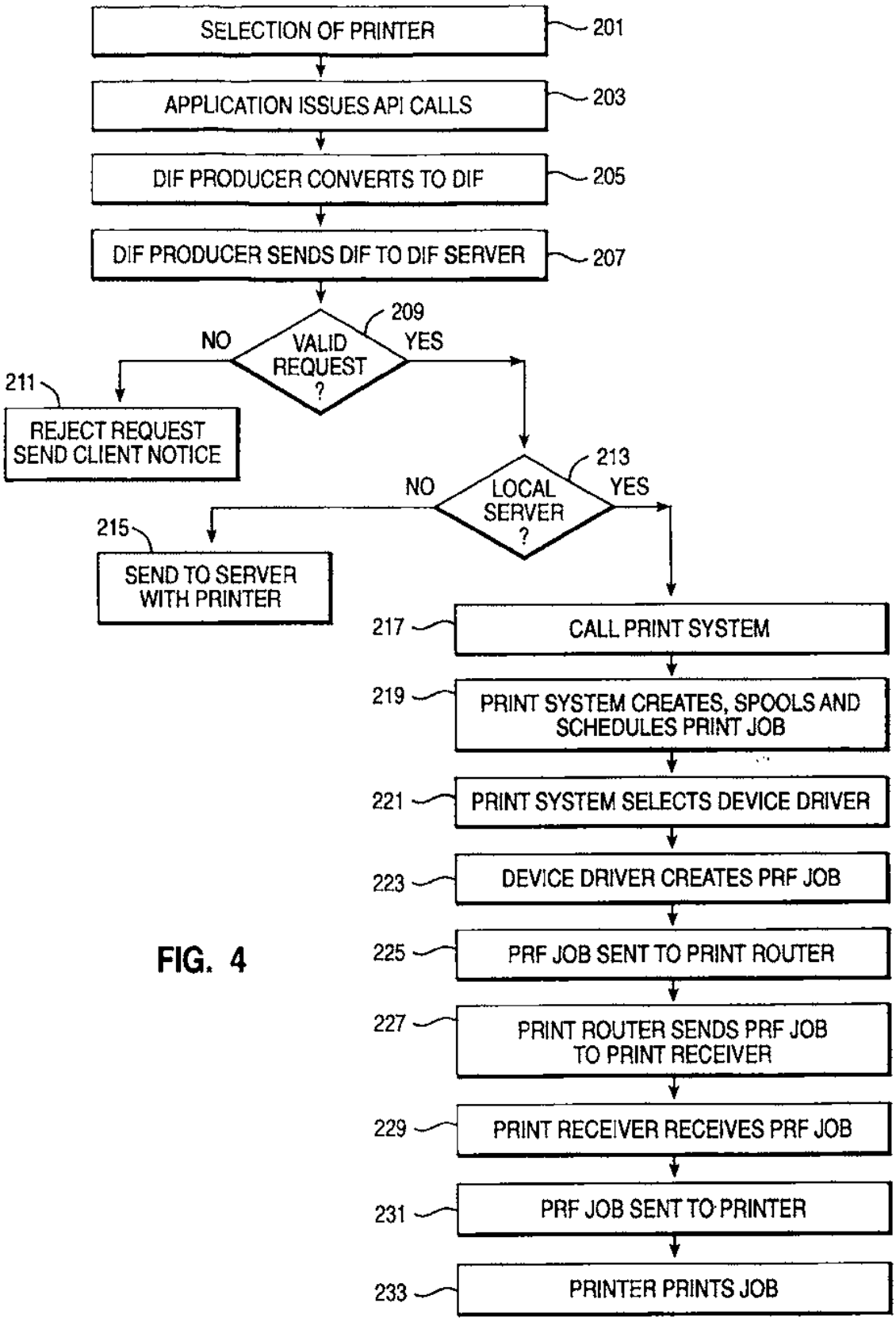


FIG. 4

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PROVIDING LOCAL PRINTING ON A THIN CLIENT

Technical Field of the Invention

The present invention relates to local printing in a resource limited client system.

Background of the Invention

The present invention generally relates to the field of a network of information handling systems. More particularly, it relates to a system and method for providing print support on a connected system with limited resources, sometimes referred to herein as a thin client.

It is well known to provide a printer coupled to a computer system as one means of providing a permanent record of the output of the computer system. However, as the number of printers with disparate interfaces as well as the number of different types of document formats have grown, full printer support in a typical computer environment has become complex. The designers of computer and printer hardware and software have attempted to insulate the application developer from the complexities of the environment as well as device specific attributes by the use of one or more printer drivers. While they have largely succeeded, the attendant demands of the printer drivers and associated software on system resources have grown quite large.

One of the recent efforts to decrease the cost of network computing is the development of network computers, or other "thin clients". These devices are characterized by limited local system resources and a greater dependency on larger systems in the network than the present day personal computer.

Providing full function local print support on a connected system with limited resources is extremely difficult. The large amounts of random access memory and disk space required, as well as the needed processor speed, complicate the development of network computers. A typical printer driver requires one to two megabytes of disk space simply to be installed. When the driver is loaded along with the system components it requires, such as a spooling system, raster banding/journaling code, and a port driver, the printer driver can consume large amounts of system memory designated for code space. When the driver is rendering a print job, the printer driver can use one to sixty-four megabytes of data memory to rasterise the page. The techniques used to lower memory requirements such as banding complicate the driver and increase driver development time. Also, these techniques

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only trade processor and disk usage for memory usage. When the printer is in use, it is necessary to provide disk spooling. Depending on the size of the jobs, number of print jobs and printer languages used, the disk requirements of the spooling system can range from a few megabytes to hundreds of megabytes.

Clearly, these enormous requirements make providing reliable local print support on a thin or resource restricted client extraordinarily demanding.

In today's information handling systems local printing from systems with limited resources is either nonexistent, limited, complicated, or resource intensive. One prior solution is to not allow local printing on the thin client. This forces users of these systems to use server printing or manually upload files to another system for printing. This method does not provide the convenience of local printing.

Another prior method is to limit the scope and functionality of local printing by reducing the device support to a single or few simple devices, limiting spooling and/or restricting print capabilities, e.g., only printing text. This method is too restrictive for general use.

The most common prior solution has been to increase the resources on the thin clients that require local printing and render the print file on the client, much like the situation on a personal computer attached to a network. This method increases the cost and complexity of every system, defeating some of the cost saving benefits of network computing.

Thus, there is a need to provide an economical, full function local print function in a network computing environment.

Disclosure of the Invention

Accordingly the present invention provides a method for local printing for a resource limited client system, comprising the steps of: at the client system, receiving a print request from a resident application for local printing; sending the print request via a network to a print rendering server; at the print rendering server, rendering the print request into a device dependent data stream; sending the device dependent data stream across the network to a printer local to the client system; and receiving the device dependent data stream for printing at the local printer.

According to a second aspect, the invention also provides a print rendering server including processor, memory and network connector comprising: means for receiving a device independent format datastream

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and printer and routing information via a network from a requesting client system; a printer driver for rendering the device independent data stream into a device dependent data stream; and a print router for sending the device dependent data stream across the network to a printer according to the routing information.

According to a third aspect, the invention also provides a resource limited client system including processor, memory and network connector comprising: a plurality of applications which periodically make print requests by means of graphics API calls; a DIF producer for generating a device independent format datastream from received graphics API calls; and a DIF sender for sending the device independent format datastream and printer and routing information via a network to a print rendering server.

Further, according to the invention, such client and server systems may be combined in a computer network.

Thus, by using a print rendering server system to perform many of the most compute intensive tasks in the overall print process, a print job in a print ready format is produced and sent back for local printing by a resource limited client system.

The process begins at the client system, where a print request is received from a resident application for local printing. The print request is sent via a network to a print rendering server. At the print rendering server, the print request is rendered into a print job in a print ready format. The print job in the print ready format is sent back across the network to a printer local to the client system. Thus, the print job is printed at the local printer without devoting significant system resources at the thin client to a print subsystem.

Brief Description of the Drawings

The invention will now be described, by way of example only, with reference to a preferred embodiment thereof, as illustrated in the accompanying drawings, in which:-

FIG. 1 depicts a computer system configured according to the teachings of the present invention;

FIG. 2 is a block diagram of a prior art system depicting some of the software used for printing;

FIG. 3 is a block diagram of a thin client and server configured according to the present invention; and

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FIG. 4 is a flow diagram of the process of the present invention.

Detailed Description of the Invention

The invention may be run on a variety of computers or collection of computers under a number of different operating systems. The computer could be, for example, a hand held computing device, a network computer a personal computer, a mini computer, mainframe computer or a computer running in a distributed network of other computers. Although the specific choice of computer is limited only by processor speed and disk storage requirements, computers in the IBM PC series of computers could be used in the present invention. One operating system which an IBM personal computer may run is IBM's OS/2 Warp 4.0. In the alternative, the computer system might be in the IBM RISC System/6000 (TM) line of computers which run on the AIX (TM) operating system. Other computers and operating systems are known.

In FIG. 1, a computer 10, comprising a system unit 11, a keyboard 12, a mouse 13 and a display 14 are depicted in block diagram form. The system unit 11 includes a system bus or plurality of system buses 21 to which various components are coupled and by which communication between the various components is accomplished. The microprocessor 22 is connected to the system bus 21 and is supported by read only memory (ROM) 23 and random access memory (RAM) 24 also connected to system bus 21. A microprocessor in the IBM PC series of computers is one of the Intel family of microprocessors including the 386, 486 or Pentium microprocessors. However, other microprocessors including, but not limited to, Motorola's family of microprocessors such as the 68000, 68020 or the 68030 microprocessors and various Reduced Instruction Set Computer (RISC) microprocessors such as the PowerPC chip manufactured by IBM. Other RISC chips made by Hewlett Packard, Sun, Motorola and others may be used in the specific computer.

The ROM 23 contains among other code the Basic Input-Output system (BIOS) which controls basic hardware operations such as the interaction of the processor and the disk drives and the keyboard. The RAM 24 is the main memory into which the operating system and application programs are loaded. The memory management chip 25 is connected to the system bus 21 and controls direct memory access operations including, passing data between the RAM 24 and hard disk drive 26 and floppy disk drive 27. The CD ROM 32 also coupled to the system bus 21 is used to store a large amount of data, e.g., a multimedia program or presentation.

Also connected to this system bus 21 are various I/O controllers: The keyboard controller 28, the mouse controller 29, the video controller 30, and the audio controller 31. As might be expected, the keyboard

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controller 28 provides the hardware interface for the keyboard 12, the mouse controller 29 provides the hardware interface for mouse 13, the video controller 30 is the hardware interface for the display 14, and the audio controller 31 is the hardware interface for the speakers 15. An I/O controller 40 such as a Token Ring Adapter enables communication over a network 46 to other similarly configured data processing systems.

One of the types of devices which would benefit from the invention is a wireless device such as a palmtop computer. While many of the components are similar to those described above for a personal computer, albeit smaller in size and capability, these devices are generally connected to a network by cellular or digital transmissions in the RF spectrum, rather than a coax or other type of cable. Other transmission means such as infrared or ultrasound are known to the art, but less commonly used. Further, some of these devices lack input devices such as a mouse and keyboard and possess others such as a touch sensitive input system.

One of the preferred implementations of the invention is as sets of instructions 48-52 resident in the random access memory 24 of one or more computer systems configured generally as described above. Until required by the computer system, the set of instructions may be stored in another computer readable memory, for example, in the hard disk drive 26, or in a removable memory such as an optical disk for eventual use in the CD-ROM 32 or in a floppy disk for eventual use in the floppy disk drive 27. Further, the set of instructions can be stored in the memory of another computer and transmitted in a computer readable medium over a local area network or a wide area network such as the Internet when desired by the user. One skilled in the art would appreciate that the physical storage of the sets of instructions physically changes the medium upon which it is stored electrically, magnetically, or chemically so that the medium carries computer readable information. While it is convenient to describe the invention in terms of instructions, symbols, characters, or the like, the reader should remember that all of these and similar terms should be associated with the appropriate physical elements.

Further, the invention is often described in terms that could be associated with a human operator. While the operations performed may be in response to user input, no action by a human operator is desirable in any of the operations described herein which form part of the present invention; the operations are machine operations processing electrical signals to generate other electrical signals.

A representative configuration of a personal computer is shown in FIG. 2. This configuration shows some of the major software modules used

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in prior art printing methods. An application 76 makes a printing call to the graphics API layer 77 where the printing request is translated into a format understood by the print subsystem 78. A representative format understood by a print subsystem is the Graphics Object Content Architecture (GOCA) supported by the OS/2 Warp operating system. In general, the format for the print subsystem is unique to each operating system. The print subsystem 78 creates, spools and schedules a print job for the print request. The print job contains the information from the print request. The print subsystem 78 selects the correct device driver 79 for the target printer 81. The device driver 79 employs the job and printer properties to create and send a print job in a Print-Ready Format (PRF) to the printer.

This prior art architecture is disadvantageous for a thin client. As discussed in the background, the demands of the print subsystem 78 and printer drivers 79 can be enormous, particularly if numerous complicated print jobs are to be printed.

The present invention provides another solution. By using a print server to create the data streams for the wide variety of the printers in a network, including those attached to the thin client the major demands of the print system are moved to the server. Thus, the reoccurring investment in each thin client for print support is limited.

During initialization, the client only queries the print system on the server for default job and printer properties based on the device names for the printers at initial setup and stores them locally. The user can then modify these properties for their local printing through a user interface. During submission of a print job, the client sends the job and printer properties along with a device independent print file and client routing information to the server for transformation of the data into a device dependent data stream, called a print-ready format (PRF).

The server transforms the device independent print file data for the appropriate printer device using the job and printer properties submitted with the job and sends the data back to a small receiver on the client using the client routing information. For example, the client routing information can be an internet IP address. The client paces off the server when the printer is busy to avoid local spooling and outputs the data to the local printer. The client system allocates memory to hold print data from the server. The amount of memory allocated at the client is configurable. When the client fills the allocated memory with print data, the client stops receiving data from the server until some or all of the data in the memory is printed on the local printer. The client then resumes receiving data from the server.

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Referring now to FIG. 3, a thin client 101 is coupled by a network link 102 to a print rendering server 103. The network link 102 can be a hardware link such as the cables which comprise a local area network, e.g., token ring or ethernet, or an infrared, RF or microwave link. A thin client for the purposes of the invention is any network connected, even temporarily, client system with limited resources, or resources which the user does not choose to be devoted to print tasks. According to the invention, a thin client 101 may be preconfigured to use a primary print rendering server 103 or search a global directory to locate a primary print rendering server. For the sake of simplicity, the normal protocol stacks, network adapters and so forth used in network communications are not depicted although one skilled in the art would understand that they would also be present.

In the thin client 101, a set of applications 106, 106', 106" are resident. The user of the thin client can access these applications by means of the user interface of the computer and cause an application to issue one or more print requests. The graphics API 107 is a set of commands available to the applications for drawing text or graphics.

The DIF producer 109 is a component called by the graphics API layer 107 on the thin client that generates a device-independent format (DIF) data stream from the graphic APIs called by the applications. An example of a device independent print file is a Graphics Object Content Architecture (GOCA) metafile. Information on GOCA can be found in Graphics Programming Interface Programming Guide, Order No. G25H-7106-00, a publication of the IBM Corporation.

The DIF producer 109 passes the DIF data stream to the DIF sender 111. The DIF sender 111 sends the DIF data stream to a DIF server 123 at the print rendering server 103. The DIF data stream is accompanied by the job properties, printer properties, and routing information for the job.

The reader should note that the registration component 121 on the print rendering server 103 has prior to the initiation of the print request registered device rendering services with a global directory service using a protocol such as the Lightweight Directory Access Protocol (LDAP). The LDAP directory service can be used by thin clients to find an appropriate server to perform print rendering services. The print rendering server 103 uses the directory service to advertise the printers and printer driver which they support. Possibly, the IP address can be used by the client to choose among servers supporting the desired print drivers for the most proximate print rendering server.

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The DIF server 123 accepts the device independent format data stream and uses the accompanying job properties, printer properties, and routing information to submit the job to the print subsystem 125 to generate a Print-Ready Format (PRF) data stream. The print subsystem 125 is a device driver which includes the components responsible for spooling and releasing print jobs. The printer device drivers 127, 127', 127" are components on print rendering server 103 capable of generating a Print-Ready Format(PRF) data stream. Examples of printer device drivers would be PostScript or PCL printer device drivers.

The print router 129 is a component on the print rendering server 103 which sends the Print-Ready Format (PRF) data stream to the destination specified in the routing information of the submitted print job, e.g., back to the thin client 101.

The print receiver component 113 on the thin client receives the Print-Ready Format (PRF) data stream and sends it to a locally attached printer 105. The print receiver component 113 contains an allocated memory monitor so that the PRF data stream is received in a controlled manner to avoid local spooling. In some embodiments of the current invention the print receiver may temporarily store data on another system. In some embodiments of the invention, the local printer is not actually attached to the particular thin client, but may be attached to a nearby thin client or a printer directly attached to the network. In these cases, the print receiver component 113 is not needed at the requesting thin client 101.

The process of printing a print job according to the present invention is further detailed with reference to the flow diagram of FIG. 4.

In an application on a thin client, an end-user selects a local printer, step 201, henceforth called the "target printer", to print information on that printer. The application then issues Graphics API calls to draw text and graphics to print the information on the target printer, step 203. Example Graphics API calls for OS/2 are GpiCharStringAt() to draw text and GpiPolygons() to draw polygons. Example graphics API calls for a Java graphics object are drawCharacters to draw text and drawPolygon to draw polygons.

The DIF producer converts these calls into a Device-Independent Format (DIF) in step 205. In the preferred embodiment, the conversion between the graphics API and the resultant DIF command is done via code and a lookup table used by the DIF producer. In step 207, the DIF producer sends a print request in device independent format to a DIF Server. This print request contains: (1) print options selected by the

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user to print the information, e.g., number of copies and orientation, henceforth called "job properties"; (2) the make and model of the target printer, henceforth called the "device id", e.g., "IBM Network Printer 12"; (3) device options for the target printer, e.g., amount of printer memory, henceforth called "printer properties"; (4) routing information that informs the server of the address of the target printer; and (5) the device-independent data, i.e. the DIF file created from the graphics API calls. The routing information and printer properties are passed with a print job to a print rendering server according to a print protocol known to the operating system. An example of a protocol could be a name-value pair such as: Protocol received by rendering server JOBNAME = Calendar Page, DATATYPE = DIF, ORIENTATION = PORTRAIT, MEMORY = 4MB, FORM = LETTER, ROUTEINFO = 9.53,255,255.

In step 209, the DIF server validates the print request from the thin client and either rejects or accepts the print request. The DIF Server may reject the request if the DIF format is not supported or if the submitting client does not have the authority to submit jobs to the DIF Server. If either is the case, step 211, the DIF server rejects the request and sends the client a notice of the rejection.

If the server accepts the request, in step 213 the server uses the device id to determine if it supports the target printer or if another DIF Server supports the target printer. If the server supports the target printer, it processes the request. Otherwise, the server will issue a search by attribute on a global directory using a protocol such as the Lightweight Directory Access Protocol (LDAP) to find another DIF Server that supports the target printer. The server forwards the print request to that DIF Server, step 215.

The DIF server that supports the target printer then calls a print subsystem, step 217. The print subsystem creates, spools and schedules a print job for the print request. The print job contains the information from the print request, i.e. job properties, printer properties, routing information and DIF file. The print subsystem uses the device id to select the correct device driver for the target printer, step 221. The device driver uses the job and printer properties to create and send a print job in a Print-Ready Format (PRF), step 223. The device driver sends the PRF job to the print router, step 225. The PRF contains the commands and the data that the target printer uses to print the job. Postscript is an example of a PRF.

The print router uses the routing information in the print job to send the print job in the PRF to the print receiver on the thin client, step 227. The print receiver receives the print job with the PRF, step

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231. Finally, the print receiver sends and prints the job on the target printer, step 233.

By using the relatively robust resources available at the print rendering server for the most compute and storage intensive tasks, the resources at each network computer devoted to printing can be limited. Yet the invention also allows the convenience of local printing, not available at most pure print server based solutions. The invention is very flexible. By passing routing information with print job to the print rendering server, the server does not necessarily send print ready format back to the submitting thin client to be printed on a local printer attached to the thin client or any particular printer associated with the printer queue. Instead, the routing information can also point the print ready format to a different local computer, e.g., one attached to an office mate's computer. The invention can also send a document to a computer or printer in another location, much like facsimile. Further, the PRF job can be sent directly to a printer attached to the network. As is known to those skilled in the art, a printer can be directly attached to a network with a network card having a network address, such as an Internet address. To send a print job directly to the printer, the PRF job is sent using routing information containing the printer's network address.

The invention finds particular application in a plurality of network computers coupled to one or more servers by means of an intranet. In such an arrangement, rather than the client files being stored permanently in the network computer, the server contains the client images. The client images, i.e. the software and profiles, of each client network computer are downloaded to the client network computer at logon. This client image would contain the software modules in the thin client 101 as shown in FIG. 3, but need not contain all of the printer software associated with the customary printer subsystem in a personal computer, much of which is offloaded to the server. Of course, if all printing from a client were accomplished on a network printer directly coupled to the network, the print receiver module is not needed in the client image. Thus, downloading of the client images is more efficient.

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CLAIMS

1. A method for local printing for a resource limited client system, comprising the steps of:

at the client system, receiving a print request from a resident application for local printing;

sending the print request via a network to a print rendering server in a device independent format wherein the print request contains routing information to a printer attached to the client system;

at the print rendering server, rendering the print request into a device dependent data stream;

sending the device dependent data stream across the network to the client system for a printer local to the client system; and

receiving the device dependent data stream at the client system for printing at the printer local to the client system .

2. A method as claimed in claim 1 wherein the print request from the resident application is received as a set of graphics API calls and the method further comprises the step of converting the graphics API calls to a device independent format at the client system.

3. A method as claimed in claim 2 wherein the print request further contains job properties, and printer properties.

4. A method as claimed in any preceding claim further comprising the step of controlling the device dependent data stream to avoid local spooling at the client system.

5. A method as claimed in any preceding claim wherein the client system is connected to the network by a wireless transmission means.

6. A print rendering server including processor, memory and network connector comprising:

means for receiving a device independent format datastream and printer and routing information via a network from a requesting client system;

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a printer driver for rendering the device independent data stream into a device dependent data stream; and

a print router for sending the device dependent data stream across the network to the requesting client system for printing at a printer local to the requesting client system according to the routing information.

7. A server as claimed in claim 6 further comprising a set of printer drivers each of which for rendering the device independent data stream to a device dependent data stream for a different printer.

8. A server as claimed in either claim 6 or claim 7 wherein the printer information contains job properties and printer properties information.

9. A server as claimed in any one of claims 6 to 8 further comprising registration means for registering the server at a global directory service in the network.

10. A server as claimed in claim 9 further comprising search means for searching a global directory service for another print rendering server which supports print rendering for a desired printer.

11. A resource limited client system including processor, memory and network connector comprising:

a plurality of applications which periodically make print requests by means of graphics API calls;

a DIF producer for generating a device independent format datastream from received graphics API calls;

a DIF sender for sending the device independent format datastream and printer and routing information via a network to a print rendering server; and

a print receiver for receiving a device dependent data stream from the print rendering server..

12. A client system as claimed in claim 11 further comprising a local printer for printing according to the device dependent data stream.

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13. A client system as claimed in claim 11 wherein the print receiver further comprises controlling means for the device dependent data stream to avoid local spooling.

14. A client system as claimed in any one of claims 11 to 13 wherein the network connector further comprising a wireless transmission means for coupling the client system to a network.

15. A client system as claimed in any one of claims 11 to 13 wherein the client systems is a network computer characterized by having a client image containing a DIF producer and a DIF sender downloaded by a server at connection to the network.

16. A computer network comprising a plurality of resource limited client systems as claimed in any of claims 11 to 15 and

a print rendering server as claimed in any of claims 6 to 10, said server being connected to receive said device independent format data stream and printer and routing information from one of said client systems and being connected to send said device dependent data stream to one of said client systems associated with said printer.

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Electronic Acknowledgement Receipt

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First Named Inventor/Applicant Name:	William Ho Chang
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	20120409_IDS_FXT312.pdf	615621	no	14
Warnings:					
Information:					
2	Foreign Reference	EP691619A2_Flynn.pdf	257285	no	17
Warnings:					
Information:					
3	Foreign Reference	EP952513A1_White.pdf	173081	no	10
Warnings:					
Information:					
4	Foreign Reference	GB2332764B.pdf	307121	no	18
Warnings:					
Information:					
5	Non Patent Literature	sdp-comparison.pdf	152265	no	8
Warnings:					
Information:					
6	Non Patent Literature	20110915_OA_FXT314.pdf	1340328	no	38
Warnings:					
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		Total Files Size (in bytes):	2845701		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PTO/SB/30EFS (07-09)
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	09992413	Filing Date	2001-11-18	Docket Number (if applicable)	FXT312	Art Unit	2453
First Named Inventor	William Ho Chang			Examiner Name	E. Bennoit		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☐ Other _____

☒ Enclosed

☒ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 111540

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

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Signature	/Peter D. Sabido/	Date (YYYY-MM-DD)	2012-03-14
Name	Peter D. Sabido	Registration Number	50353

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:			Date: March 14, 2012
William Ho Chang			Examiner E. Bennoit
Serial No.	:	09/992,413	Group Art Unit 2453
Filed	:	November 18, 2001	Confirmation No. 5528
For	:	Information Apparatus And Output Device For Selecting And Rendering Protected Digital Content On Demand, And Digital Content Service Over The Internet For Transmitting Audio/Video Content. (As Amended)	

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

S i r :

AMENDMENT ACCOMPANYING
REQUEST FOR CONTINUED EXAMINATION

In response to the Office action dated September 14, 2011, please consider the amendments and remarks below. This response is also accompanied by a Request for Continued Examination under 37 C.F.R. § 1.114, a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) for three (3) months, and the associated small entity fees under 37 C.F.R. § 1.17(e). Please charge any additional fees required, or credit any overpayments, to our deposit account number 11-1540.

Amendments to the Specification	Begin on page 2
Amendments to the Claims	Begin on page 4
Remarks	Begin on page 36

Amendments to the Specification

Please replace the title as follows:

[[~~Digital Content Security for Rendering~~]]

Information Apparatus And Output Device For Selecting And Rendering Protected Digital Content On Demand, And Digital Content Service Over The Internet For Transmitting Audio/Video Content

Please replace the current abstract with the abstract provided on the next page:

ABSTRACT

Audio/video digital content services over the Internet for providing protected digital content on demand to information apparatus or output devices are herein disclosed and enabled. The protected digital content are encrypted and are device dependent or specific for rendering at smart phones, information pads, audio players, media controllers, televisions, among others. To illustrate, an information apparatus may include a touch sensitive screen, an operating system, and a client application for accessing selected digital content from a content service or store over the Internet. To access the digital content, the client application may send to the service authentication information, payment or subscription information, a reference to selected digital content, and identification information related to an output device. The service then generates encrypted device dependent output data associated with the output device for transmitting or streaming to the information apparatus, the output data may include compressed data for transmission.

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AMENDMENTS TO THE CLAIMS

This listing of claims reflects all claim amendments and replaces all prior versions, and listings, of claims in the application.

Listing of Claims:

1-130. (Cancelled)

131. (Currently amended) A method of operating a ~~data output~~ digital content service ~~system~~ for providing ~~rendering, at an output device,~~ output content ~~managed from~~ over a network that includes the Internet to an information apparatus for rendering at an output device, ~~and ensuring security of the output content,~~ the output device is at least one of a display device and an audio output device, the digital content service ~~system~~ including, ~~: having~~

one or more servers for ~~generating~~ providing, to the information apparatus, device dependent output data corresponding to the output content ~~with a compression operation and an encryption operation~~, the device dependent output data being device specific and being acceptable for rendering at the output device, the one or more servers being distinct and separate from the information apparatus and the output device, and

one or more server applications at the one or more servers for generating the device dependent output data, the digital content service ~~system~~ method comprising:

~~means for~~ receiving, from the information apparatus[[,]] by the one or more servers, security or authentication information associated with the user operating the

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information apparatus for authentication of the user, and, in dependence of successful authentication of the user, enabling the user access to the ~~data output~~ digital content service ~~provided by the one or more servers~~;

~~means for~~ receiving, from the information apparatus[[,]] by the one or more servers, payment or subscription information for accessing the ~~data output~~ digital content service ~~provided by the one or more servers~~;

providing, to the information apparatus by the one or more servers, one or more pointers or references to one or more output content available at a content server for selection at the information apparatus;

~~means for~~ receiving, at the one or more servers, a ~~document~~ content object from the information apparatus over [[a]] the network, the ~~document~~ content object ~~relating to the output content and~~ including a pointer or reference to [[the]] a selected output content;

~~means for~~ receiving, at the one or more servers, an output device object from the information apparatus over [[a]] the network, the output device object having one or more attributes ~~corresponding to the output device, and including identification information related to~~ associated with the output device;

retrieving, by the one or more server applications, the selected output content from the content server employing, at least in part, the pointer or reference to the selected output content included in the content object received from the information apparatus;

~~means for~~ generating the device dependent output data at the one or more servers with [[a]] the one or more server applications, the generating of the device dependent output data including:

~~means for~~ applying, by the one or more server applications, a compression operation on the selected output content, and

~~means for~~ applying, by the one or more server applications, an encryption scheme on the selected output content for ensuring security of the device dependent output data that is device specific and is acceptable for rendering at the output device, the generated device dependent output data corresponding to the selected output content and having a relationship ~~being related~~, at least in part, to the ~~identification information related to~~ one or more attributes associated with the output device included in the output device object and received by the one or more servers from the information apparatus over the network; and

~~means for~~ transmitting, by the one or more servers, at least part of the generated device dependent output data to the information apparatus for rendering of the selected output content at the output device that is at least one of a display device and an audio output device.; ~~and~~

~~means for delivering, by the information apparatus, at least part of the generated device dependent output data received at the information apparatus from the one or more servers, to the output device for rendering the output content.~~

132. (Currently amended) The ~~system~~ method of claim 131 further comprising,

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~~means for~~ providing, by a client application over a graphical user interface at a display screen of the information apparatus, one or more pointers or references to the one or more output content for selection ~~of the output content~~; and

~~means for~~ receiving, by the client application, [[a]] the selected output content over the graphical user interface ~~for rendering~~ from among the one or more pointers or references to the one or more output content; and

~~means for generating~~ obtaining, by the client application, a ~~document~~ content object that includes a pointer or reference to the selected output content.

133. (Currently amended) The ~~system~~ method of claim 131 further comprising ~~means for~~ receiving, from the information apparatus, one or more job objects having one or more attributes corresponding to an output job, including one or more of an output quality, instructions, a preference, and a pointer or reference to another job object, individually or in any combination.

134. (Currently amended) The ~~system~~ method of claim 131 in which the encryption scheme includes use of security keys for generating the device dependent output data ~~output device object includes a pointer or a reference to the identification information related to the output device~~.

135. (Currently amended) The ~~system~~ method of claim 131 in which the output device includes a display ~~output~~ controller unit for displaying at least part of the selected output content at the output device.

136. (Currently amended) The ~~system~~ method of claim 131 further comprising:

receiving, by a client application at the information apparatus, at least part of the device dependent output data from the one or more servers; and

delivering, by the client application at the information apparatus, at least part of the device dependent output data received from the one or more servers to the output device for rendering of at least part of the output content. ~~in which the output device is a printer and the device dependent output data includes one or more of image data, graphics data, and text data.~~

137. (Currently amended) The ~~system~~ method of claim 131 in which the information apparatus is a wireless information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop computer, an e-book ~~a personal digital assistant (PDA)~~, a smart phone, a screen phone, an Internet phone, an information pad, an Internet pad, an Internet appliance, and a digital camera, individually or in any combination.

138. (Currently amended) The ~~system~~ method of claim 131 in which the payment or subscription information is provided automatically by the information apparatus.

139. (Currently amended) The ~~system~~ method of claim 131 in which the payment information is provided through the information apparatus as entered by a user in response to a prompt to enter payment information.

140. (Currently amended) The ~~system~~ method of claim 131 in which the payment information includes service subscriber information corresponding to a pre-arranged subscription to a ~~data output~~ digital content service system.

141. (Currently amended) The ~~system~~ method of claim 140 further comprising correlating the service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

142. (Currently amended) The ~~system~~ method of claim 131 in which the output device ~~includes~~ is part of a television.

143. (Currently amended) The ~~system~~ method of claim 131 further comprising ~~means for~~ establishing a communication channel between the information apparatus and the one or more server application~~s~~, the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network, individually or in any combination.

144. (Currently amended) The ~~system~~ method of claim 131 in which the output device is an audio output device and the device dependent output data includes audio data.

145. (Currently amended) The ~~system~~ method of claim 131 in which the output device is a display device or a projection device and the device dependent output data includes ~~one or more of image data, audio data, and~~ video data.

146. (Currently amended) The ~~system~~ method of claim 131 in which the output device or the information apparatus decodes and decompresses the device dependent output data for rendering the output content.

147. (Currently amended) The ~~system~~ method of claim 131 in which ~~the means for~~ generating the device dependent output data at the one or more servers includes one or more of invoking, launching, calling, utilizing, and involving one or more applications.

148. (Currently amended) ~~A method for generating~~ An information apparatus for obtaining ~~device dependent output data~~ digital content acceptable for rendering at an output device, the output device being at least one of a display device and an audio output device, the ~~device dependent output data corresponding to~~ digital content accessible, at least partly, by [[an]] the information apparatus, the information apparatus including:

a processor;

an operating system;

a touch sensitive screen;

a graphical user interface over the touch sensitive screen for selecting an icon and for scrolling display; and

a client application for interacting with a user via the graphical user interface over the touch sensitive screen of the information apparatus, the client application facilitated, at least partly, by the operating system, wherein the information apparatus is operable for: ~~the method comprising:~~

installing at least part of the client application for expanding functionalities of the information apparatus;

sending, from the information apparatus to one or more servers ~~a server~~ over a network, security or authentication information associated with the user ~~operating~~ of the information apparatus for authentication of the user, the one or more servers ~~server~~ being distinct and separate from the information apparatus and the output device, and in dependence of successful authentication of the user, enabling the user access to a digital content ~~data output~~ service provided by the one or more servers ~~server~~;

sending, from the information apparatus to the one or more servers, payment or subscription information for accessing the ~~data output~~ digital content service provided by the one or more servers ~~server~~;

receiving, by the information apparatus and from the one or more servers over the network, one or more pointers or references to one or more digital content that are stored in the one or more servers;

receiving, by the client application and via the graphical user interface over the touch sensitive screen, a selected digital content from among the one or more pointers or references to the one or more digital content stored in the one or more servers;

delivering, from the information apparatus, at least part of a ~~document~~ content object and at least part of an output device object to the one or more servers over a network, the ~~document~~ content object being associated with the selected digital content and including a pointer or reference to the selected digital content, and the output device object including ~~identification~~ information related to the output device;

receiving, at the information apparatus[[,]] and from the one or more servers, device dependent output data corresponding to at least part of the selected digital content, the device dependent output data received from the one or more servers related, at least in part, to the ~~identification~~ information included in the output device object delivered from the information apparatus, and the device dependent output data received from the one or more servers further including an encryption scheme ~~that includes security keys~~ for ensuring security of the device dependent output data that is device specific for rendering at the output device;

decoding ~~decompressing~~, at the information apparatus, the device dependent output data received from the one or more servers; and

~~delivering the device dependent output data from the information apparatus to the output device for~~ rendering of the at least part of the selected digital content at the output device.

149. (Currently amended) The apparatus ~~method~~ of claim 148 wherein the information apparatus is further operable for: ~~further comprising~~

establishing a communication channel between the information apparatus and the output device; and

receiving, at the information apparatus, one or more attributes corresponding to the output device over the communication channel.

150. (Currently amended) The apparatus ~~method~~ of claim 148 in which the ~~server includes a computing device in a network and the~~ network includes one or more of an Internet, a local area network, a cellular network, a wireless network, and a wide area network, individually or in any combination.

151. (Currently amended) The apparatus ~~method~~ of claim 148 in which the output device further includes one or more of a display device, a projection device, a ~~printing~~ television device, and an audio output device, individually or in any combination.

152. (Currently amended) The apparatus ~~method~~ of claim 148 wherein the information apparatus is further operable for ~~further comprising~~ discovering an output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

153. (Currently amended) The apparatus ~~method~~ of claim 148 further including one or more wireless communication units, and a communication between the information apparatus and the one or more servers over the network includes transmission over the one or more wireless communication units ~~comprising decoding and decompressing the device dependent output data~~ at the information apparatus ~~subsequent to receiving the device dependent output data~~.

154. (Currently amended) The apparatus ~~method~~ of claim 148 wherein the information apparatus is further operable for: ~~further comprising~~

providing, by [[a]] the client application over a graphical user interface at the display screen of the information apparatus, one or more pointers or references to digital content for selection; ~~and~~

receiving, by the client application, a selected digital content over the graphical user interface at the display screen of the information apparatus from among the one or more pointers or references to digital content; and

generating, by the client application, a ~~document~~ content object that includes a pointer or reference to the selected digital content received by the client application.

155. (Currently amended) The apparatus ~~method~~ of claim 148 in which the one or more servers obtain[[s]] the selected digital content from a content server based, at least in part, on the pointer or reference to the selected digital content included in the ~~document~~ content object.

156. (Currently amended) The apparatus ~~method~~ of claim 148 in which the information apparatus is a wireless mobile information apparatus and the wireless mobile information apparatus includes one or more of ~~a palmtop computer, a handheld computer,~~ a laptop computer, ~~a personal digital assistant (PDA),~~ a smart phone, ~~a screen phone,~~ an Internet phone, an Internet pad, an information pad, an Internet appliance, and a digital camera, individually or in any combination.

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157. (Currently amended) A method for ~~generating device dependent output data acceptable for~~ rendering, at ~~each of~~ one or more ~~selected~~ output devices, device dependent output data, the device dependent output data ~~for each selected output device~~ corresponding to digital content and accessible, at least partly, by an information apparatus over a network that includes the Internet, the one or more output devices being at least one of a display device and an audio output device, the information apparatus including an operating system and one or more client applications facilitated by the operating system for providing one or more functionalities of the information apparatus, the method comprising:

establishing a ~~communication channel~~ connection between the information apparatus and the one or more ~~selected~~ output devices;

receiving, at the information apparatus over the ~~communication channel~~ connection from the one or more output devices, one or more attributes including information corresponding to the one or more ~~selected~~ output devices ~~from the one or more selected output devices~~;

delivering, from the information apparatus, at least partially a ~~document~~ content object and one or more output device objects to one or more servers over a network that includes the Internet, the one or more servers being distinct and separate from the information apparatus and the one or more ~~selected~~ output devices, the ~~document~~ content object being associated with the digital content, and the one or more output device objects ~~having~~ including ~~one or more attributes~~ information corresponding to ~~each of~~ the one or more ~~selected~~ output devices~~, including the one or more attributes~~

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~~corresponding to each selected output device for rendering, received at the information apparatus over the communication channel from the one or more selected output devices~~;

sending, from the information apparatus to the one or more servers over [[a]] the network, security or authentication information associated with a user operating the information apparatus, and, in dependence of a successful authentication of the user, enabling the user access to a ~~data output~~ digital content service; and

receiving, at the information apparatus, from the one or more servers, device dependent output data corresponding to the ~~data~~ digital content, the device dependent output data corresponding to the digital content further having a relationship ~~being related~~, at least in part, to the ~~one or more attributes~~ information corresponding to the one or more ~~selected~~ output devices included in the one or more output device objects delivered from the information apparatus to the one or more servers over the network, and the device dependent output data corresponding to the digital content further including an encryption scheme that includes security keys for ensuring security of the digital content ~~device dependent output data~~ that is ~~device specific~~ acceptable to the one or more ~~selected~~ output devices for rendering; and

transmitting, by the information apparatus, at least part of the device dependent output data corresponding to the digital content over the connection for rendering, at the one or more output devices, of at least part of the digital content that includes at least one of an audio content or a video content.

158. (Currently amended) The method of claim 157 in which the output device is part of a television. ~~one or more servers are connected to a computer network that includes the Internet.~~

159. (Currently amended) The method of claim 157 in which the information apparatus is a wireless mobile information apparatus that includes one or more of a palmtop computer, a handheld computer, a laptop computer, ~~a personal digital assistance (PDA),~~ a smart phone, a screen phone, an Internet pad, an Internet appliance, and a digital camera, individually or in any combination.

160. (Currently amended) The method of claim 157 further comprising sending payment or subscription information from the information apparatus to the one or more servers over the network as payment for the ~~data output~~ digital content service.

161. (Currently amended) The method of claim 157 in which the one or more output devices is an audio output device and the digital content includes audio content and the method further comprising ~~discovering~~ transmitting over the connection at least part of an audio content to the audio output device, ~~with the information apparatus, one or more output devices as being available~~ for rendering at least part of the digital content.

162. (Currently amended) The method of claim 157 in which the ~~document~~ content object includes the digital content for storing at the one or more servers.

163. (Currently amended) The method of claim 157 in which the information apparatus and the output device is part of a television system with access to digital content service over the Internet. ~~document object includes a pointer or reference related to the digital content.~~

164. (Currently amended) The method of claim 157 in which the one or more servers obtain digital content based on [[the]] a pointer or reference to the digital content included in the ~~document~~ content object.

165. (Currently amended) The method of claim 157 in which the information apparatus further comprising a touch sensitive screen for interacting with a user, and one or more wireless communication unitsfor wireless communication. ~~delivering the device dependent output data to each selected output device for rendering of the digital content.~~

166. (Currently amended) The method of claim 157 further comprising decoding and decompressing at least part of the device dependent output data corresponding to the digital content at the information apparatus.

167. (Currently amended) An ~~data~~ output system ~~security method~~ for rendering ~~output data corresponding to~~ digital content ~~at an output system~~, the output system comprising ~~includes~~:

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an information apparatus for receiving device dependent output data from one or more servers over a network, the device dependent output data corresponding to at least part of the digital content that is device specific and is acceptable for rendering at the output system;

~~an output controller for decoding device dependent output data, and~~

an output device that is at least one of a display device and an audio output device for rendering the device dependent output data;

a display screen;

an operating system;

a client application having a graphical user interface over the display screen for interacting with a user of the output system, the client application facilitated at least partly by the operating system included in the output system;

~~an output controller for decoding the device dependent output data into a form suitable for rendering over at least one of the display device or the audio output device,~~ wherein, the output system enables operations for ~~comprising~~:

establishing a communication channel between the output system and the one or more servers over [[a]] the network;

receiving, by the client application and from the one or more servers over the network, one or more pointers or references to one or more digital content stored in a content server for selection by the user;

providing, ~~by a client application, over a~~ at the information apparatus and via the graphical user interface ~~at the output system~~ over the display screen, the one or more pointers or references to the one or more digital content for selection by the user; and

receiving, ~~by the client application,~~ at the information apparatus and via the graphical user interface over the display screen, a selected digital content ~~over the graphical user interface for rendering~~ from among the one or more pointers or references to the one or more digital content provided for selection; and

~~generating~~ obtaining, by the client application, a ~~document~~ content object that includes a pointer or reference to the selected digital content, and an output device object that includes information related to at least part of the output system;

delivering, from the output system, at least part of [[a]] the ~~document~~ content object and at least part of [[an]] the output device object to the one or more servers, the one or more servers being distinct and separate devices from the output system, the ~~document~~ content object including [[a]] the pointer or reference to the selected digital content, for enabling the one or more servers configured to retrieve at least part of the ~~data~~ selected digital content from [[a]] the content server ~~with the pointer or reference, and the output device object including at least identification information related to the output system~~;

sending, from the output system to the one or more servers over [[a]] the network, security or authentication information associated with the user of ~~operating~~ the output system for authentication of the user;

sending, from the output system to the one or more servers, payment or subscription information for accessing a ~~the~~ digital content ~~data output~~ service provided by the one or more servers;

receiving, at the output system, the device dependent output data from the one or more servers, the device dependent output data corresponding to at least part of the

selected digital content and ~~being~~ having a relationship ~~related~~, at least in part, to the ~~identification~~ information related to at least part of the output system included in the output device object delivered from the output system to the one or more servers over the network, and the device dependent output data further including an encryption scheme ~~that includes security keys~~ for ensuring security of the selected digital content ~~device dependent output data~~ that is device specific and is acceptable to the output system for rendering;

passing the device dependent output data from the information apparatus to the output device for rendering at least part of the selected digital content ~~controller included in the output system~~;

decoding at least part of the device dependent output data at ~~the output controller included in~~ the output system for rendering at least part of the selected digital content by the at least one of a display device and an audio output device included in the output system; and

~~decompressing the device dependent output data at the output controller included in the output system;~~

~~delivering~~ rendering by the at least one of a display device and an audio output device included in the output system, at least part of the selected ~~the device dependent or device specific output data from the output controller to the output device included in the output system for rendering the~~ digital content that includes video or audio content.

168. (Currently amended) The system ~~method~~ of claim 167 ~~further comprising obtaining an output device object at the information apparatus, the~~ in which obtaining of

the output device object includes ~~including one or more of~~ obtaining information from one or more of (1) user input, ~~from~~ (2) a communication with an output device, (3) a parameter stored in the output system, and ~~from~~ (4) a default parameter or preference associated with the output system, individually or in any combination.

169. (Currently amended) The system ~~method~~ of claim 167 wherein the output system further enables operations for ~~comprising~~ discovering an output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the digital content.

170. (Currently amended) The system ~~method~~ of claim 167 in which the output device ~~is associated with~~ and the information apparatus are ~~and includes a direct~~ wire connected ~~between the information apparatus and the output device~~.

171. (Currently amended) The system ~~method~~ of claim 167 wherein the output system further enables operations for ~~comprising~~ conforming, at the information apparatus, the device dependent output data into a form, format or language more suitable for rendering at an output device, the conforming including a decoding operation and an encoding operation.

172. (Currently amended) A system for ~~generating a~~ transmitting to an information apparatus over a network that includes the Internet, at least part of device dependent output data corresponding to digital content acceptable for rendering at an

output device, the output device associated with the information apparatus is at least one of a display device and an audio output device ~~the device dependent output data corresponding to digital content accessible, at least partly, by an information apparatus~~, the system comprising:

[[a]] one or more servers that [[is]] are distinct and separate from the information apparatus and the output device, the one or more servers being operable to receive a ~~document~~ content object and at least part of an output device object, the ~~document~~ content object being associated with the digital content and the output device object having ~~one or more attributes~~ information corresponding to the output device~~, including identification information related to the output device~~, the one or more servers being further operable to receive, from the information apparatus, security or authentication information associated with a ~~the~~ user operating the information apparatus for authentication of the user, and the one or more servers being further operable to receive, from the information apparatus, payment or subscription information to enable transmitting at least part of the device dependent ~~for sending~~ output data corresponding to the digital content to the information apparatus;

[[a]] one or more server applications on the one or more servers for ~~receiving the document object and the at least part of an output device object and for~~ generating the device dependent output data, the device dependent output data having a relationship ~~related~~, at least in part, to the ~~identification~~ information related to the output device, and the generating of the device dependent output data includes (1) applying a compression operation on the digital content, and (2) applying an encryption scheme with one or

more security keys for ensuring security of the device dependent output data that is device specific for rendering; and

a client application for interacting with a user at the information apparatus via a graphical user interface over a display screen associated with the information apparatus, the client application facilitated at least partly by an operating system operating at the information apparatus; and

wherein, the client application at the information apparatus communicates with the one or more servers over a network that includes the Internet for receiving at least part of the device dependent output data corresponding to the digital content, and the client application delivers ~~means for delivering, by the server,~~ the received device dependent output data to the output device for rendering [[of]] at least part of the digital content.

173. (Currently amended) The system of claim 172 wherein the client application at the information apparatus is further operable for decoding the at least part of the device dependent output data received from the one or more servers for rendering at the output device at least part of the digital content. ~~further comprising means for establishing a communication channel between the information apparatus and the server application by the server application, and the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.~~

174. (Previously presented) The system of claim 172 in which the output device includes an audio output device and the device dependent output data includes audio data.

175. (Currently amended) The system of claim 172 in which the output device includes a display device or a projection device and the device dependent output data includes ~~one or more of an image data, an audio data, and a~~ video data, and the information apparatus and the output device being part of a television system.

176. (Currently amended) The system of claim 172 in which the content object received from the information apparatus includes a pointer or reference to a selected digital content, and the one or more server applications further retrieve the digital content from a content server for transmitting at least part of the selected digital content to the information apparatus. ~~output device includes a printing device and the device dependent output data includes one or more of image data, graphics data, and text data.~~

177. (Currently amended) In a computer memory or storage device, ~~A system~~ containing server applications executable by a processor at a server system for generating device dependent output data acceptable for rendering at ~~each of~~ one or more output devices, the one or more output devices being display devices and/or audio output devices, the device dependent output data for transmitting ~~each of output device corresponding to digital content accessible~~, at least partly, [[by]] to an information

apparatus, the server system including ~~comprising: a~~ one or more servers that are [[is]] accessible by the information apparatus over a network that includes the Internet, ~~and~~ the server system being [[is]] distinct and separate from the information apparatus and the one or more output devices, the server applications in the computer memory or storage device, when executed by the processor at the server system, enables the server system ~~being operable for~~ to:

receive ~~receiving~~, by the server system from the information apparatus, one or more ~~document~~ content objects ~~and one or more output device objects~~, the one or more ~~document~~ content objects being associated with the digital content, including a pointer or reference to the digital content; ~~and~~

receive, by the server system from the information apparatus, one or more output device objects, the one or more output device objects having information related ~~one or more attributes corresponding~~ to the one or more output devices~~, including identification information related to the one or more output devices~~;

~~means for establishing, by the server, a communication channel between the server and the information apparatus at least in part over an Internet;~~

receive ~~means for receiving~~, by the server system and from the information apparatus, security or authentication information associated with a user operating the information apparatus for authentication of the user;

receive ~~means for receiving~~, by the server system and from the information apparatus, payment or subscription information for accessing a digital content service provided by the server system;

retrieve ~~means for retrieving~~, by the server system, the digital content from a content server employing at least in part the pointer or reference to the digital content included in the one or more ~~document~~ content objects received from the information apparatus; ~~and~~

~~a server application operating at the server for generating~~

generate, by the server system, the device dependent output data associated with the digital content for rendering at the ~~each of the corresponding~~ one or more output devices, the device dependent output data associated with the digital content having a relationship ~~being related~~, at least in part, to the ~~identification~~ information related to the one or more output devices included in the one or more output device objects received from the information apparatus;~~, the server application being configured to~~

apply, by the server system, a compression operation on the digital content for ~~generating~~ transmitting the device dependent output data associated with the digital content;~~, and to~~

apply, by the server system, an encryption scheme on the digital content for ensuring security of the digital content ~~device dependent output data~~ that is device specific for rendering ~~at the one or more output devices~~; and

transmit ~~means for delivering~~, by the server system, at least part of the device dependent output data associated with the digital content to the information apparatus over the ~~communication channel~~ network that includes the Internet ~~in response~~ subsequent to receiving the security or authentication information, the payment or

subscription information, the one or more ~~document~~ content objects, and the one or more output device objects from the information apparatus.

178. (Currently amended) The memory or storage device ~~system~~ of claim 177 in which the encryption scheme includes security keys for ensuring security of the digital content. ~~further comprising means for delivering, by the server, the device dependent output data from the information apparatus to the one or more output devices for rendering of the digital content.~~

179. (Currently amended) The memory or storage device ~~system~~ of claim 177 in which ~~each output device of the one or more output devices includes one of a display device and an audio output device, and~~ the device dependent output data includes audio data and/or video data.

180. (Currently amended) In a computer memory, containing client software executable by a processor at an information apparatus ~~operable from a information apparatus~~ for ~~generating~~ obtaining device dependent output data acceptable for rendering at an output device associated with the information apparatus, the output device is at least one of a display device and an audio output device, the information apparatus including a graphical user interface over a display screen of the information apparatus for interacting with a user, the information apparatus further including an operating system for facilitating operations of the client software at the information apparatus, the device dependent output data corresponding to digital content for

rendering ~~accessible, at least partly, by the information apparatus~~, the computer memory containing the client software comprising:

software executable at the information apparatus for establishing a communication channel between the information apparatus and one or more servers over a network;

~~client~~ software executable at the information apparatus for providing over [[a]] the graphical user interface at the display screen of the information apparatus, one or more pointers or references to the digital content for selection; and

~~client~~ software executable at the information apparatus for receiving a selected digital content via [[over]] the graphical user interface, from among the one or more pointers or references to the digital content; and

~~client~~ software executable at the information apparatus for ~~generating~~ obtaining a ~~document~~ content object that includes a pointer or reference to the selected digital content;

~~client~~ software executable at the information apparatus for delivering, from the information apparatus, at least part of the ~~document~~ content object and at least part of an output device object to [[a]] the one or more servers that is distinct and separate from the information apparatus and the output device, the document content object being associated with the selected digital content, and the output device object including information related ~~having one or more device dependent attributes corresponding~~ to the output device ~~and including identification information related to the output device~~, the ~~document~~ content object and the output device object being required at the one or

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

more servers for generating device dependent output data corresponding to the selected digital content and acceptable for rendering at the output device;

~~client~~ software executable at the information apparatus for sending, from the information apparatus to the one or more servers over a network, security or authentication information associated with the user operating the information apparatus for authentication of the user;

~~client~~ software executable at the information apparatus for receiving, at the information apparatus, the device dependent output data for rendering at the output device, the device dependent output data corresponding to the selected digital content and having a relationship ~~being related~~, at least in part, to the ~~identification~~ information related to the output device included in the output device object delivered from the information apparatus to the one or more servers over the network, and the device dependent output data further including an encryption scheme that includes security keys for ensuring security of the selected digital content ~~device dependent output data that is device specific to the output device for rendering~~; and

~~client~~ software executable at the information apparatus for decoding at least part of the device dependent output data received from the one or more servers;

client software executable at the information apparatus for decompressing at least part of the device dependent output data received from the one or more servers;

~~client software executable at the information apparatus for encoding device dependent output data into a format or language acceptable for delivering to the output device;~~

~~client~~ software executable at the information apparatus for delivering at least part of the decoded and decompressed ~~encoded~~ device dependent output data ~~from the information apparatus~~ to the output device for rendering ~~or output~~ of the selected digital content.

181. (Previously presented) The computer memory of claim 180 further comprising software executable at the information apparatus for establishing a communication channel between the information apparatus and the output device.

182. (Currently amended) The computer memory of claim 180 further comprising software executable at the information apparatus for encoding at least part of the decoded device dependent output data into a format or language acceptable for delivering to the output device. ~~establishing a communication channel between the information apparatus and the server, the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.~~

183. (Currently amended) The computer memory of claim 180 in which the information apparatus is a wireless information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop computer, ~~a personal digital assistance (PDA),~~ a smart phone, a touch sensitive screen phone, an Internet pad, an Internet appliance, and a digital camera, individually or in any combination.

184. (Currently amended) The computer memory of claim 180 in which the output device is ~~one of a display device and~~ an audio output device and the device dependent output data includes audio data, and wherein a connection between the information apparatus and the output device includes a wired connection.

185. (Currently amended) The computer memory of claim 180 in which the ~~output device~~ information apparatus includes a touch sensitive screen ~~printer~~, and the device dependent output data includes one or more of image data, graphics data, video data, and text data, individually or in any combination, for rendering over the touch sensitive screen.

186. (Currently amended) The computer memory of claim 180 in which the output device ~~includes~~ is part of a television.

187. (Currently amended) The computer memory of claim 180 further comprising software executable at the information apparatus for sending, from the information apparatus to the one or more servers over the network that includes the Internet, payment or subscription information for accessing a digital content service provided by the one or more servers.

189. (Currently amended) The apparatus ~~system~~ of claim ~~177~~ 148 in which the output device is associated with the information apparatus and is connected to the information apparatus by a wire connection. ~~communication channel between the~~

~~information apparatus and the one or more output devices includes a wireless communication channel.~~

190. (Currently amended) The memory or storage device ~~system~~ of claim 177 in which the one or more output devices includes a television. ~~printing device and the device dependent output data includes one or more of image data, graphics data, and text data.~~

191. (Currently amended) The memory or storage device ~~system~~ of claim 177 in which the one or more ~~document~~ content objects received from the information apparatus at the server system include ~~a reference or pointer related to~~ the digital content and the server applications in the computer memory or storage device when executed by the processor at the server system enables the server system to stored the received digital content at a server.

192. (Currently amended) The memory or storage device ~~system~~ of claim 177 in which the one or more output device objects include identification related to the one or more output devices, the identification including one or more of an output device brand, a model, a name, a path, a registration, and an IP address, individually or in any combination.

193. (Currently amended) The system of claim 172 in which the content object includes the digital content for storing at the content server. ~~document object includes a reference or pointer related to the digital content.~~

194. (Currently amended) The system of claim 172 in which the information apparatus is a mobile wireless information apparatus having a touch sensitive screen, an operating system, and a graphical user interface over the touch sensitive screen. ~~further comprising means for retrieving data content employing the document object.~~

195. (Currently amended) The system ~~method~~ of claim 167 in which the delivering the device dependent output data to the output device includes delivering the device dependent output data to an output controller ~~connected to~~ associated with the output device.

196. (Currently amended) The system ~~method~~ of claim 167 in which the information apparatus is connected to the output device [[is]] over a wireless connection. ~~an audio device or a display device.~~

197. (Currently amended) The system ~~method~~ of claim 167 in which the output system is a television system. ~~the communication channel between the information apparatus and the one or more servers include one or more of an Internet, a local area network, a cellular network, and a wide area network.~~

198. (Currently amended) The system ~~method~~ of claim 167 in which the communication channel over the network between the ~~information apparatus~~ output system and the one or more servers includes ~~a wireless communication channel and~~ one or more of an a local area network, a cellular network, a wide area network, and a wireless network, individually or in any combination. ~~and the method further comprises discovering the output device over the wireless communication channel.~~

199. (Currently amended) The system ~~method~~ of claim 167 in which the information apparatus is a wireless information apparatus, and the wireless information apparatus includes one or more of a palmtop computer, a handheld computer, a laptop computer, ~~a personal digital assistance(PDA),~~ a smart phone, a screen phone, an Internet pad, an Internet appliance, and a digital camera, individually or in any combination.

200. (Currently amended) The method of claim 157 in which the ~~communication channel~~ connection includes a wireless connection ~~communication channel, and the method further comprises discovering the one or more selected output devices over the wireless communication channel~~.

REMARKS

Claims 131-200 are currently pending in the application. Claims 131, 148, 157, 167, 172, 177, and 180 are in independent form. The Listing of Claims herein replaces all prior amendments. No new claims are added.

In the final Office action mailed September 14, 2011, claims 131-147, 172-179, and 189-194 were objected to under 35 U.S.C. § 112, second paragraph. Additionally, each of independent claims 131, 148, 157, 167, 172, 177, and 180 were rejected under 35 U.S.C. § 102(e) as being anticipated by Lapstun (US2009/0094457). Finally, the remainder of the pending claims were rejected under 35 U.S.C. § 102(e) or § 103(a).

Applicant has amended the abstract and the title to more closely describe the subject matter recited in the claims. Additionally, Applicant has amended at least each of independent claims 131, 148, 157, 167, 172, 177, and 180 to add clarity and to facilitate expeditious prosecution of this application.

Claim Rejection - 35 U.S.C § 112

Claims 131-147, 172-179, and 189-194 were rejected under 35 U.S.C. § 112, second paragraph. The Examiner states that "the means plus function claim lacks structure ...merely reciting means for... by a device...does not render the device to be the corresponding structure of the means for step." Applicant disagrees with these rejections.

Applicant respectfully notes the following in MPEP § 2181:

> (1) If one skilled in the art would be able to identify the structure, material or acts from the description in the specification for performing the recited function, then the requirements of 35 U.S.C. 112, second paragraph, are satisfied. See *Dossel*, 115 F.3d at 946-47, 42 USPQ2d at 1885...The

court stated that "[n]either the written description nor the claims uses the magic word 'computer,' nor do they quote computer code that may be used in the invention. Nevertheless, when the written description is combined with claims 8 and 9, the disclosure satisfies the requirements of Section 112, Para. 2." The court concluded that based on the specific facts of the case, one skilled in the art would recognize the structure for performing the "reconstructing" function since "a unit which receives digital data, performs complex mathematical computations and outputs the results to a display must be implemented by or on a general or special purpose computer."). See also *Intel Corp. v. VIA Technologies*, Inc, 319 F.3d 1357, 1366, 65 USPQ2d 1934, 1941 (Fed. Cir. 2003) (The "core logic" structure that was modified to perform a particular program was held to be adequate corresponding structure for a claimed function although the specification did not disclose internal circuitry of the core logic to show exactly how it must be modified.)

In the present application, the pending claims go well beyond the minimum requirements set forth in MPEP § 2181 by explicitly reciting, for example, "server" and "information apparatus" in the claims, which are well supported in the description and the drawings of the present application. One of ordinary skill in art will not only be able to recognize "the structure" required in MPEP § 2181, but also will be able to identify that structure from the description and the drawings of the present application as shown below.

- Examples of support for "information apparatus" can be found, for example, in Fig. 1 (reference number 100) and paragraph 0002.
- Examples of support for "Client application" can be found, for example, in Fig. 1 (reference number 102) and paragraphs 0055-0056.
- Examples of support for "server" can be found, for example, in Fig. 1 (reference numbers 110 and 114), and paragraphs 0045 and 0084-0091.
- Examples of support for "server application" can be found, for example, in Fig. 1 (reference number 112) and paragraph 0055-0056 and 0086.

However, in an effort to expedite prosecution of the application, Applicant has deleted, in this response, the term "means" in all claims so that 35 U.S.C. § 112, sixth paragraph is not being invoked in any of the claims. Deletion of the "means" term in the claims is not an admission that corresponding structure does not exist in the description. To the contrary, as outlined above, the description and drawings supports all claim limitations (see support examples and also MPEP § 2181 above). Applicant reserves the right to re-introduce the "means" term in the future.

Claim Rejections - 35 U.S.C. § 102 and § 103

Claims 131-134, 136-141, 143, 146-173, 176-178, 180-183, 185, 187-195, and 196-200, which includes all of the independent claims (claims 131, 148, 157, 167, 172, 177, and 180), were rejected under 35 U.S.C. § 102(e) as being anticipated by Lapstun (US2009/0094457). Additionally, claims 135, 142, 144-145, 174-175, 179, 184, 186, and 196 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lapstun in view of Kulakowski (US6226098).

I. Standards for 35 U.S.C. § 102 and § 103(a) Rejections

MPEP § 2131 states: "[A] claim is anticipated only if **each and every element** as set forth in the claim is found...in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). "The identical invention must be shown in **as complete detail** as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9

USPQ2d 1913, 1920 (Fed. Cir. 1989) (emphasis added). Moreover, "[t]he elements must be **arranged as in the claim**." *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990) (emphasis added).

MPEP § 2143.03 states: "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

MPEP § 2143.01 states: "[I]f proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is **no suggestion or motivation** to make the proposed modification." *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984) (emphasis added). "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are **not sufficient** to render the claims *prima facie* obvious." *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959) (emphasis added).

MPEP 2145(X) states that an obviousness rejection may not be based on improper hindsight reasoning "gleaned only from applicant's disclosure." *In re McLaughlin*, 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971).

Under relevant case law:

"It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one skilled in the art." *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d

443, 448 (Fed. Cir. 1986) (quoting *In re Wesslau*, 53 C.C.P.A 746, 353 F.2d 238, 241, 147 U.S.P.Q. 391, 393 (CCPA 1965)).

"To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553 (Fed. Cir. 1983).

II. Office Action Was Prematurely Made Final

As a preliminary matter, Applicant notes that the Office action was prematurely made final because the Office action:

(1) Cites a reference that describes a different subject matter in a different field;

(2) Cites large paragraph sections in Lapstun, without providing any reasoning in support of citing those sections and Figures. However, upon reading of the cited material, these cited sections describe a different subject matter and is nothing similar to what is being recited in the claims;

(3) Ignores elements in the pending claims; and

(4) Makes rejections using merely conclusory statements not found in Lapsun or Kulakowski. Applicant submits that those statements made without any articulated reasoning is based on hindsight teaching of the Applicant's disclosure "wherein that which only the inventor taught is used against its teacher."

Examples are further discussed below. Applicant requests withdrawal of the finality of the Office action. Additionally, Applicant requests that future Office actions address each element of the pending claims and provide support and reasoning that explains how the cited reference(s) meet each element.

III. Rejections under U.S.C § 102

1. *Lapstun*

Lapstun teaches the subject matter of a "paper-based user interface" for scanning a piece of paper using a pen (paragraph 0004). The pen includes a marker for marking the paper and a sensor for sensing print tags printed on the paper. Content printed on the paper (a netpage) uses regular ink, but print tags are printed using special infrared ink (that is invisible to human eye but visible to the sensor of the pen). The invisible print tag for sensing by the pen is for identifying the page number and which region of the page is being scanned using the pen.

The pen is not connected to a network and does not communicate with a server, but the pen communicates with a printer over a short range wireless connection. The printer is connected to a network and communicates with a server. After the pen senses the print tag, the pen sends the print tag by wireless communication to the printer. The printer sends the print tag to the server, over the network; and the server sends publications associated with the print tag to the printer for printing.

The printer is a special type of printer called netpage printer. Lapstun strongly discourages using a commercially available printer as the NetPage printer. Lapstun emphasizes that only the Memjet™ inkjet printers (paragraph 0173), invented by

Lapstun, are the desired output device for use in a netpage system. This is because only the Memjet™ printer satisfies ALL expected results required of a netpage printer (see paragraphs 0159 to 0173). Those expected results or properties of a netpage printer includes for example: "simultaneous double sided printing", "low ink cost", and "nearly silent printing" among many others (see paragraphs 0159 to 0173).

For security of the printer, the netpage printer must first be registered with the server. The security of the printer is accomplished by authenticating the printer with the server during printer registration. Authentication of the printer uses an encryption (see paragraph 0329 "Netpage Printer Security") method that exchanges private security keys between the server and the printer. If the server finds that the security keys matches, then the printer is registered with the server for use in the netpage system. Lapstun notes that a user must be able to use any number of netpage printers (paragraphs 0086 and 0294) and any number of pens. The publication delivered from the server to the printer is to be "user" dependent (see paragraph 0085) "publications are formatted according to individual user profiles".

2. *Distinctions Examples over Lapstun*

Examples of the many distinctions between the subject matter disclosed in Lapstun and the subject matter recited in the pending claims are provided below.

2.1 *Information apparatus including a display screen (claim 167)*

Lapstun does not teach the information apparatus (or the pen) "including a display screen." Instead, Lapstun teaches that the pen includes a sensor for sensing tags on a piece of paper (see paragraph 0014 and Fig 8). The Office action appears to

have ignored the above element, and without providing any reasoning for ignoring such element.

Following Lapstun, one of ordinary skill in the art would not be motivated for the pen to include "a display screen." Instead, as explicitly taught in paragraph 0014 and Fig. 8, one of ordinary skill in the art would have the pen including a "sensor" for sensing tags on a piece of paper. Thus, the suggested modification would disable the principle mode of operation explicitly taught by Lapstun under MPEP § 2143.01(V).

2.2 *Graphical user interface over the display screen (claim 167)*

Lapstun does not teach that the pen has "a display screen" or "a graphical user interface," much less "a graphical user interface over the display screen." Instead, Lapstun explicitly teaches to one of ordinary skill "a paper-based user interface" over "a piece of paper" (see Fig. 8 and paragraphs 0014, 0076, and 0094-0095).

Following Lapstun, one of ordinary skill in the art would not be motivated to include "a graphical user interface over the display screen" with the pen. Instead, as explicitly taught in paragraphs 0014, 0076, and 0094-0095, one of ordinary skill in the art would include a "paper-based user interface" over a piece of paper so that the pen can sense print tags over the piece of paper. Thus, the suggested modification would disable the principle mode of operation explicitly taught by Lapstun under MPEP § 2143.01(V).

2.3 *Receiving pointers or references to one or more digital content*

Lapstun does not teach the pen or information apparatus receiving pointers or references to one or more digital content from a server. Instead, Lapstun teaches that

the pen receives sensing data from the paper print tags (see paragraphs 0094-0095, 0102, and 0117).

Following Lapstun, one of ordinary skill in the art would be led away from receiving pointers or references to one or more digital content from the server. Additionally, one of ordinary skill in the art is explicitly instructed, in paragraphs 0094-0095, 0102, and 0117, to receive print tags from a piece of paper (not from a server) by sensing the piece of paper with the pen. Thus, the suggested modification would disable the principle mode of operation explicitly taught by Lapstun under MPEP § 2143.01(V).

2.4 *Providing a pointer or reference to digital content for selection by the user (claim 167)*

Lapstun does not teach that the pen has "a display screen" or a "graphical user interface over the display screen," must less "providing, via the graphical user interface over the display screen, a pointer or reference to digital content for selection by the user." Instead, Lapstun teaches providing, over the piece of paper, an invisible print tag (printed with infrared ink that is invisible to user's eye) for selection by the user over the piece of paper (see paragraphs 0013 and 0097-0098).

Following Lapstun, one of ordinary skill in the art would not be motivated to provide "via the graphical user interface over the display screen, a pointer or reference to digital content for selection by the user." Instead, as explicitly taught in paragraphs 0013 and 0097-0098, one of ordinary skill in the art would be explicitly instructed to provide, over a piece of paper, an invisible print tag for selection by the user over the piece of paper for scanning tags that are invisible to the user's eye. Thus, the suggested

modification would disable the principle mode of operation explicitly taught by Lapstun under MPEP § 2143.01(V).

2.5 *Receiving a selected digital content (claim 167)*

Lapstun does not teach that the pen has "a display screen" much less "receiving ...over the display screen a selected digital content." Instead, Lapstun teaches receiving a print tag over the piece of paper (see paragraphs 0097-0098 and 0102).

Following Lapstun, one of ordinary skill in the art would not be motivated to receive "over the display screen a selected digital content." Instead, as explicitly taught in paragraphs 0097-0098 and 0102, one of ordinary skill in the art would be explicitly instructed to receiving print tags over a piece of paper. Thus, the suggested modification would disable the principle mode of operation explicitly taught by Lapstun under MPEP § 2143.01(V).

2.6 *Lapstun cannot be combined with "anything" to teach selecting or receiving a pointer to digital content*

Lapstun cannot be combined with any reference to teach any one of "a graphical user over the display screen", "providing, via the graphical user interface over the display screen", "a pointer or reference to digital content for selection over the display screen", and "receiving ...over the display screen a selected digital content," because Lapstun teaches away from any one of the combination as discussed above by explicitly teaching a (1) "paper-based user interface," (2) providing, over the piece of paper, an invisible print tag for selection, and (3) receiving print tags over the piece of paper.

Moreover, Lapstun cannot be combined with any other reference to teach the above-mentioned combination for at least two reasons. First, Lapstun emphasizes

"paper-based user interface" as the principle of operation (see paragraph 0094 - "paper-based user interface to published information"). Second, Lapstun's purpose is the interaction between printed matter and sensors (the pen) (see Field of Invention, paragraphs 0002-0003). Thus, modifying a paper-based user interface over a piece of paper to a "graphical user interface over a display screen" renders Lapstun unsatisfactory for its intended purpose. Hence, there is no suggestion or motivation to make the proposed modification under MPEP § 2143.01.

2.7 *Information apparatus including an operating system and a client application facilitated by the operating system (claim 167)*

Lapstun does not teach the pen including an "operating system" or a "client application," much less "a client application facilitated by the operating system." The Office action appears to have ignored each of the above elements.

2.8 *The output device is at least one of a display device or an audio output device (claim 167)*

Lapstun does not teach that the output device is at least one of a display device or an audio output device. Instead, Lapstun emphasizes that the output device is a printing device (netpage printer) (see paragraph 0173). Lapstun strongly discourages modification to the netpage printer because it emphasizes that only the Memjet™ inkjet printer (paragraph 0173) satisfies ALL the requirements of a netpage printer (see paragraphs 0159 to 0173). Following Lapstun, one of ordinary skill in the art would not be motivated to modify the netpage printer using a "commercially available printer", much less to become "a display device or an audio output device." Thus, the suggested

modification would disable the principle mode of operation explicitly taught by Lapstun under MPEP § 2143.01(V).

Furthermore, Lapstun cannot be combined with any reference to teach "display device or audio output device" because Lapstun explicitly teaches away from the "display device or audio output device" by emphasizing the expected results required of a netpage printer, such as "simultaneous double sided printing," "low ink cost," and "nearly silent printing" (see paragraphs 0159 to 0173). One of ordinary skill in the art knows that "a display device or an audio output device" lacks the characteristics of "nearly silent printing", much less ALL the characteristics of a netpage printer explicitly required by Lapstun in paragraphs 0159 to 0173.

Modifying the "netpage printer" to be a "display screen or audio output device" renders Lapstun unsatisfactory for its intended purpose. Hence, there is no suggestion or motivation to make the proposed modification for combining with any reference as provided under MPEP § 2143.01.

2.9 *Rendering by the display device and/or the audio output device at least part of the selected digital content that includes video or audio content (claim 167)*

Lapstun does not teach "display device or the audio output device," much less "display device or the audio output device rendering video or audio content." Instead, Lapstun explicitly teaches that the netpage printer is to render ink on paper, for example printing publications (see paragraphs 0085 and 0173). Thus, the suggested modification would disable the principle mode of operation explicitly taught by Lapstun under MPEP § 2143.01(V).

Furthermore, Lapstun teaches away from the combination as discussed above by explicitly instructing one of ordinary skill in the art to use only the Memjet™ inkjet printer in the netpage system (see paragraphs 0160 to 0171).

2.10 *A connection between the information apparatus and the output device includes a wired connection (claims 170, 184, and 189)*

Lapstun does not teach that the communication between the pen and the printer is over a wired connection. Instead, Lapstun emphasizes that the pen communicates with the printer over a wireless connection (see Fig. 2 and paragraphs 0079, 0082, 0099, and 0340). Following Lapstun, one of ordinary skill in the art would not be motivated to include a wired connection between the pen and the printer. Instead, as explicitly taught in Fig. 2 and paragraphs 0079, 0082, 0099, and 0340, one of ordinary skill in the art is explicitly instructed to include a wireless connection between the pen and the printer. Thus, the suggested modification would disable the principle of operation explicitly taught by Lapstun under MPEP § 2143.01(V).

2.11 *Transmitting by the server device dependent output data corresponding to the selected digital content (claim 131)*

Lapstun does not teach or suggest "transmitting by the server the device dependent output data corresponding to selected digital content." Instead, Lapstun teaches the publication provided by the server is user dependent and not device dependent. For example, paragraph 0085 states that publications are formatted according to individual user profiles.

Following Lapstun, one of ordinary skill in the art would not be motivated to transmit "by the server the device dependent output data corresponding to the selected

digital content." Instead, as explicitly taught in paragraph 0085, one of ordinary skill in the art would be instructed to transmit, by the server, user dependent publication to the printer.

2.12 *An encryption scheme for ensuring security of the selected digital content that is output device specific ...for rendering (claim 167)*

Lapstun does not teach "an encryption scheme for ensuring security of the selected digital content that is output device specific...for rendering". Instead, Lapstun teaches an encryption scheme for ensuring the security of the printer by authenticating the printer for registration (see paragraphs 0329-0330).

Following Lapstun, one of ordinary skill in the art would not be lead to "an encryption scheme for ensuring security of the selected digital content that is output device specific...for rendering". Instead, as explicitly taught in paragraphs 0329-0330, one of ordinary skill in the art would be lead away by the specific instructions to an encryption scheme for ensuring the security of the printer by authenticating the printer for registration.

2.13 Passing the device dependent output data from the information apparatus to the output device for rendering ... of the selected digital content (claim 167)

Lapstun does not teach or describe "passing the device dependent output data from the information apparatus to the output device for rendering...of the selected digital content." Instead, Lapstun explicitly teaches that the netpage server 14 (and not the pen) delivers the publication to the printer for printing the publication (see paragraph 0085). Following Lapstun, one of ordinary skill in the art would not be motivated to pass

the device dependent output data from the information apparatus to the output device for rendering of the selected digital content. Instead, one of ordinary skill in the art would pass publication from the server to the printer for printing the publication. For example, as described in paragraph 0085, the netpage publication server delivers the publication to the netpage printer. Thus, the suggested modification would disable the principle of operation explicitly taught by Lapstun under MPEP § 2143.01(V).

Furthermore, Lapstun cannot be combined with any reference to teach "passing the device dependent output data from the information apparatus to the output device" because Lapstun explicitly teaches away from the combination as discussed above.

IV. Rejections under U.S.C § 103

The Examiner rejected claims 135, 142, 144-145, 174-175, 179, 184, 186, and 196 under 35 U.S.C. § 103(a) as being unpatentable over Lapstun in combination with Kulakowski. Lapstun is described above.

Kulakowski teaches a printing appliance having a LCD display "to facilitate the user interface" of the printing appliance. The printing appliance is for printing printable messages, such as coupons (see Field of the Invention). The user can select which "printed message" is to be printed using the printing appliance.

In the Office action, Lapstun is asserted to disclose all of the subject matter recited in the pending claims except for a display device, an audio output device, or a television. Kulakowski is, however, asserted to disclose a display device in column 10, lines 37-45.

Applicant respectfully disagrees that each and every element recited in the claims is taught by the combination of Lapstun and Kulakowski. For example, Applicant submits examples of distinctions below.

1. *Rendering by the display device at least part of the selected digital content that includes video content*

Kulakowski does not teach or describe "rendering by the display device the selected digital content that includes video content." Instead, Kulakowski teaches printing by the printing appliance the selected printed message. Following Lapstun, one of ordinary skill in the art would not be led to render, by the display device, at least part of the selected digital content that includes video content. Instead, as explicitly taught in column 10, lines 37-45 of Kulakowski, one of ordinary skill in the art would be led away by the explicit instruction to print selected printed messages at the printing appliance. Thus, the suggested modification would disable the principle of operation explicitly taught by Kulakowski under MPEP § 2143.01(V).

Moreover, Kulakowski cannot be combined with any other reference to teach the above combination. Following column 10, lines 37-45 of Kulakowski, it is not obvious to one of ordinary skill in the art how video content should be selected for printing by the printing appliance. The suggested modification would produce "unexpected and unpredictable" results that are neither anticipated by Kulakowski nor obvious to one of ordinary skill under MPEP § 716.02.

2. *Rendering by the audio output device at least part of the selected digital content that includes audio content*

Kulakowski does not teach or describe an "audio output device," much less "rendering by the audio output device the selected digital content that includes audio content." Instead, Kulakowski teaches printing by the printing appliance selected print messages that are printable matter. Following Kulakowski, one of ordinary skill in the art would not be led to an audio output device, much less selecting the audio content for printing the audio content by the printing appliance. Instead, as explicitly taught in column 10, lines 37-45 of Kulakowski, one of ordinary skill in the art would select a printed message for printing by the printing appliance. Thus, the suggested modification would disable the principle of operation explicitly taught by Kulakowski under MPEP § 2143.01(V).

Moreover, Kulakowski cannot be combined with any other reference to teach the above combination because, following column 10, lines 37-45 of Kulakowski, it is not obvious to one of ordinary skill in the art how audio content should be selected for printing at the printing appliance. The suggested modification would produce "unexpected" and "unpredictable" results that are neither anticipated by Kulakowski nor obvious to one of ordinary skill under MPEP § 716.02.

3. *Output device is an audio output device*

Although the Office action asserts that column 10, lines 37-45 of Kulakowski teaches an audio output device, that portion (or any other portion) of Kulakowski does not disclose that the printing appliance is an audio output device.

4. *Output device or output system is part of a television or a television system (claims 142, 158, 163, 175, and 186)*

Although the Office action asserts that column 10, lines 37-45 of Kulakowski teaches a television, that portion (or any other portion) of Kulakowski does not disclose that the printing appliance is a "television."

Moreover, Kulakowski does not teach or describe that the LCD is "part of a television" or "television system." Instead, Kulakowski explicitly teaches that the LCD is part of the printing appliance (column 10, lines 37-45). Thus, one of ordinary skill in the art would not be motivated to include the LCD as part of the television. Instead, as explicitly taught in column 10, lines 37-45 of Kulakowski, one of ordinary skill in the art would include the LCD as part of the printing appliance. Therefore, the suggested modification would disable the principle mode of operation explicitly taught by Kulakowski under MPEP § 2143.01(V).

5. *Lapstun and Kulakowski cannot be combined to teach a display device*

Lapstun explicitly teaches that the netpage printer must include ALL of the following characteristics or properties, including:

(1) Photographic quality color printing (paragraph 0160);
(2) Low ink cost (paragraph 0164);
(3) Nearly silent printing (paragraph 0167); and
(4) Simultaneous double side printing (paragraph 0169).

Additionally, Lapstun states in paragraphs 0172-0173 that "[n]o commercially available printing technology has all of these characteristics" and "[t]o enable to production of printers with these characteristics, the present applicant has invented a new print technology, referred to as Memjet™ technology. Memjet™ is a drop-on-demand inkjet

technology that incorporates page-width printheads fabricated using microelectromechanical systems (MEMS) technology."

Kulakowski's printing appliance does not appear to include ALL of the characteristics of a netpage printer explicitly required by Lapstun to be suitable for operating in a netpage system. Additionally, Kulakowski's LCD of the printing appliance does not appear to include any one of the netpage printer characteristics required by Lapstun, must less ALL the characteristics of the netpage printer required by Lapstun (see paragraphs 0159 to 0173).

Instead, one of ordinary skill in the art is explicitly discouraged by Lapstun to combine with anything (including Kulakowski) to modify the netpage printer with a commercially available printer, much less with a display device, the suggested modification renders the netpage printer unsatisfactory for its intended purposes explicitly required by Lapstun in paragraphs 0159 to 0173.

6. *Lapstun cannot be combined with Kulakowski to teach audio output device or a television*

Neither Lapstun nor Kulakowski teaches an audio output device or a television, whether alone or in combination.

7. *The information apparatus including a touch sensitive screen (claim 148)*

Neither Lapstun nor Kulakowski teaches or suggests the information apparatus including a touch sensitive screen.

For at least the above reasons, the pending claims are patentable over Lapstun and Kulakowski.

Conclusion

Applicant appreciates the Examiner for examining the application and for identifying potential deficiencies in the application. Applicant has traversed each objection and rejections by the Examiner accordingly. Applicant has further amended at least each of the independent claims to add clarity and to further emphasize distinctions over the cited references.

In an effort to expedite prosecution of the present application, Applicant requests a phone interview (if the Examiner considers such an interview to be helpful in advancing the prosecution of the application) in accordance with MPEP § 706.07.

Applicant hereby pays the Request for Continued Examination fee and the small entity three-month extension fee. Please charge any additional fees required, or credit any overpayments, to our deposit account number 11-1540.

The Examiner is invited to contact the undersigned attorney of record as indicated below, or William Chang, Applicant and representative of the assignee at (503) 381-7056 for scheduling the interview requested or for any questions.

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this correspondence is being filed electronically via the EFS-Web system at www.uspto.gov on March 14, 2012.

/ Heidi Dutro /
Heidi Dutro

Respectfully submitted,

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PTO/SB/22 (09-11)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARMENT OF COMMERCE
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) FXT312
Application Number 09992413	Filed November 18, 2001
For INFORMATION APPARATUS AND OUTPUT DEVICE FOR SELECTING AND RENDERING PROTECTE	
Art Unit 2453	Examiner E. Bennoit

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	
☐ One month (37 CFR 1.17(a)(1))	$150	$75	$
☐ Two months (37 CFR 1.17(a)(2))	$560	$280	$
☑ Three months (37 CFR 1.17(a)(3))	$1270	$635	$ 635
☐ Four months (37 CFR 1.17(a)(4))	$1980	$990	$
☐ Five months (37 CFR 1.17(a)(5))	$2690	$1345	$

☑ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 11-1540.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☑ attorney or agent of record. Registration Number 50353

☐ attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____

/Peter D. Sabido/ — Signature

March 14, 2012 — Date

Peter D. Sabido — Typed or printed name

503-224-6655 — Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☐ Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Electronic Patent Application Fee Transmittal

Application Number:	09992413
Filing Date:	18-Nov-2001
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Filer:	Peter D. Sabido./Heidi Dutro
Attorney Docket Number:	FXT312

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with $0 paid	2253	1	635	635

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	2801	1	465	465
		Total in USD ($)		**1100**

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Lexmark v. Flexiworld

Electronic Acknowledgement Receipt

EFS ID:	12307469
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Correspondence Address:	Edward B. Anderson Kolisch Hartwell, P.C. 200 Pacific Building 520 S.W. Yamhill Street Portland OR 97204 US 503-224-6655 docketing@khpatent.com
Filer:	Peter D. Sabido./Heidi Dutro
Filer Authorized By:	Peter D. Sabido.
Attorney Docket Number:	FXT312
Receipt Date:	14-MAR-2012
Filing Date:	18-NOV-2001
Time Stamp:	18:56:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1100

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RAM confirmation Number	7812
Deposit Account	111540
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	20120314_RCE_FXT312.pdf	697782	no	3
Warnings:					
Information:					
2	Amendment Submitted/Entered with Filing of CPA/RCE	20120314_AmendmentAccompanyingRCE_FXT312.pdf	283728	no	55
Warnings:					
Information:					
3	Extension of Time	20120314_ExtensionofTime_FXT312.pdf	286758	no	2
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	32071	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1300339		

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Lexmark v. Flexiworld

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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Lexmark v. Flexiworld

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 09/992,413	Filing Date 11/18/2001	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 03/14/2012	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 69	Minus	** 70	= 0	X $30 =	0	OR	X $ =	
Independent (37 CFR 1.16(h))	* 7	Minus	*** 7	= 0	X $125 =	0	OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/CATHERINE SMITH/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,413	11/18/2001	William Ho Chang	EXT312	5528

7590 09/14/2011

Edward B. Anderson
Kolisch Hartwell, P.C.
200 Pacific Building
520 S.W. Yamhill Street
Portland, OR 97204

EXAMINER	
BENOIT, ESTHER	
ART UNIT	PAPER NUMBER
2453	
MAIL DATE	DELIVERY MODE
09/14/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/992,413	CHANG ET AL.	
	Examiner	Art Unit	
	ESTHER BENOIT	2453	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 June 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *131-200* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *131-200* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/10/2011 and 8/26/2011*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendments

1. This Action is in Response to an Amendment filed on June 17, 2011. Claims 131-142, 144-146, 148-149, 151-157, 159, 161-193, and 195-200 have been amended. Claims 131-200 are pending in this application.

Response to Arguments

2. Applicant's arguments with respect to claims 131-200 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 131-147, 172-179, and 189-194 remain rejected under 35 U.S.C. 112, second paragraph. The amendments do not alleviate the requirement for evidence of a structural relationship to the means for limitations. By merely stating, for example, "means for....., by a device..." does not render the "device" to be the corresponding structure of the means for step. Therefore, this does not suffice to alleviate the indefiniteness of the claims. Again, the examiner states claims 131, 172, and 177 are indefinite because the means for performing the claimed functions lack corresponding structures. It is not clear in the specification, which elements the means plus function claims can be implemented. Therefore, the claims are indefinite. See MPEP §2181.

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Claims 132-147, 173-176, 178-179, and 189-194 do not provide any additional support for the structures of the "means for" limitations of claims 131, 172, and 177 and thus, are also indefinite.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 131-134, 136-141, 143, 146-173, 176-178, 180-183, 185, 187-195, and 197-200 are rejected under 35 U.S.C. 102(e) as being anticipated by Lapstun et al. (US 2009/0094457 A1). Claim 167 will be discussed first because it incorporates the limitations also found in independent claims 131, 148, 157, 172, 177, and 180.

With respect to claim 167, Lapstun discloses a data output security method for rendering output data corresponding to the output digital content at an output system, the output system includes with-an information apparatus for receiving device dependent output data from one or more servers over a network (Abstract), an output controller for decoding device dependent output data (Figure 15), and an output device for rendering device dependent output data (Figure 26), the output system comprising:

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- establishing a communication channel between the output system and one or more servers over a network ([0012], *wireless connection to the network*);
- providing, by a client application over a graphical user interface at the output system, one or more pointers or references to the digital content for selection ([0077] and [0097], *printed tag to reference page description*); and
- receiving, by the client application, a selected digital content over the graphical user interface for rendering from among the one or more pointers or references to digital content ([0097]-[0101], *wireless pen is used to select tag associated with requested page description*); and
- generating, by the client application, a document object that includes a pointer or reference to the selected digital content ([0097], *printed tag*);
- delivering, from the output system, at least part of a document object and at least part of an output device object to the one or more servers ([0335], *request is sent to registration server to add printing authorization*), the one or more servers being distinct and separate from the output system the document object including a pointer or reference to the digital content for the one or more servers to retrieve the data content from a content server with the pointer or reference, and the output device object including at least identification information related to the output system ([0097], [0330]-[0331], and Figure 52, *authenticating a user with a specified printer*);

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- sending, from the output system to the one or more servers over a network, security or authentication information associated with the user operating the output system for authentication of the user ([0330]-[0331], *authenticating the user*);
- sending, from the output system to the one or more servers, payment or subscription information for accessing the data output service provided by the one or more servers ([0361], *user stores payment card information at the registration server*);
- receiving, at the output system device dependent output data from the one or more servers ([0334]-[0335], *user is provided with a key by the registration server, where the key is used to print requested content*), the device dependent output data corresponding to the digital content and being related, at least in part, to the identification information related to the output system included in the output device object delivered from the output system to the one or more servers over the network ([0329]-[0330], *printer uses unique ID to communicate with the server*), and the device dependent output data further including an encryption scheme that includes security keys for ensuring security of the device dependent output data that is device specific to the output system for rendering ([0143] and [0330], *creating a public ID and signature key*);

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- passing the device dependent output data from the information apparatus to the output controller included in the output system ([0293]-[0295], *user is authorized to use a specific printer using unique ID*);
- decoding the device dependent output data at the output controller included in the output system ([0453]-[0454], *using a JPEG decoder or Fax decoder*);
- decompressing the device dependent output data at the output controller included in the output system ([0453]-[0454], *page expansion*);
- delivering the device dependent or device specific output data from output controller to the output device included in the output system for rendering the digital content ([0293]-[0295]).

With respect to claim 133, Lapstun discloses means for receiving, from the information apparatus, one or more job objects having one or more attributes corresponding to an output job, including one or more of an output quality, instructions, a preference, and a pointer or reference to another job object ([0097]-[0101]).

With respect to claim 134, Lapstun discloses the output device object includes a pointer or a reference to the identification information related to the output device ([0097]-[0101]).

With respect to claim 136, Lapstun discloses the output device is a printer and the device dependent output data includes one or more of image data, graphics data, and text data ([0117]).

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With respect to claim 137, Lapstun discloses the information apparatus is a wireless information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistant (PDA), a smart phone, a screen phone, an Internet pad, an Internet appliance, and a digital camera ([0080]).

With respect to claim 138, Lapstun discloses the payment subscription information is provided automatically by the information apparatus ([0361]).

With respect to claim 139, Lapstun discloses the payment information is provided through the information apparatus as entered by a user in response to a prompt to enter payment information ([0361]).

With respect to claim 140, Lapstun discloses the payment information includes service subscriber information corresponding to a pre-arranged subscription to a data output service system ([0361]).

With respect to claim 141, Lapstun discloses correlating the service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information ([0361]).

With respect to claim 143, Lapstun discloses means for establishing a communication channel between the information apparatus and the server application, the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network ([0012]).

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With respect to claim 146, Lapstun discloses the output device decodes and decompresses the device dependent output data for rendering the output content ([0453]-[0454]).

With respect to claim 147, Lapstun discloses the means for generating device dependent output data at the server includes one or more of invoking, launching, calling, utilizing, and involving one or more applications ([0082]).

With respect to claim 151, Lapstun discloses the output device includes one or more of a display device, a projection device, a printing device, and an audio output device (Abstract)

With respect to claim 152, Lapstun discloses discovering an output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content ([0342]).

With respect to claim 153, Lapstun discloses decoding and decompressing the device dependent output data at the information apparatus subsequent to receiving the device dependent output data ([0453]-[0454]).

With respect to claim 160, Lapstun discloses sending payment information from the information apparatus to the one or more servers over the network as payment for the data output service ([0361]).

With respect to claim 165, Lapstun discloses delivering the device dependent output data to each selected output device for rendering of the digital content ([0293]-[0295]).

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With respect to claim 168, Lapstun discloses obtaining an output device object at the information apparatus, the obtaining of the output device object including one or more of obtaining information from user input, from a communication with an output device, and from a default parameter or preference associated with the output system ([0294]).

With respect to claim 169, Lapstun discloses discovering an output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the digital content ([0342]).

With respect to claim 170, Lapstun discloses the output device is associated with the information apparatus and includes a direct wire connected between the information apparatus and the output device ([0446]).

With respect to claim 171, Lapstun discloses conforming at the information apparatus the device dependent output data into a form, format or language more suitable for rendering at an output device, the conforming including a decoding operation and an encoding operation ([0453]-[0454]).

With respect to claim 192, Lapstun discloses the one or more output device objects includes identification related to the one or more output devices, the identification including one or more of an output device brand, a model, a registration, and an IP address ([0387]).

With respect to claim 194, Lapstun discloses means for retrieving data content employing the document object ([0097]).

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With respect to claim 195, Lapstun discloses the delivering the device dependent output data to the output device includes delivering the device dependent output data to an output controller connected to the output device ([0293]-[0295]).

With respect to claims 148-150, 154-159, 161-164, 166-167, 172-173, 176-178, 180-183, 187-191, 193, 195, and 197-200, the limitations of these claims are essentially similar to the limitations of the claims above. Claims 148-150, 154-159, 161-164, 166-167, 172-173, 176-178, 180-183, 187-191, 193, 195, and 197-200 are simply variations of similar subject matter found in the claims above. For this reason, claims 148-150, 154-159, 161-164, 166-167, 172-173, 176-178, 180-183, 187-191, 193, 195, and 197-200 are rejected for the same reasons as the claims above and will not be individually repeated.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 135, 142, 144-145, 174-175, 179, 184, 186, and 196 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lapstun et al. (US 2009/0094457 A1), in view of Kulakowski et al. (US 6,226,098 B1).

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With respect to claim 135, Lapstun does not explicitly disclose the output device includes a display output control unit for displaying data the output content.

However, Kulakowski discloses the output device includes a display output control unit for displaying data the output content (Col. 10, lines 37-45, *printer includes display*);

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Lapstun with the teachings of Kulakowski to include a display on the output device, *because* it will provide for a visual user interface on the output device .

With respect to claim 142, Lapstun does not explicitly disclose the output device includes a television.

However, Kulakowski discloses the output device includes a display output control unit for displaying data the output content (Col. 11, lines 25-35);

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Lapstun with the teachings of Kulakowski to include a television, *because* it will allow for accommodation of more common user appliances.

With respect to claim 144, Lapstun discloses the device dependent output data includes audio data ([0139]). Lapstun does not explicitly disclose the output device is an audio output device.

However, Kulakowski discloses the output device is an audio output device (Col. 11, lines 25-35);

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Lapstun with the teachings of Kulakowski to include an audio device, *because* it will allow for accommodation of more common user appliances.

With respect to claim 145, Lapstun discloses the device dependent output data includes one or more of image data, audio data, and video data ([0139]). Lapstun does not explicitly disclose the output device is a display device.

However, Kulakowski discloses the output device is a display device (Col. 10, lines 37-45, *printer includes display*);

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Lapstun with the teachings of Kulakowski to include a display on the output device, *because* it will provide for a visual user interface on the output device.

With respect to claims 174-175, 179, 184, 186, and 196, the limitations of these claims are essentially similar to the limitations of the claims above. Claims 174-175, 179, 184, 186, and 196 are simply variations of similar subject matter found in the claims above. For this reason, claims 174-175, 179, 184, 186, and 196 are rejected for the same reasons as the claims above and will not be individually repeated.

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Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Esther Benoit whose telephone number is 571-270-3807. The examiner can normally be reached on Monday through Friday between 7:30 a.m and 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Krista M. Zele can be reached on 571-272-7288. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

E.B.
August 31, 2011

/Krista M. Zele/
Supervisory Patent Examiner, Art Unit 2453

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Notice of References Cited	Application/Control No. 09/992,413	Applicant(s)/Patent Under Reexamination CHANG ET AL.	
	Examiner ESTHER BENOIT	Art Unit 2453	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2009/0094457	04-2009	Lapstun et al.	713/168
*	B	US-6,957,194	10-2005	Stefik et al.	705/52
*	C	US-6,226,098	05-2001	Kulakowski et al.	358/1.14
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	09992413	CHANG ET AL.
	Examiner	Art Unit
	Benoit, Esther	2453

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	04/02/2007	06/25/2007	03/29/2009	05/18/2010	12/11/2010	08/31/2011			
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	34	÷	✓	-	-	-	-			
	35	÷	✓	-	-	-	-			
	36	÷	✓	-	-	-	-			

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CLAIM		DATE								
Final	Original	04/02/2007	06/25/2007	03/29/2009	05/18/2010	12/11/2010	08/31/2011			
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	136			✓	✓	✓	✓			
	137			✓	✓	✓	✓			
	138			✓	✓	✓	✓			
	139			✓	✓	✓	✓			
	140			✓	✓	✓	✓			
	141			✓	✓	✓	✓			
	142			✓	✓	✓	✓			
	143			✓	✓	✓	✓			
	144			✓	✓	✓	✓			

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	09992413	CHANG ET AL.
	Examiner	Art Unit
	Benoit, Esther	2453

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	04/02/2007	06/25/2007	03/29/2009	05/18/2010	12/11/2010	08/31/2011			
	145			✓	✓	✓	✓			
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	147			✓	✓	✓	✓			
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	162			✓	✓	✓	✓			
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	164			✓	✓	✓	✓			
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	173			✓	✓	✓	✓			
	174			✓	✓	✓	✓			
	175			✓	✓	✓	✓			
	176			✓	✓	✓	✓			
	177			✓	✓	✓	✓			
	178			✓	✓	✓	✓			
	179			✓	✓	✓	✓			
	180			✓	✓	✓	✓			

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	09992413	CHANG ET AL.
	Examiner	Art Unit
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✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
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CLAIM		DATE								
Final	Original	04/02/2007	06/25/2007	03/29/2009	05/18/2010	12/11/2010	08/31/2011			
	181			✓	✓	✓	✓			
	182			✓	✓	✓	✓			
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	187			✓	✓	✓	✓			
	188			✓	✓	✓	✓			
	189			✓	✓	✓	✓			
	190			✓	✓	✓	✓			
	191			✓	✓	✓	✓			
	192			✓	✓	✓	✓			
	193			✓	✓	✓	✓			
	194			✓	✓	✓	✓			
	195			✓	✓	✓	✓			
	196			✓	✓	✓	✓			
	197			✓	✓	✓	✓			
	198			✓	✓	✓	✓			
	199			✓	✓	✓	✓			
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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	09992413	CHANG ET AL.
	Examiner	Art Unit
	Benoit, Esther	2453

SEARCHED

Class	Subclass	Date	Examiner
709	203-230, 245-48	6/13/07	AMN
715	500, 516-517,969	6/13/07	AMN
710	8, 10	6/13/07	AMN
358	1.1	3/29/09	AMN
	Update Search	12/9/2010	EB
	Update Search	8/31/2011	EB

SEARCH NOTES

Search Notes	Date	Examiner
East Search (USPAT; USPGPUB; EPO: JPO: DERWENT; IBM_TDB)	6/13/07	AMN
Inventor Name Search for ODP	6/16/07	AMN
updated East search	3/29/09	AMN
updated inventor name search	3/29/09	AMN
updated East search	1/18/09	AMN
updated classification and inventor name search	5/18/10	AMN
Update Search	12/9/2010	EB
Assignee Search	12/13/2010	EB
Update Search	8/31/2011	EB
Limited classified search of d18, 101, 358, and 713	8/31/2011	EB

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	09992413
Filing Date	2001-11-18
First Named Inventor	Chang, William Ho
Art Unit	2453
Examiner Name	Benoit, Esther
Attorney Docket Number	FXT312

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6496855		2002-12-17	Hunt et al.	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20050222963		2005-10-06	Johnson	
	2	20080201236		2008-08-21	Field et al.	
	3	20090180142		2009-07-17	Suzuki et al.	

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	1							☐

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Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Receipt date: 08/26/2011

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	09992413 09992413 - GAU: 2453
Filing Date	2001-11-18
First Named Inventor	Chang, William Ho
Art Unit	2453
Examiner Name	Benoit, Esther
Attorney Docket Number	FXT312

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	US PATENT AND TRADEMARK OFFICE, Office Action regarding US Patent Application Serial No. 11/933,031, May 26, 2011, 63 pages.	☐

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EXAMINER SIGNATURE

Examiner Signature	/Esther Benoit/	Date Considered	08/31/2011

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Receipt date: 08/26/2011	Application Number	09992413	09992413 - GAU: 2453
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Filing Date	2001-11-18	
	First Named Inventor	Chang, William Ho	
	Art Unit	2453	
	Examiner Name	Benoit, Esther	
	Attorney Docket Number	FXT312	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Edward B. Anderson/	Date (YYYY-MM-DD)	2011-08-26
Name/Print	Edward B. Anderson	Registration Number	30,154

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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Application Number	09992413
Filing Date	2001-11-18
First Named Inventor	William Ho CHANG
Art Unit	2453
Examiner Name	Esther BENOIT
Attorney Docket Number	FXT.222

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5270773		1993-12-14	SKLUT et al.	
	2	5353388		1994-10-04	MOTOYAMA	
	3	5467434		1995-11-14	HOWER, Jr. et al.	
	4	5475507		1995-12-12	SUZUKI et al.	
	5	5537517		1996-07-16	WAKABAYASHI et al.	
	6	5566278		1996-10-15	PATEL et al.	
	7	5613124		1997-03-18	ATKINSON et al.	
	8	5625757		1997-04-29	KAGEYAMA et al.	

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Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Receipt date: 01/10/2011	Application Number	09992413	09992413 - GAU: 2453
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Filing Date	2001-11-18	
(Not for submission under 37 CFR 1.99)	First Named Inventor	William Ho CHANG	
	Art Unit	2453	
	Examiner Name	Esther BENOIT	
	Attorney Docket Number	FXT.222	

	9	5748859		1998-05-05	TAKAYANGI et al.	
	10	5862321		1999-01-19	LAMMING et al.	
	11	5867633		1999-02-02	TAYLOR, III et al.	
	12	5930466		1999-07-27	RADEMACHER	
	13	5931919		1999-08-03	THOMAS et al.	
	14	5940843		1999-08-17	ZUCKNOVICH et al.	
	15	5968176		1999-10-19	NESSETT et al.	
	16	5974401		1999-10-26	ENOMOTO et al.	
	17	5978560		1999-11-02	TAN et al.	
	18	5983200		1999-11-09	SLOTZNICK	
	19	5987454		1999-11-16	HOBBS	

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	First Named Inventor	William Ho CHANG	
	Art Unit	2453	
	Examiner Name	Esther BENOIT	
	Attorney Docket Number	FXT.222	

	20	6009464		1999-12-28	HAMILTON et al.	
	21	6020973		2000-02-01	LEVINE et al.	
	22	6023715		2000-02-01	BURKES et al.	
	23	6061142		2000-05-09	SHIMA	
	24	6070185		2000-05-30	ANUPAM et al.	
	25	6076109		2000-06-13	KIKINIS	
	26	6141659		2000-10-31	BARKER et al.	
	27	6145031		2000-11-07	MATISE et al.	
	28	6189993		2001-02-21	MANTELL	
	29	6225993		2001-05-01	LINDBLAD et al.	
	30	6256666		2001-07-03	SINGHAL	

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	First Named Inventor	William Ho CHANG	
	Art Unit	2453	
	Examiner Name	Esther BENOIT	
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	31	6288790		2001-09-11	YELLEPEDDY et al.	
	32	6366912		2002-04-02	WALLENT et al.	
	33	6369909		2002-04-09	SHIMA	
	34	6418439		2002-07-09	PAPIERNAIK et al.	
	35	6442375		2002-08-27	PARMENTIER	
	36	6453127		2002-09-17	WOOD et al.	
	37	6473800		2002-10-29	JERGER et al.	
	38	6477575		2002-11-05	KOEPPEL et al.	
	39	6487599		2002-11-26	SMITH et al.	
	40	6487587		2002-11-26	DUBEY	
	41	6493104		2002-12-10	CROMER et al.	

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Lexmark v. Flexiworld

	42	6546387		2003-04-08	TRIGGS	
	43	6578072		2003-06-10	WATANABE et al.	
	44	6604135		2003-08-05	ROGERS et al.	
	45	6623527		2003-09-23	HAMZY	
	46	6643650		2003-11-04	SLAUGHTER et al.	
	47	6658625		2003-12-02	ALLEN	
	48	6694371		2004-02-17	SANAI	
	49	6697848		2004-02-04	HAMILTON et al.	
	50	6705781		2004-03-16	IWAZAKI	
	51	6741871		2004-05-25	SILVERBROOK et al.	
	52	6745229		2004-06-01	GOBIN et al.	

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	First Named Inventor	William Ho CHANG	
	Art Unit	2453	
	Examiner Name	Esther BENOIT	
	Attorney Docket Number	FXT.222	

	53	6751732		2004-06-15	STROBEL et al.	
	54	6775407		2004-08-10	GINDELE et al.	
	55	6778289		2004-08-17	IWATA	
	56	6840441		2005-01-11	MONAGHAN et al.	
	57	6857716		2005-02-22	NAGAHASHI	
	58	7478403		2009-01-13	ALLAVARPU et al.	
	59	5228118		1993-07-13	SASAKI	

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	1	20020042263		2002-04-11	ISHIKAWA	
	2	20020092029		2002-07-11	SMITH	

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	Attorney Docket Number	FXT.222	

	3	20020194302		2002-12-19	BLUMBERG	
	4	20030120754		2003-06-26	MUTO et al.	
	5	20030160993		2003-08-28	KANG	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] ¡	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	0691619	EP	A2	1996-10-01	FLYNN		☐
	2	0952513	EP	A1	1999-10-27	WHITE		☐

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	1	U.S. PATENT AND TRADEMARK OFFICE, Office Action regarding U.S. Patent Application Serial No. 09/992,198, July 6, 2004, 7 pages.	☐
	2	U.S. PATENT AND TRADEMARK OFFICE, Office Action regarding U.S. Patent Application Serial No. 09/992,417, October 27, 2004, 28 pages.	☐

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	Art Unit	2453	
	Examiner Name	Esther BENOIT	
	Attorney Docket Number	FXT.222	

	3	U.S. PATENT AND TRADEMARK OFFICE, Office Action regarding U.S. Patent Application Serial No. 09/992,420, February 25, 2005, 24 pages.	☐
	4	U.S. PATENT AND TRADEMARK OFFICE, Office Action regarding U.S. Patent Application Serial No. 09/992,183, March 14, 2005, 10 pages.	☐
	5	U.S. PATENT AND TRADEMARK OFFICE, Office Action regarding U.S. Patent Application Serial No. 09/992,198, April 4, 2005, 8 pages.	☐
	6	U.S. PATENT AND TRADEMARK OFFICE, Office Action regarding U.S. Patent Application Serial No. 11/993,031, September 9, 2009, 5 pages.	☐
	7	U.S. PATENT AND TRADEMARK OFFICE, Office Action regarding U.S. Patent Application Serial No. 09/992,183, January 13, 2010, 11 pages.	☐
	8	U.S. PATENT AND TRADEMARK OFFICE, Office Action regarding U.S. Patent Application Serial No. 11/933,005, April 30, 2010, 26 pages.	☐
	9	U.S. PATENT AND TRADEMARK OFFICE, Office Action regarding U.S. Patent Application Serial No. 12/204,689, September 15, 2010, 9 pages.	☐
	10	U.S. PATENT AND TRADEMARK OFFICE, Office Action regarding U.S. Patent Application Serial No. 12/684,869, September 29, 2010, 17 pages.	☐
	11	U.S. PATENT AND TRADEMARK OFFICE, Office Action regarding U.S. Patent Application Serial No. 12/204,695, December 21, 2010, 11 pages.	☐

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Examiner Signature	/Esther Benoit/	Date Considered	08/31/2011

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Receipt date: 01/10/2011	Application Number	09992413 09992413 - GAU: 2453
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Filing Date	2001-11-18
	First Named Inventor	William Ho CHANG
	Art Unit	2453
	Examiner Name	Esther BENOIT
	Attorney Docket Number	FXT.222

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

EFS Web 2.1.17 ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.B./

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S65	22	flexiworld.as.	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/30 14:22
S66	17355	("713".clas. or "726".clas.) and printer	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2011/08/30 14:27
S67	2384	("713".clas. or "726".clas.) and (printer server)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2011/08/30 14:27
S68	1199	("713".clas. or "726".clas.) and (printer server) and (payment or subscri$7 or account or money or monetary or fee or pay)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2011/08/30 14:29
S69	817	("713".clas. or "726".clas.) and (printer server) and (payment or subscri$7 or money or monetary or fee or pay)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2011/08/30 14:29
S70	779	("713".clas. or "726".clas.) and (printer server) and (payment or subscri$7 or money or monetary or fee or pay) and (pointer or reference)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2011/08/30 14:30
S71	140	("713".clas. or "726".clas.) and (printer server) and (payment or subscri$7 or money or monetary or fee or pay) and (pointer)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2011/08/30 14:30
S72	73	("713".clas. or "726".clas.) and (printer server) and (payment or subscri$7 or money or monetary or fee or pay) and (pointer) and compress$6	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2011/08/30 14:31
S73	0	("2010/0039669").URPN.	USPAT	WITH	ON	2011/08/30 14:49

S74	177	("713".clas. or "726".clas.) and (printer server) and (payment or subscri$7 or money or monetary or fee or pay) and compress$6 not S72	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2011/08/30 14:51
S75	59	("713".clas. or "726".clas.) and (printer server) and (payment or subscri$7 or money or monetary or fee or pay) and compress$6 and (reference near3 (file or content)) not S72	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2011/08/30 14:52
S76	42	("2002/0042884").URPN.	USPAT	WITH	ON	2011/08/30 14:52
S77	81	d18/$3.ccls. and ((mobile near2 device) or (phone) or (portable near2 (device or computer)))	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 09:23
S78	16	d18/$3.ccls. and ((wireless))	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 09:32
S79	245	"101"/$3.ccls. and ((wireless))	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 09:33
S80	782	"101"/$3.ccls. and ((pointer))	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 09:50
S81	16	"101"/$3.ccls. and ((pointer) (content or document))	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 09:51
S82	120	"101"/$3.ccls. and (authentication)	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 09:52
S83	64	("20020042263" | "20020092029" | "20020194302" | "20030120754" | "20030160993" | "5228118" | "5270773" | "5353388" | "5467434" | "5475507" | "5537517" | "5566278" | "5613124" | "5625757" | "5748859" | "5862321" | "5867633" | "5930466" | "5931919" | "5940843" | "5968176" | "5974401" | "5978560" | "5983200" | "5987454" | "6009464" | "6020973" | "6023715" | "6061142" | "6070185" | "6076109" | "6141659" | "6145031" | "6189993" | "6225993" | "6256666" | "6288790" | "6366912" | "6369909" | "6418439" | "6442375" |	US-PGPUB; USPAT	WITH	ON	2011/08/31 11:35

		"6453127" | "6473800" | "6477575" | "6487587" | "6487599" | "6493104" | "6546387" | "6578072" | "6604135" | "6623527" | "6643650" | "6658625" | "6694371" | "6697848" | "6705781" | "6741871" | "6745229" | "6751732" | "6775407" | "6778289" | "6840441" | "6857716" | "7478403").PN.				
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S86	126	("713".clas. or "726".clas.) and (printer server) and (payment or subscri$7 or money or monetary or fee or pay) and (television)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2011/08/31 15:00
S87	110	("713".clas. or "726".clas.) and (printer server) and (payment or subscri$7) and (television)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2011/08/31 15:00
S88	79	("713".clas. or "726".clas.) and (mobile or portable) and (printer server) and (payment or subscri$7) and (television)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2011/08/31 15:00
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S91	252	"101"/$3.ccls. and television	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 15:26

S92	16	"101"/$3.ccls. and (television printer)	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 15:26
S93	6	"101"/$3.ccls. and (television same printer) not S92	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 15:27
S94	8056	(television printer) not S92	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 15:32
S95	1342	(television printer audio video) not S92	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 15:33
S96	88	(television printer audio video image) not S92	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 15:33
S97	1932	(television same printer) not (S92 or S96) and (wireless print$4)	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 16:00
S98	272	(television same printer) not (S92 or S96) and (wireless near2 print$4)	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 16:00
S99	169	(television same printer) not (S92 or S96) and (wireless near2 print$4) and (object or pointer)	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 16:01
S100	54	(television same printer) not (S92 or S96) and (wireless near2 print$4) and (pointer)	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 16:01
S101	27	(television same printer) not (S92 or S96) and (wireless near2 print$4) and (printer.ti.)	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 16:04
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S103	0	"6789191.pn"	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 16:44
S104	0	"6789191.pn."	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 16:44
S105	9	"09575169"	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 16:44
S106	0	"09575169.pn."	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 16:45
S107	82	(interactive adj device).ti.	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 17:37
S108	1	(interactive adj device adj network).ti.	US-PGPUB; USPAT; USOCR	WITH	ON	2011/08/31 17:38

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	09992413
Filing Date	2001-11-18
First Named Inventor	Chang, William Ho
Art Unit	2453
Examiner Name	Benoit, Esther
Attorney Docket Number	FXT312

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6496855		2002-12-17	Hunt et al.	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20050222963		2005-10-06	Johnson	
	2	20080201236		2008-08-21	Field et al.	
	3	20090180142		2009-07-17	Suzuki et al.	

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	1							☐

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Lexmark, Exhibit 1003
Lexmark v. Flexiworld

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	09992413
	Filing Date	2001-11-18
	First Named Inventor	Chang, William Ho
	Art Unit	2453
	Examiner Name	Benoit, Esther
	Attorney Docket Number	FXT312

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	US PATENT AND TRADEMARK OFFICE, Office Action regarding US Patent Application Serial No. 11/933,031, May 26, 2011, 63 pages.	☐

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	09992413
	Filing Date	2001-11-18
	First Named Inventor	Chang, William Ho
	Art Unit	2453
	Examiner Name	Benoit, Esther
	Attorney Docket Number	FXT312

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Edward B. Anderson/	Date (YYYY-MM-DD)	2011-08-26
Name/Print	Edward B. Anderson	Registration Number	30,154

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	10828553
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Correspondence Address:	Edward B. Anderson Kolisch Hartwell, P.C. 200 Pacific Building 520 S.W. Yamhill Street Portland OR 97204 US 503-224-6655 docketing@khpatent.com
Filer:	Edward Anderson/Veronica Gotelli
Filer Authorized By:	Edward Anderson
Attorney Docket Number:	FXT312
Receipt Date:	26-AUG-2011
Filing Date:	18-NOV-2001
Time Stamp:	19:52:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	20110826_IDS_FXT312.pdf	612342	no	4
Warnings:					
Information:					
2	Non Patent Literature	OA_11933031_FXT313.pdf	2207903	no	63
Warnings:					
Information:					
		Total Files Size (in bytes):	2820245		

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:			Date: June 17, 2011
William Ho Chang			Examiner E. Benoit
Serial No.	:	09/992,413	Group Art Unit 2453
Filed	:	November 18, 2001	Confirmation No. 5528
For	:	DIGITIAL CONTENT SECURITY FOR RENDERING (as Amended)	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NON-FINAL OFFICE ACTION

This amendment is responsive to the non-final Office action dated December 17, 2010. Please amend the above-identified application as follows:

Amendments to the Specification	Begin on page 2
Statement of Claim Status and Support	Begins on page 3
Amendments to the Claims	Begin on page 5
Amendments to the Drawings	None
Remarks	Begin on page 30

Amendments to the Specification

Please replace the title as follows:

[Method For Mobile And Pervasive Output]] Digital Content Security for Rendering

Please replace the current abstract with the abstract provided below.

ABSTRACT

A digital content security system for securing the digital content for rendering at an output device. A server over a network generates device dependent output data corresponding to the digital content that is device specific for rendering at the output device. The server may receive authentication information associated with the user and may receive payment or subscription information for accessing the digital content. The server receives a content object having a reference to the digital content; and also receives an output device object having identification information related to the output device. The server then generates device dependent output data applying an encryption scheme for ensuring security of the digital content that is device specific for rendering, the server may further compress the digital content and transmit the device dependent output data to the information apparatus for rendering of the output content at the output device.

Support for Claim Changes

Examples of support for the claims are found in the specification and drawings as follows:

Support Table	
Claim Elements Presently Amended	**Examples of Support**
device dependent output data being device specific	(Paragraph 0150, Lines 1), (Paragraph 0150, Lines 15)
means for receiving from the information apparatus by the one or more servers payment or subscription information for accessing the data output content service provided by the one or more servers	(Paragraph 0142, Lines 2), (Paragraph 0171, Lines 24), (Paragraph 0135), Fig. 9C
the document object relating to the output content and including a pointer or reference to the output content	(Paragraph 0044, Lines 6)
the output device object having one or more attributes corresponding to the output device, and including an identification information related to the output device	(Paragraph 0038, Lines 6-7)
the generating of the device dependent output data includes applying a compression operation on the output content, and	(Paragraph 0150, Lines 14), (Paragraph 0158, Lines 3-4), (Paragraph 0161, Lines 6), Fig. 7-706
the generating of the device dependent output data includes applying an encryption scheme for ensuring security of the device dependent output data that is device specific for rendering	(Paragraph 0161, Lines 5), (Paragraph 0158, Lines 2-3), (Paragraph 0134, Lines 8), Fig. 7-706
the generating of the device dependent output corresponding to the output content ~~and~~ being related	(Paragraph 0086, Lines 5-0), (Paragraph 145, Lines 11), Fig. 7-706

at least in part to the indication of an identification information related to the output device included in the output device object and received from the information apparatus over the network	
means for transmitting by the one or more servers the generated device dependent output data to the information apparatus for rendering of the output content at the output device	(Paragraph 0086, Lines 12-13), (Paragraph 145, Lines 15-16), Fig. 7 - 710, Fig. 8-800,

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-130. (Cancelled)

131. (Currently amended) A data output content service system for rendering, at an output device, output content managed from an information apparatus and for ensuring security of the output content, the system having

one or more servers for generating device dependent output data corresponding to the output content with a compression operation and an encryption operation, the device dependent output data being device specific acceptable for rendering at the output device, ~~the information apparatus being distinct and separate from the output device, and~~

the one or more servers being distinct and separate from the information apparatus and the output device, the system comprising:

means for receiving from the information apparatus, [[at]] by the one or more servers, [[a]] security or authentication information associated with the user operating the information apparatus for authentication of the user, and, in dependence of [[a]] successful authentication of the user, enabling the user access to the data output content service provided by the one or more servers;

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means for receiving from the information apparatus, by the one or more servers, payment or subscription information for accessing the data output content service provided by the one or more servers;

means for receiving, at the one or more servers, a document object from the information apparatus over a network, the document object relating to the output content and including a pointer or reference to the output content;

means for receiving, at the one or more servers, an output device object from the information apparatus over a network, the output device object having one or more attributes corresponding to the output device, and including ~~an indication of a language and or data format that is acceptable as input to~~ identification information related to the output device ~~for rendering~~;

means for generating the device dependent output data at the server with a server application, including:

means for applying a compression operation on the output content, and

means for applying an encryption scheme for ensuring security of the device dependent output data that is device specific for rendering,

the generated ~~the~~ device dependent output data ~~being associated with~~ corresponding to the output content ~~and~~ being related, at least in part, to the ~~indication of a language or a data format~~ identification information related to the output device included in the output device object and received from the information apparatus over the network; and

means for transmitting, by the one or more servers, the generated device dependent output data to the information apparatus for rendering of the output content at the output device; and

means for delivering, by the information apparatus, at least part of the generated device dependent output data received at the information apparatus from the one or more servers, to the output device for rendering the output content.

132. (Currently amended) The system of claim 131 further comprising

means for providing by a client application over a graphical user interface at the information apparatus, one or more pointers or references to the output content for selection of the output content; and

means for receiving, by the client application, a selected output content over the graphical user interface for rendering from among the one or more pointers or references to the output content; and

means for generating, by the client application, a document object that includes a pointer or reference to the selected output content. ~~means for obtaining payment information from the information apparatus as payment for the data output service provided at the output device or as payment for sending the output data from the server.~~

133. (Currently amended) The system of claim 131 further comprising means for receiving, from the information apparatus, one or more job objects having one or more attributes corresponding to an ~~the~~ output job, including one or more of an output quality, instructions, a preference, and a pointer or reference to another job object.

134. (Currently amended) The system of claim 131 in which the output device object includes a pointer or a reference to the identification information related to the output device ~~language or the data format~~.

135. (Currently amended) The system of claim 131 in which the output device includes a display output control unit for displaying ~~data~~ the output content.

136. (Currently amended) The system of claim 131 in which the output device is a printer and the device dependent output data includes one or more of [[an]] image data, [[a]] graphics data, and text data.

137. (Currently amended) The system of claim 131 in which the information apparatus is a wireless information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistant ~~assistance~~(PDA), a smart phone, a screen phone, an Internet pad, an Internet ~~internet~~ appliance, and a digital camera.

138. (Currently amended) The system of claim ~~132~~ 131 in which the payment or subscription information is provided automatically by the information apparatus.

139. (Currently amended) The system of claim ~~132~~ 131 in which the payment information is provided through the information apparatus as entered by a user in response to a prompt to enter payment information.

140. (Currently amended) The system of claim 131 ~~132~~ in which the payment information includes service subscriber information corresponding to a pre-arranged subscription to a ~~the~~ data output service system.

141. (Currently amended) The system of claim 140 further comprising correlating the ~~data output~~ service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

142. (Currently amended) The system of claim 131 in which the output device includes a television ~~further comprising obtaining authentication information from the information apparatus to authenticate permission for the information apparatus to access the data output service~~.

143. (Previously presented) The system of claim 131 further comprising means for establishing a communication channel between the information apparatus and the server application, the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

144. (Currently amended) The system of claim 131 in which the output device is an audio output device and the device dependent output data includes audio data.

145. (Currently amended) The system of claim 131 in which the output device is a display device and the device dependent output data includes one or more of [[an]] image data, [[an]] audio data, and [[a]]video data.

146. (Currently amended) The system of claim 131 in which the output device decodes and decompresses the device dependent output data for rendering the output content ~~document object includes a reference or pointer related to the data content~~.

147. (Previously presented) The system of claim 131 in which the means for generating device dependent output data at the server includes one or more of invoking, launching, calling, utilizing, and involving one or more applications.

148. (Currently amended) A method for generating [[a]] device dependent output data acceptable for rendering at an output device, the device dependent output data corresponding to ~~output~~ digital content accessible, at least partly, by an information apparatus, the method comprising:

sending, from the information apparatus to a server over a network, [[a]]security or authentication information associated with the user operating the information apparatus for authentication of the user, the server being distinct and separate from the information apparatus and the output device, and in dependence of [[a]]successful

authentication of the user, enabling the user access to a [[the]] data output service provided by the server;

sending, from the information apparatus to the server, payment or subscription information for accessing the data output service provided by the server;

delivering, from the information apparatus, at least part of a document object and at least part of an output device object to the server over a network, the document object being associated with the ~~output~~ digital content including a pointer or reference to the digital content, and the output device object including identification information related to ~~an indication of a language and or data format that is acceptable to~~ the output device ~~for rendering~~;

receiving, at the information apparatus, from the server, device dependent output data related, at least in part, to the ~~indication of a language or a format~~ identification information included in the output device object delivered from the information apparatus, and the device dependent output data further including an encryption scheme that includes security keys for ensuring security of the device dependent output data that is device specific for rendering at the output device;

decompressing, at the information apparatus, the device dependent output data received from the server; and

delivering the device dependent output data from the information apparatus to the output device for rendering of the ~~output~~ digital content.

149. (Currently amended) The method of claim 148 further comprising establishing a communication channel between the information apparatus and the output device; and

receiving, at the information apparatus, ~~over the communication channel~~ one or more attributes corresponding to the output device over the communication channel.

150. (Previously presented) The method of claim 148 in which the server includes a computing device in a network and the network includes one or more of an Internet, a local area network, a cellular network, and a wide area network.

151. (Currently amended) The method of claim 148 in which the output device includes one or more of a display device, a projection device, a printing device, and ~~or~~ an audio output device.

152. (Currently amended) The method of claim 148 further comprising discovering an ~~the selected~~ output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

153. (Currently amended) The method of claim 148 further comprising decoding and decompressing the device dependent output data at the information apparatus subsequent to receiving the device dependent output data ~~in which the document object includes the output content~~.

154. (Currently amended) The method of claim 148 further comprising

providing, by a client application over a graphical user interface at the information apparatus, one or more pointers or references to digital content for selection; and

receiving, by the client application, a selected digital content over the graphical user interface from among the one or more pointers or references to digital content; and

generating, by the client application, a document object that includes a pointer or reference to the selected digital content. ~~in which the document object includes a pointer or reference related to the output content.~~

155. (Currently amended) The method of claim 148 in which the server obtains the ~~output~~ digital content based on a the pointer or reference to the ~~output~~ digital content included in the document object.

156. (Currently amended) The method of claim 148 in which the information apparatus is a wireless mobile information apparatus and the wireless mobile information apparatus includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistant ~~assistance~~(PDA), a smart phone, a screen phone, an Internet phone, an Internet pad, an Internet ~~internet~~ appliance, and a digital camera.

157. (Currently amended) A method for generating device dependent output data acceptable for rendering at each of one or more selected output devices, the device dependent output data for each selected output device corresponding to ~~an output~~ digital content accessible, at least partly, by an information apparatus, the method comprising:

establishing a communication channel between the information apparatus and the one or more selected output devices;

receiving at the information apparatus over the communication channel one or more attributes corresponding to the one or more selected output devices;

~~selecting at the information apparatus one or more output devices for rendering the output content;~~

delivering, from the information apparatus, at least partially a document object and one or more output device objects to one or more servers over a network, the one or more servers being distinct and separate from the information apparatus and the one or more selected output devices, the document object being associated with the ~~output~~ digital content, and the one or more output device objects having one or more attributes corresponding to each of the one or more selected output devices, including ~~an indication of a language and or data format that is acceptable to~~ the one or more attributes corresponding to each selected output device for rendering, the one or more attributes received at the information apparatus over the communication channel from the one or more selected output devices;

sending, from the information apparatus to the one or more servers over a network, [[a]] security or authentication information associated with a [[the]] user operating the information apparatus, and, in dependence of a successful authentication of the user, enabling the user access to a [[the]] data output service; and

receiving, from the one or more servers, device dependent output data corresponding to the data content, the device dependent output data further being related, at least in part, to the one or more attributes corresponding to the one or more selected output devices ~~indication of a language or a data format~~ included in the one or more output device objects delivered from the information apparatus to the one or more

servers over the network, and the device dependent output data further including an encryption scheme that includes security keys for ensuring security of the device dependent output data that is device specific to the one or more selected output devices for rendering.

158. (Previously presented) The method of claim 157 in which the one or more servers are connected to a computer network that includes the Internet.

159. (Currently amended) The method of claim 157 in which the information apparatus is a wireless mobile information apparatus that includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance (PDA), a smart phone, a screen phone, an Internet pad, an Internet ~~internet~~ appliance, and a digital camera.

160. (Previously presented) The method of claim 157 further comprising sending payment information from the information apparatus to the one or more servers over the network as payment for the data output service.

161. (Currently amended) The method of claim 157 further comprising discovering, with the information apparatus, one or more output devices as being available for rendering the ~~output~~ digital content.

162. (Currently amended) The method of claim 157 in which the document object includes the ~~output~~ digital content.

163. (Currently amended) The method of claim 157 in which the document object includes a pointer or reference related to the ~~output~~ digital content.

164. (Currently amended) The method of claim 157 in which the one or more servers obtain ~~output~~ digital content based on the pointer or reference to the ~~output~~ digital content included in the document object.

165. (Currently amended) The method of claim 157 further comprising delivering the device dependent output data to each selected output device for rendering of the ~~output~~ digital content.

166. (Currently amended) The method of claim 157 further comprising decoding and decompressing the device dependent output data at the information apparatus ~~sending from the information apparatus the device dependent output data for rendering at each selected output device~~.

167. (Currently amended) A data output security method for rendering output data corresponding to ~~the output~~ digital content at an output system, the output system includes ~~with~~ an information apparatus for receiving device dependent output data from one or more servers over a network, an output controller for decoding device dependent

output data, and an output device for rendering device dependent output data, the output system comprising:

establishing a communication channel between the ~~information apparatus~~ output system and one or more servers over a network;

providing, by a client application over a graphical user interface at the output system, one or more pointers or references to the digital content for selection; and

receiving, by the client application, a selected digital content over the graphical user interface for rendering from among the one or more pointers or references to digital content; and

generating, by the client application, a document object that includes a pointer or reference to the selected digital content;

delivering, from the ~~information apparatus~~ output system, at least part of a document object and at least part of an output device object to the one or more servers, the one or more servers being distinct and separate from the ~~information apparatus and the~~ output system ~~device~~, the document object including a pointer or reference to the ~~output~~ digital content for the one or more servers to retrieve the data content from a content server with the pointer or reference, and the output device object including at least [[an]] identification information related to ~~indication related to a form or format that is acceptable for rendering at a selected~~ the output system ~~device~~;

sending, from the ~~information apparatus~~ output system to the one or more servers over a network, [[a]] security or authentication information associated with the user operating the ~~information apparatus~~ output system for authentication of the user;

sending, from the output system to the one or more servers, payment or subscription information for accessing the data output service provided by the one or more servers;

receiving, at the output system ~~information apparatus~~, device dependent output data from the one or more servers, the device dependent output data corresponding to the ~~output~~ digital content and being related, at least in part, to the identification information related to the output system included in the output device object delivered from the output system to the one or more servers over the network, and the device dependent output data further including an encryption scheme that includes security keys for ensuring security of the device dependent output data that is device specific ~~indication of a form or format that is acceptable~~ to the ~~selected~~ output system ~~device~~ for rendering;

passing the device dependent output data from the information apparatus to the output controller included in the output system;

decoding the device dependent output data at the output controller included in the output system;

decompressing the device dependent output data at the output controller included in the output system;

delivering the device dependent or device specific output data from the ~~mobile information apparatus~~ output controller to the ~~selected~~ output device included in the output system for rendering the ~~output~~ digital content.

168. (Currently amended) The method of claim 167 further comprising obtaining an output device object at the information apparatus, the obtaining of the output device object including one or more of obtaining information from [[a]] user input, from a communication with an ~~the selected~~ output device, and [[or]] from a default parameter or preference associated with the output system.

169. (Currently amended) The method of claim 167 further comprising discovering an ~~the selected~~ output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the ~~output~~ digital content.

170. (Currently amended) The method of claim 167 in which the output device is associated with the information apparatus and includes a direct wire connected between the information apparatus and the ~~further comprising selecting an~~ output device ~~compatible for receiving the output data~~.

171. (Currently amended) The method of claim 167 further comprising conforming, at the information apparatus, the device dependent output data into a form, format or language more suitable for rendering at an ~~the selected~~ output device, the conforming including a decoding operation and an encoding operation.

172. (Currently amended) A system for generating a device dependent output data acceptable for rendering at an output device, the device dependent output data

corresponding to ~~output~~ digital content accessible, at least partly, by an information apparatus, comprising:

a server that is distinct and separate from the information apparatus and the output device, the server being operable to receive a document object and at least part of an output device object, the document object being associated with the ~~output~~ digital content and the output device object having one or more attributes corresponding to the output device, including identification information related to ~~an indication of a language and or data format that is acceptable to~~ the output device ~~for rendering the output content~~, the server being further operable to receive, from the information apparatus, [[a]] security or authentication information associated with the user operating the information apparatus for authentication of the user, and the server being operable to receive from the information apparatus payment or subscription information for sending output data corresponding to the digital content to the information apparatus;

a server application on the server for receiving the document object and the at least part of an [[the]] output device object and for generating the device dependent output data related, at least in part, to the identification information related to output device ~~indication of a language or a data format included in the output device object received from information apparatus~~, the generating of the device dependent output data includes (1) applying a compression operation on the digital content, and (2) applying an encryption scheme with one or more security keys for ensuring security of the device dependent output data that is device specific for rendering; and

means for delivering, by the server, the device dependent output data to the output device for rendering of the ~~output~~ digital content.

173. (Currently amended) The system of claim 172 further comprising means for establishing a communication channel between the information apparatus and the server application by the server application, and the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

174. (Currently amended) The system of claim 172 in which the output device includes an audio output device and the device dependent output data includes audio data.

175. (Currently amended) The system of claim 172 in which the output device includes a display device and the device dependent output data includes one or more of an image data, an audio data, and a video data.

176. (Currently amended) The system of claim 172 in which the output device includes a printing device and the device dependent output data includes one or more of [[an]] image data, [[a]]graphics data, and [[a]]text data.

177. (Currently amended) A system for generating device dependent output data acceptable for rendering at each of one or more ~~selected~~ output devices, the device dependent output data for each ~~selected~~ output device corresponding to ~~an output~~ digital content accessible, at least partly, by an information apparatus, the system comprising:

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a server that is accessible by the information apparatus over a network and is distinct and separate from the information apparatus and the one or more ~~selected~~ output devices, the server being operable for receiving, from the information apparatus, one or more document objects and one or more output device objects, the one or more document objects being associated with the ~~output~~ digital content and the one or more output device objects having one or more attributes corresponding to the one or more ~~selected~~ output devices, including ~~an~~ identification information related ~~indication of a language and or data format that is acceptable~~ to the one or more output devices ~~for rendering~~;

means for establishing, by the server, a communication channel between the server and the information apparatus at least in part over an Internet;

means for receiving, by the server and ~~at the server~~ from the information apparatus, [[a]]security or authentication information associated with a [[the]] user operating the information apparatus for authentication of the user;

means for receiving, by the server and from the information apparatus, payment or subscription information for accessing a digital content service provided by the server;

means for retrieving, by the server, the digital content from a content server employing the one or more document objects received from the information apparatus; and

a server application operating at the server for generating device dependent output data associated with each of the corresponding one or more ~~selected~~ output devices, the device dependent output data being related, at least in part, to the

identification information related to the one or more output devices ~~indication of a language or a data format~~ included in the output device object received from the information apparatus, the server application being configured to apply a compression operation on the digital content for generating the device dependent output data, and to apply an encryption scheme for ensuring security of the device dependent output data that is device specific for rendering at the one or more output devices; and

means for delivering, by the server, the device dependent output data to the information apparatus over the communication channel in response to receiving the security or authentication information, the payment or subscription information, the one or more document objects, and the one or more output device objects from the information apparatus.

178. (Currently amended) The system of claim 177 further comprising means for delivering, by the server, the device dependent output data from the information apparatus to the one or more ~~selected~~ output devices for rendering of the ~~output~~ digital content.

179. (Currently amended) The system of claim 177 in which each output device of the one or more output devices includes one of a display device and an audio output device, and the device dependent output data includes ~~including~~ audio data.

180. (Currently amended) In a computer memory, client software operable from a information apparatus for generating device dependent output data acceptable for

rendering at an ~~selected~~ output device associated with the information apparatus, the device dependent output data corresponding to ~~output~~ digital content accessible, at least partly, by the information apparatus, the computer memory comprising:

client software executable at the information apparatus for providing over a graphical user interface at the information apparatus, one or more pointers or references to the digital content for selection; and

client software executable at the information apparatus for receiving a selected digital content over the graphical user interface from among the one or more pointers or references to the digital content; and

client software executable at the information apparatus for generating a document object that includes a pointer or reference to the selected digital content

client software executable at the information apparatus for delivering, from the information apparatus, at least part of ~~a~~ the document object and at least part of an output device object to a server that is distinct and separate from the information apparatus and the output device, the document object being associated with the ~~output~~ digital content and the output device object having one or more device dependent attributes corresponding to the ~~selected~~ output device and including identification information related ~~an indication of a language or a data format that is acceptable~~ to the output device ~~for rendering~~, the document object and the output device object being required at the server for generating device dependent output data corresponding to the ~~output~~ digital content and acceptable for rendering at the ~~selected~~ output device;

client software executable at the information apparatus for sending, from the information apparatus to the server over a network, [[a]] security or authentication

information associated the user operating the information apparatus for authentication of the user;

client software executable at the information apparatus for receiving, at the information apparatus, the device dependent output data for rendering at the ~~selected~~ output device, the device dependent output data corresponding to the digital content and being related, at least in part, to the identification information related to the output device included in the output device object delivered from the information apparatus to the one or more servers over the network, and the device dependent output data further including an encryption scheme that includes security keys for ensuring security of the device dependent output data that is device specific to the output device for rendering; and

client software executable at the information apparatus for decoding the device dependent output data received from the server;

client software executable at the information apparatus for decompressing the device dependent output data received from the server;

client software executable at the information apparatus for encoding the device dependent output data into a format or language acceptable for delivering to the output device;

client software executable at the information apparatus for delivering the encoded device dependent output data from the ~~mobile~~ information apparatus to the ~~selected~~ output device for rendering or output of the ~~output~~ digital content.

181. (Currently amended) The computer memory of claim 180 further comprising software executable at the information apparatus for establishing a communication channel between the information apparatus and the ~~one or more~~ output devices~~.~~

182. (Currently amended) The computer memory of claim 180 further comprising software executable at the information apparatus for establishing a communication channel between the information apparatus and the server, the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

183. (Currently amended) The computer memory of claim 180 in which the information apparatus is a wireless information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance (PDA), a smart phone, a screen phone, an Internet pad, an Internet ~~internet~~ appliance, and a digital camera.

184. (Currently amended) The computer memory of claim 180 in which the output device is ~~being~~ one of a display device and an audio output device and the device dependent output data includes audio data.

185. (Currently amended) The computer memory of claim 180 in which the output device includes a printer, and the device dependent output data include one or more of [[an]] image data, [[a]] graphics data, and text data.

186. (Currently amended) The computer memory of claim 180 in which the output device includes a television ~~further comprising software for obtaining payment information at the information apparatus as payment for receiving the output data~~.

187. (Currently amended) The computer memory of claim 180 further comprising software executable at the information apparatus for sending, from the information apparatus to the server, payment or subscription information for accessing a digital content service provided by the server ~~181 in which the communication channel is a wireless communication channel and the computer memory further comprises software for discovering the one or more output devices over the wireless communication channel~~.

189. (Currently amended) The system of claim 177 in which the communication channel between the information apparatus and the one or more output devices includes a wireless communication channel.

190. (Currently amended) The system of claim 177 in which the one or more output devices includes a printing device and the device dependent output data includes one or more of [[an]] image data, [[a]] graphics data, and [[a]] text data.

191. (Currently amended) The system of claim 177 in which the one or more document objects includes a reference or pointer related to the ~~data~~ digital content.

192. (Currently amended) The system of claim 177 in which the one or more output device objects ~~further~~ includes ~~an~~ identification related to the one or more output devices, the identification including one or more of an output device brand, a model, a registration, and an IP address.

193 (Currently amended) The system of claim 172 in which the document object includes a reference or pointer related to the digital ~~data~~ content.

194. (Previously presented) The system of claim 172 further comprising means for retrieving data content employing the document object.

195. (Currently amended) The method of claim 167 in which the delivering the device dependent output data to the output device includes delivering the device dependent output data to an output controller connected to the output device ~~further comprising obtaining payment information at the information apparatus as payment for receiving the output data corresponding to the output content~~.

196. (Currently amended) The method of claim 167 in which the output device is an audio device or a display device ~~further comprising obtaining a document object at the information apparatus, including a user selecting at least a pointer or reference to a data content~~.

197. (Currently amended) The method of claim 167 in which the communication channel between the information apparatus and the one or more servers includes one or more of an Internet, a local area network, a cellular network, and a wide area network.

198. (Currently amended) The method of claim 167 in which the communication channel between the information apparatus and the one or more servers ~~selected output device~~ includes a wireless communication channel and the method further comprises discovering the ~~one or more~~ output device over the wireless communication channel.

199. (Currently amended) The method of claim 167 in which the information apparatus is a wireless information apparatus, and the wireless information apparatus includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance(PDA), a smart phone, a screen phone, an Internet pad, an Internet ~~internet~~ appliance, and a digital camera.

200. (Currently amended) The method of claim 157 in which the communication channel includes a wireless communication channel, and the method further comprises discovering the one or more selected output devices over the wireless communication channel.

REMARKS

Claims 131-200 are currently pending in the application. Claims 131, 148, 157, 167, 172, 177, and 180 are in independent form. The Listing of Claims herein replaces all prior amendments. No new claims are added.

In the Non-Final Office Action mailed December 17, 2010, the Examiner rejected Claims 131-147, 172-179 and 189-194 under 35 U.S.C §112 second paragraph for being indefinite.

Claims 131, 133-137, and 142-159, 161-185, 187-194 and 196-200 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wolff (U.S. Pat. No. 6,738,841) in view of Larsson (U.S. Pat. No. 7,028,102).

Claims 132, 138-141,160, 186, and 195 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wolff (U.S. Pat. No. 6,738,841) in view of Larsson (U.S. Pat. No. 7,028,102) and in further view of Eldridge (US 6,515,988).

The above amendments and these remarks are responsive to the Office Action of December, 17, 2010, reconsideration is requested.

In the above amendments, the title is changed, and a replacement Abstract is also provided. A "support for claim changes" is also included. At least each independent claim in the application has been amended. No new claims are added.

Rejections under 35 U.S.C § 112

Claims 131-147, 172-179 and 189-194 are rejected under 35 U.S.C § 112, second paragraph for being indefinite. Specifically, Examiner noted that the mean plus function claims lack definite structure.

In this response, Applicant has amended the means for performing the claimed functions with corresponding structures, such as "by the one or more servers," "by the information apparatus," "by the server application," "by the client application;" or with analogous elements, such as "at the one or more servers" and "at the information apparatus." Accordingly, Applicant submits that the amended claims herein have overcome the U.S.C § 112, second paragraph rejection and thus respectfully requests withdrawal of the U.S.C § 112, second paragraph rejection.

Rejections under 35 U.S.C. § 103(a)

Claims 131, 133-137, and 142-159, 161-185, 187-194 and 196-200 are rejected as being unpatentable over Wolff (U.S. Pat. No. 6,738,841, thereafter Wolff) in view of Larsson (U.S. Pat. No. 7,028,102, thereafter Larsson).

Claims 132, 138-141,160, 186, and 195 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wolff in view of Larsson and in further view of Eldridge (US 6,515,988 thereafter Eldridge).

1. **Wolff**

Wolff teaches a Printer 250, connected to a network that includes a Printer Server 255 internally inside the printer 250 (see Fig. 1). The Printer server 255 also includes Printer Driver 255 for generating print data. To print a document, a client 210 sends a request to the printer driver inside the printer 250. A server 220 that has the document provides the document to the printer driver 255 inside the printer 250 for

generating print data and for printing at the printer 250. For convenience, a passage from Wolff cited by the Examiner is reproduced below.

> *If a user requests, via client 210 or otherwise, that an HTML document be printed on printer 250, the user sends a request for the document to printer driver 255 within printer 250. Printer driver 255 obtains the document from a server 220 or 230 and renders it as it might appear on printer 250 (or a low-resolution version of the rendering) (Wolff, Column 6, lines 1-6).*

In the Office action, the Examiner cites Wolff as having taught each of the steps or elements in Claim 131 that includes the following:

"receiving by the one or more servers a document object from the information apparatus over a network..."

"receiving by the one or more servers an output device object from the information apparatus over a network, the output device object having one or more attributes corresponding to the output device..."

"generating device dependent output data at the server...."

"delivering the device dependent output data by the information apparatus to the output device for rendering the output content..."

In making the rejection, the Examiner cites the Printer Server 255 inside the printer 250 as being the "one or more servers" recited in Claim 131. Applicant respectfully disagrees for at least the following reasons.

1.1 The one or more servers is distinct and separate from ... the output device

Applicant notes that Claim 131 recites "the one or more servers being distinct and separate from ... the output device". In contrast, Wolff explicitly teaches the opposite to one of ordinary skill in the art that the Printer Server 255 must be included inside the printer 250 (see Fig. 1). Accordingly, because of the opposite teaching by Wolff, Applicant submits that Wolff is not an applicable reference for Claim 131 and analogously to all other claims.

Moreover, following Wolff, one of ordinary skill in the art will be led away from "the one or more servers being distinct and separate from ... the output device" because Wolff explicitly teaches to one of ordinary skill in the art to include the printer server 255 inside the printer 250. Accordingly, Wolff cannot be combined with any other reference, including Larsson and Eldridge, to teach any of the steps or elements in Claim 131.

1.2 Transmitting, by the one or more servers, the generated device dependent output data to the information apparatus

Claim 131 has further been amended to recite "means for transmitting, by the one or more servers, the generated device dependent output data to the information apparatus for rendering of the output content at the output device".

Applicant notes that in Wolff, it would be obvious to one of ordinary skill in the art that the Printer server 255 inside Printer 250 does not send print data to client 210 for printing at the output device because Printer 250 internally has the print data generated by Printer server 255; hence, it just prints the document whether in low resolution or not

(Wolff, Column 6, lines 1-6). One of ordinary skill in the art will not be motivated to include "means for transmitting, by the one or more servers, the generated device dependent output data to the information apparatus for rendering of the output content at the output device" because of the explicit teachings of Wolff.

Applicant further notes that the server 220 in Wolff could not reasonably be interpreted by one of ordinary skill in the art to be the "one or more servers" recited in Claim 131 because server 220 does not teach nor suggest any one of the following elements recited in claim 131: "means for receiving a document object," "means for receiving an output device object," "means for generating device dependent output data," "means for transmitting...the generated device dependent output data to the information apparatus," and "means for delivering the device dependent output data by the information apparatus to the output device."

Accordingly, Wolff is not an applicable reference to claim 131, either alone or in combination with the other cited references.

2. Additional Distinctions Added to Claim 131

In addition to the above, Claim 131 has been further amended to add clarity and to further distinguish from the cited references. Specifically, claim 131 has been amended to recite as follows:

> *means for generating the device dependent output data at the server with a server application, including:*
>
> *means for applying a compression operation on the output content, and*

Lexmark, Exhibit 1003
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means for applying an encryption scheme for ensuring security of the device dependent output data that is device specific for rendering, and

the generated device dependent output data corresponding to the output content being related, at least in part, to the identification information related to the output device included in the output device object and received from the information apparatus over the network; and

means for transmitting, by the one or more servers, the generated device dependent output data to the information apparatus for rendering of the output content at the output device; and...

Applicant submits that neither Wolff, Larsson, nor Eldridge teaches or suggests the combination of elements in the above that are recited in Claim 131. To cite just one example, neither Wolff, Larsson, nor Eldridge teaches or suggests means for applying a compression operation on the output content".

Applicant notes that Eldridge teaches encryption of document that is associated with a recipient or user (Column 2, line 64, Column 3, line 1-4); however, the encryption is not associated with "generating...device dependent output data that is device specific" for rendering.

Moreover, Eldridge does not teach "means for receiving, at the one or more servers, an output device object from the information apparatus over a network, the output device object having one or more attributes corresponding to the output device, and including identification information related to the output device." Accordingly, Eldridge could not further teach "means for applying an encryption scheme for ensuring security of the device dependent output data that is device specific for rendering" and

"the generated device dependent output data corresponding to the output content being related, at least in part, to the indication of identification information related to the output device included in the output device object and received from the information apparatus over the network".

Following the teachings of Eldridge, one of ordinary skill in the art would be led to encryption associated with the user to protect the user and not encryption associated with the output device.

3. Other Claims

The other independent claims, namely claims 148, 157, 167, 172, 177, and 180, includes similar or analogous limitations to claim 131, therefore, applicant has not repeated the above arguments to facilitate reading of this Response. However, it shall become apparent from reading those claims that they distinguish from cited references, either alone or in combination. The dependent claims depend from independent claims 131, 148, 157, 167, 172, 177, and 180, and are thus allowable for the same reasons as those independent claims.

Conclusion

Applicant appreciates that the Examiner identified potential deficiencies in the application and the Applicant has corrected each of them accordingly. Applicant has further amended at least each independent claim to add clarity and to further emphasize the distinctions over the cited references.

Applicant hereby pays the fee for three months of extension for responding that is now due. Please charge any additional fees required, or credit any overpayments, to our deposit account number 11-1540.

Applicant believes that the above amendments overcome the rejections in the application, and that the application is now in condition for allowance. Accordingly, Applicant respectfully requests that the Examiner issue a Notice of Allowability covering the pending claims. If the Examiner has any questions, or if a telephone interview would in any way advance prosecution of the application, please do not hesitate to contact the undersigned attorney of record as indicated below, at (503) 224-6655, or William Chang, Applicant and representative of the assignee of the entire interest in the application, at 503-381-7056.

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this correspondence is being filed electronically via the EFS-Web system at www.uspto.gov on June 17, 2011.

/ Heidi Dutro /
Heidi Dutro

Respectfully submitted,

KOLISCH HARTWELL, P.C.

/ Peter D. Sabido /
Peter D. Sabido
Reg. No. 50,353
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Attorney for Assignee
520 S.W. Yamhill Street, Suite 200
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Facsimile: (503) 295-6679

PTO/SB/22 (07-09)
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) **FY 2009** ***(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)***	Docket Number (Optional) FXT312
Application Number 09/992,413	Filed November 18, 2001
For DIGITAL CONTENT SECURITY FOR RENDERING	
Art Unit 2453	Examiner E. Benoit

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$130	$65	$
☐	Two months (37 CFR 1.17(a)(2))	$490	$245	$
☒	Three months (37 CFR 1.17(a)(3))	$1110	$555	$ 555
☐	Four months (37 CFR 1.17(a)(4))	$1730	$865	$
☐	Five months (37 CFR 1.17(a)(5))	$2350	$1175	$

☒ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 11-1540.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☒ attorney or agent of record. Registration Number 50,353

☐ attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____

/Peter D. Sabido/	June 17, 2011
Signature	Date
Peter D. Sabido	(503) 224-6655
Typed or printed name	Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☐ Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Electronic Patent Application Fee Transmittal

Application Number:	09992413
Filing Date:	18-Nov-2001
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Filer:	Peter D. Sabido./Heidi Dutro
Attorney Docket Number:	FXT312

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with $0 paid	2253	1	555	555

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	555

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Electronic Acknowledgement Receipt

EFS ID:	10334802
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Correspondence Address:	Edward B. Anderson Kolisch Hartwell, P.C. 200 Pacific Building 520 S.W. Yamhill Street Portland OR 97204 US 503-224-6655 docketing@khpatent.com
Filer:	Peter D. Sabido./Heidi Dutro
Filer Authorized By:	Peter D. Sabido.
Attorney Docket Number:	FXT312
Receipt Date:	17-JUN-2011
Filing Date:	18-NOV-2001
Time Stamp:	18:10:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$555

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Lexmark v. Flexiworld

RAM confirmation Number	5744
Deposit Account	111540
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	20110617_ResponsetoOfficeAction_FXT312.pdf	214686	no	37
Warnings:					
Information:					
2	Extension of Time	20110617_ExtensionofTime_FXT312.pdf	102126	no	1
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30037	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	346849		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
09/992,413	11/18/2001	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☒ RATE ($)	SMALL ENTITY ☒ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 06/17/2011

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 69	Minus	** 70	= 0	X $26 =	0	OR	X $ =	
Independent (37 CFR 1.16(h))	* 7	Minus	*** 7	= 0	X $110 =	0	OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/TONYA MCBRIDE/

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/992,413	11/18/2001	William Ho Chang	FLEX.003

CONFIRMATION NO. 5528

23442
RYLANDER & ASSOCIATES PC
P.O. Box 250
VANCOUVER, WA 98660

POWER OF ATTORNEY NOTICE

OC000000045745027

Date Mailed: 02/01/2011

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/21/2011.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/gbien-aime/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/992,413	11/18/2001	William Ho Chang	FXT312

CONFIRMATION NO. 5528

Edward B. Anderson
Kolisch Hartwell, P.C.
200 Pacific Building
520 S.W. Yamhill Street
Portland, OR 97204

POA ACCEPTANCE LETTER

OC000000045745066

Date Mailed: 02/01/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/21/2011.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/gbien-aime/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

REVOCATION AND REAPPOINTMENT OF POWER OF ATTORNEY, STATEMENT UNDER 37 C.F.R. § 3.73(b), and ASSERTION OF RIGHT UNDER 37 C.F.R. § 3.71 AND MPEP § 106

Applicant(s): William Ho Chang and Christina Ying Liu
Serial No.: 09/992,413
Filed: November 18, 2001
Title: METHOD FOR MOBILE AND PERVASIVE OUTPUT

Flexiworld Technologies, Inc., a Washington corporation, hereby revokes any and all previous powers of attorney or authorizations of agent given in the above-identified patent application and appoints:

Practitioners at Kolisch Hartwell, P.C., associated with Customer No.: **23581**

as its attorneys and agents to prosecute the above-identified patent application and to transact all business in the United States Patent and Trademark Office connected therewith.

These practitioners currently include:

John M. McCormack, Reg. No. 26,948; Edward B. Anderson, Reg. No. 30,154; David P. Cooper, Reg. No. 33,372; Pierre C. Van Rysselberghe, Reg. No. 33,557; Charles H. DeVoe, Reg. No. 37,305; Anton E. Skaugset, Reg. No. 38,617; Owen W. Dukelow, Reg. No. 41,002; James R. Abney, Reg. No. 42,253; Stanley M. Hollenberg, Reg. No. 47,658; Peter D. Sabido, Reg. No. 50,353; Carla Todenhagen, Reg. No. 60,943; Thomas J. Romano, Reg. No. 61,230; and Shawn J. Kolitch, Reg. No. 62,233.

Flexiworld Technologies, Inc. states, under 37 C.F.R. § 3.73(b), that it is the assignee of the entire right, title, and interest in the above-identified patent application by virtue of an assignment from each of the inventor(s) named in the above-identified patent application. The assignment was recorded in the United States Patent and Trademark Office at Reel 012325, Frame 0362.

Flexiworld Technologies, Inc. hereby asserts its right, under 37 C.F.R. § 3.71 and MPEP § 106, to conduct the prosecution of the above-identified patent application to the exclusion of any previous assignee(s) and the inventors other than William Chang.

DIRECT COMMUNICATIONS TO:
Edward B. Anderson
Kolisch Hartwell, P.C.
200 Pacific Building
520 S.W. Yamhill Street
Portland, Oregon 97204

Telephone: (503) 224-6655
Facsimile: (503) 295-6679
E-Mail: docketing@khpatent.com

The undersigned (whose title is supplied below) is authorized to act on behalf of the above-identified assignee.

Flexiworld Technologies, Inc.

Date: 1/19/11

Signature: William Chang
William Ho Chang
President and Chief Technical Officer

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Electronic Acknowledgement Receipt

EFS ID:	9283482
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Customer Number:	23442
Filer:	Edward Anderson/Veronica Gotelli
Filer Authorized By:	Edward Anderson
Attorney Docket Number:	FLEX.003
Receipt Date:	21-JAN-2011
Filing Date:	18-NOV-2001
Time Stamp:	17:07:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	20110114_Revocation_and_Reappointment_of_POA_FXT312.pdf	402009	no	1

Warnings:	
Information:	

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Lexmark v. Flexiworld

Total Files Size (in bytes):	402009

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	09992413
Filing Date	2001-11-18
First Named Inventor	William Ho CHANG
Art Unit	2453
Examiner Name	Esther BENOIT
Attorney Docket Number	FXT.222

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5270773		1993-12-14	SKLUT et al.	
	2	5353388		1994-10-04	MOTOYAMA	
	3	5467434		1995-11-14	HOWER, Jr. et al.	
	4	5475507		1995-12-12	SUZUKI et al.	
	5	5537517		1996-07-16	WAKABAYASHI et al.	
	6	5566278		1996-10-15	PATEL et al.	
	7	5613124		1997-03-18	ATKINSON et al.	
	8	5625757		1997-04-29	KAGEYAMA et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	09992413
	Filing Date	2001-11-18
	First Named Inventor	William Ho CHANG
	Art Unit	2453
	Examiner Name	Esther BENOIT
	Attorney Docket Number	FXT.222

	9	5748859		1998-05-05	TAKAYANGI et al.	
	10	5862321		1999-01-19	LAMMING et al.	
	11	5867633		1999-02-02	TAYLOR, III et al.	
	12	5930466		1999-07-27	RADEMACHER	
	13	5931919		1999-08-03	THOMAS et al.	
	14	5940843		1999-08-17	ZUCKNOVICH et al.	
	15	5968176		1999-10-19	NESSETT et al.	
	16	5974401		1999-10-26	ENOMOTO et al.	
	17	5978560		1999-11-02	TAN et al.	
	18	5983200		1999-11-09	SLOTZNICK	
	19	5987454		1999-11-16	HOBBS	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	09992413
	Filing Date	2001-11-18
	First Named Inventor	William Ho CHANG
	Art Unit	2453
	Examiner Name	Esther BENOIT
	Attorney Docket Number	FXT.222

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	First Named Inventor	William Ho CHANG
	Art Unit	2453
	Examiner Name	Esther BENOIT
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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

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☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Edward B. Anderson/	Date (YYYY-MM-DD)	2011-01-07
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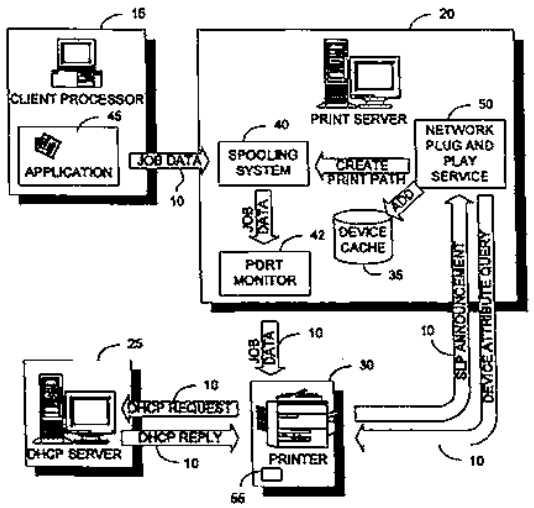
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(54) Automatic configuration of a network printer

(57) A method of configuring a peripheral device (30) on a network (10) without user intervention includes a server node (20) receiving identification data (130) for identifying the peripheral device on the network and, if the peripheral device is a new device (135) on the network or a driver for the peripheral device is not registered (145) on the server node, the server node self-installing the driver (160) for the peripheral device. As such, newly connected peripheral devices are automatically seen on a network and a driver for the peripheral device is automatically configured on a print server without any user intervention. Additionally, a communication port and queue for the device are also automatically created (175,185). Moreover, device configurations are dynamically and automatically updated (190,192,195) on the print server for consistent, accurate network information.

FIG. 1



EP 0 952 513 A1

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Description

FIELD OF THE INVENTION

[0001] This invention relates in general to network communications and, more particularly, to enabling network peripheral devices such as printers to be automatically configured without user intervention upon connection to a network.

BACKGROUND OF THE INVENTION

[0002] Enabling a user to employ a newly added printer over a network is often a complex task. At an overview level, initial set-up in current network environments generally requires the creation of print queues, printer objects and print servers. Then, such queues, objects and print servers must be properly linked and configured. Then, to send a print job to the network printer, the client processor usually directs the print job to a network queue on the print server, and then the print server processes the job from the queue and sends it to the printer.

[0003] More specifically, adding a printer to a network environment is, conventionally, no small task. It requires a series of installation and configuration steps that are generally performed either by a user or a network administrator or both in cooperation with each other. Namely, the printer requires specific configuration steps to be performed and parameters to be applied for successful operation on the network, as also does any computer (client processor) on the network that will be sending data to the printer. For example, typically, a vendor's configuration application program must be executed on a client computer to identify the new printer (device) to be used on the network. Once the new printer is identified from a list of devices presented by the vendor's configuration application, then the configuration application provides proper configuration parameters for that new device. The configuration parameters are very specific to the device being added and to the client computer and network over which communication occurs.

[0004] Additionally, a print server must be configured to enable use of the newly added printer on the network. Conventionally, the print server manages and monitors use of the printer relative to all client computers on the network, and all client computers access the printer via the print server. Accordingly, the print server must also be configured, in addition to the client computer, to enable use of the printer over the network. This includes, typically, a vendor's configuration application also being executed on the print server for that printer.

[0005] In addition to a vendor's configuration application being executed to install and configure the printer on the print server, the network operating system must also execute its configuration routines on the print server in order to configure and enable the printer for the network via the print server. This often includes identifying appropriate printer files, registering the printer with the spooling system, establishing printer queues and printer ports, and defining client processor network share-access rights to the printer. Unfortunately, the vendor configuration application and the network operating system configuration routines are generally not integrated, and must also be accessed directly from the print server itself. Thus, a network administrator conventionally manually initiates this software configuration process for the newly added printer from the print server itself.

[0006] While such a conventional network printer configuration system and method works well, when properly configured, it is more complex and cumbersome than what most users care to engage in. In addition, if the installation or configuration doesn't work quite right, troubleshooting can be both difficult and time-consuming.

[0007] Accordingly, an object of the present invention is to enable a peripheral device, such as a printer, to be automatically configured without user intervention upon connection to a network.

SUMMARY OF THE INVENTION

[0008] According to principles of the present invention in a preferred embodiment, a method of configuring a peripheral device on a network without user intervention includes the server node receiving identification data for identifying the peripheral device on the network and, if the peripheral device is a new device on the network or a driver for the peripheral device is not registered on the server node, the server node self-installing the driver for the peripheral device.

[0009] Thus, newly connected peripheral devices are automatically seen on a network and a driver for the peripheral device is automatically configured on a server node without any user intervention. Additionally, a communication port and queue for the device are also automatically created. Moreover, device configurations are dynamically and automatically updated on the server for consistent, accurate network information.

[0010] Other objects, advantages, and capabilities of the present invention will become more apparent as the description proceeds.

DESCRIPTION OF THE DRAWINGS

[0011]

FIG. 1 is a block diagram of a communication network and attached devices and includes the present invention for automatically configuring a network printer.

FIGs. 2-3 are flow charts depicting a preferred method of the present invention.

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DETAILED DESCRIPTION OF THE INVENTION

[0012] FIG. 1 is a high level block diagram of a communication network 10 and attached devices including a client processor 15, print server 20, DHCP server 25, and network printer 30. The present invention is described in the context of communication network 10 being a conventional TCP/IP network. In the diagram, network 10 is illustrated as directional arrows to represent the TCP/IP communication links and data flow paths between each of the devices over the network in association with the present invention. The present invention is further described herein in the context of client processor 15, print server 20 and DHCP server 25 employing the Windows® or Windows NT® operating system produced by Microsoft Corporation. However, the present invention is also applicable to other networking environments and operating systems. Additionally, although a laser printer 30 is disclosed herein for purposes of discussion, it is understood that it is merely exemplary and that the present invention is equally applicable to other network peripheral devices, including ink jet printers, digital copiers, facsimile machines, etc. Moreover, each device 15, 20 and 25 includes a conventional network input/output (I/O) card for enabling communications with network 10. Printer 30 also includes a "conventional" network I/O card for general network communications purposes, but it is modified per the present invention as will be discussed hereafter.

[0013] Print server 20 includes device cache memory 35, spooling system 40, and port monitor 42 as conventional in the art. Client processor 15 includes application software 45 as conventional in the art for sending a print job to printer 30. DHCP server 25 is a Dynamic Host Configuration Protocol (DHCP) server that holds TCP/IP configuration parameters available for printer 30 and/or other devices to be configured on network 10. DHCP server 25 is shown and discussed as a device that is physically separate from print server 20 for clarity of discussion and illustration. However, DHCP server 25 and print server 20 may be a single device having the separate functionalities combined therein.

[0014] Overall, the present invention enables printer 30 to be automatically configured on network 10 for use by client processor 15 after it (the printer) is physically connected to the network by a user. Specifically, "network plug and play" software 50 depicts a key component of the present invention and resides in a memory on print server 20. A coexisting "network plug and play" module 55 resides (as firmware) on the network I/O card in printer 30. Thus, the network I/O card on printer 30 is modified from a conventional network I/O card in that it includes the "network plug and play" module 55 of the present invention. These software routines (50,55) execute and interact to enable the automatic configuration of printer 20 without any user intervention after the printer is connected to the network.

[0015] Referring now to FIGs. 2-3 (in conjunction with FIG. 1), a flow chart describes the functionality and a preferred method of the present invention. First, 105 (FIG. 2), printer 30 is connected to the network 10 and turned on. Upon power up, printer 30 (module 55) issues a DHCP request packet 110 over network 10. DHCP server 25 responds with a DHCP reply packet 115 that contains the available TCP/IP configuration parameters for printer 30. Upon receiving those TCP/IP configuration parameters 120, printer 30 sets its memory configuration to reflect the parameters received. The printer now has its TCP/IP address.

[0016] Next, 125, module 55 of printer 30 sends a Service Location Protocol (SLP) reply packet using IP multicast over network 10. This SLP reply packet serves as an announcement that the printer is up and running on the network. The SLP reply packet contains information specific to printer 30, including the printer's hardware (network I/O card) address, TCP/IP address, printer model name, network I/O card name, and TCP/IP hostname.

[0017] When "network plug and play" service 50 receives the SLP packet data 130, it initiates a search of device cache 35 on print server 20 to determine whether printer 30 (as identified in the SLP reply packet data) is a new device on the network. If printer 30 is a new device 135 on the network (i.e., there is not an entry for printer 30 in cache 35), then it is added as a new entry 140 to cache 35. Additionally, and importantly, after adding printer 30 as a new entry to cache 35, "network plug and play" service 50 then installs the appropriate print driver for printer 35 onto printer server 20 based on the printer model provided in the SLP reply packet.

[0018] Automatically installing the appropriate print driver includes communicating 145 (FIG. 3) with spooling system 40 to see if the appropriate print driver is already registered therein. If it is not, the installation source (location) of the network operating system is determined 150 (i.e., from a saved location in the Windows and Windows NT operating systems) and then that installation source (ie., local or remote disk drive) is accessed in an attempt to automatically obtain the print driver. If the original disk that was used to install the network operating system is available at the source location 155 (i.e., in the drive), then the appropriate print driver for printer 30 is accessed 160 and registered with spooling system 40. Thus, the print driver installation is completely automated by "network plug and play" software 50, 55 of the present invention.

[0019] Only if the original disk does not exist at the determined source location 150, 155 will a user be prompted for input 165 to identify the location of the installation disk. However, this prompting only occurs once because the "network plug and play" module subsequently stores 170 the user input source location. As such, upon a next attempt to install another printer, the newly identified installation location is automatically accessed for obtaining the appropriate print driver.

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Then, only if the installation disk is not in that location will another prompt occur for user input to identify a new installation location.

[0020] Subsequent to accessing the print driver 150, 155, 160 and registering it with spooling system 40, "network plug and play" software 50 then creates a communication port 175 on print server 20 using the hostname from the SLP reply packet or a generated port name based on the hardware address of the device. Additionally, a print queue is created 180 on print server 20 using a unique name based on the model name of printer 30 (supplied in the SLP reply packet). The print queue is then designated with network share access rights 180 so client processor 15 can use printer 30 over network 10.

[0021] Finally, after basic communication and configuration parameters have been established, "network plug and play" software 50 then queries printer 30 for additional attribute information 185, such as how much memory the printer has, text describing the printer, number of trays, print resolution, etc. This information is then sent to spooling system 40 to allow client processor 15 to locate printer 30 based on such attributes. At this point, client processor 15 is now able to send print data to printer 30 via print server 20.

[0022] Referring back now for a moment to the determination 130, 135 (FIG. 2) of whether an entry already exists for printer 30 in cache 35, if an entry exists (i.e., the printer is not a new device on the network), then no change is made in cache 35. However, if some configuration parameters have changed 190 for printer 30 (as detected in the SLP reply packet information), but the printer model has not changed 192, then the spooler 40 configuration parameters are adjusted accordingly 195. For example, if an I/P address for printer 30 has changed, then the port address in spooling system 40 is modified accordingly.

[0023] On the other hand, if the printer model has changed 192, then a determination is made 145 (FIG. 3) as to whether the print driver for that new (changed) model is already registered in the spooler. If the driver for the changed model is not already registered 145, then steps are taken 150, 155, 160 to access and install the appropriate driver (as previously discussed). If the driver is already registered 145, then we simply ensure that a proper communication port 175 and print queue 180 are created, and we verify attribute information 185.

[0024] In either case, whether certain printer parameters are noted to have changed, or whether the printer model itself has changed, these processes discussed for capturing the changes represent a unique, dynamic updating capability of the present invention for automatically maintaining accurate network information for printer 30 on print server 20 without any user intervention.

[0025] Advantageously, the present invention enables new peripheral devices (such as printer 30) to be automatically seen on a network with the only user input requirement being to physically connect the printer to the network. Importantly, the printer driver is automatically configured on print server 20 without any user intervention, the port and queue for the printer are likewise automatically created, and printer configurations are dynamically and automatically updated for consistent, accurate network information.

[0026] In summary, the present invention provides an automatic configuration of a network peripheral device without user intervention. It will be obvious to one of ordinary skill in the art that the present invention is easily implemented utilizing any of a variety of components and tools existing in the art. Moreover, while the present invention has been described by reference to specific embodiments, it will be apparent that other alternative embodiments and methods of implementation or modification may be employed without departing from the true spirit and scope of the invention.

Claims

1. A method of configuring a peripheral device (30) on a network (10) without user intervention, the network having a server node (20) connected thereto, the method comprising:

   (a) the server node (20) receiving identification data (130) for identifying the peripheral device (30) on the network (10); and,
   (b) upon detecting the received identification data, the server node self-installing a driver (160) for the peripheral device if the driver is not already installed (145) on the server node (20).

2. The method of claim 1 wherein the peripheral device (30) is selected from a printing device, digital copying device, or facsimile device.

3. The method of claim 1 or 2 wherein the step of self-installing the driver (160) includes accessing a driver file for the peripheral device and registering the driver file with the server node.

4. The method of claim 3 wherein accessing the driver file includes accessing a storage device (150,155) identified from a memory location in the server node (20), the storage device being identified as a source from which the server node was network enabled.

5. The method of claim 1, 2, 3 or 4 wherein the peripheral device is a printer (30) and wherein the step of self-installing the driver (160) includes registering the peripheral device with a spooling system associated with the server node.

6. The method of claim 1, 2, 3, 4 or 5 further including,

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upon detecting the received identification data, the server node (20) self-creating a communication line (175,180) to the peripheral device.

7. The method of claim 1, 2, 3, 4, 5 or 6 wherein the identification data is received (130) by the peripheral device (30) having broadcast (125) the identification data over the network (10).

8. The method of claim 1, 2, 3, 4, 5, 6 or 7 further including the server node (20) self-modifying (190,192,195) to embody changed configuration parameters of the peripheral device as identified from the received identification data.

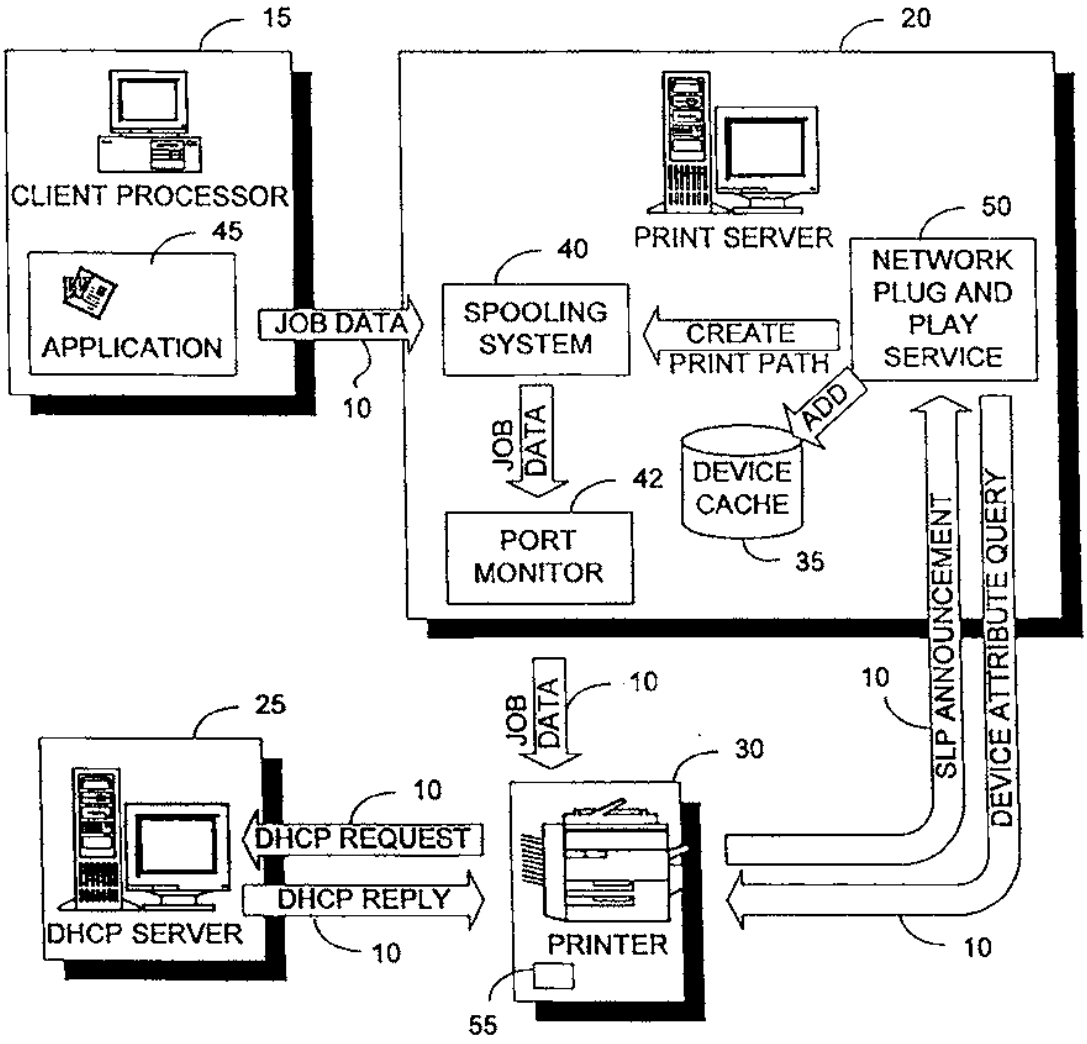
9. An apparatus (50,55) for configuring a peripheral device (30) on a network (10) without user intervention, the network having a server node (20) connected thereto, the apparatus comprising:

(a) means (50,55) for enabling the server node (20) to receive identification data (130) for identifying the peripheral device (30) on the network (10); and,
(b) means (50,55) for enabling the server node (20) to self-install a driver (160) for the peripheral device (30) upon detecting the received identification data.

10. The apparatus of claim 9 further including means for enabling the server node (20) to self-modify (190,192,195) to embody changed configuration parameters of the peripheral device (30) as identified from the received identification data.

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FIG. 1



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FIG. 2

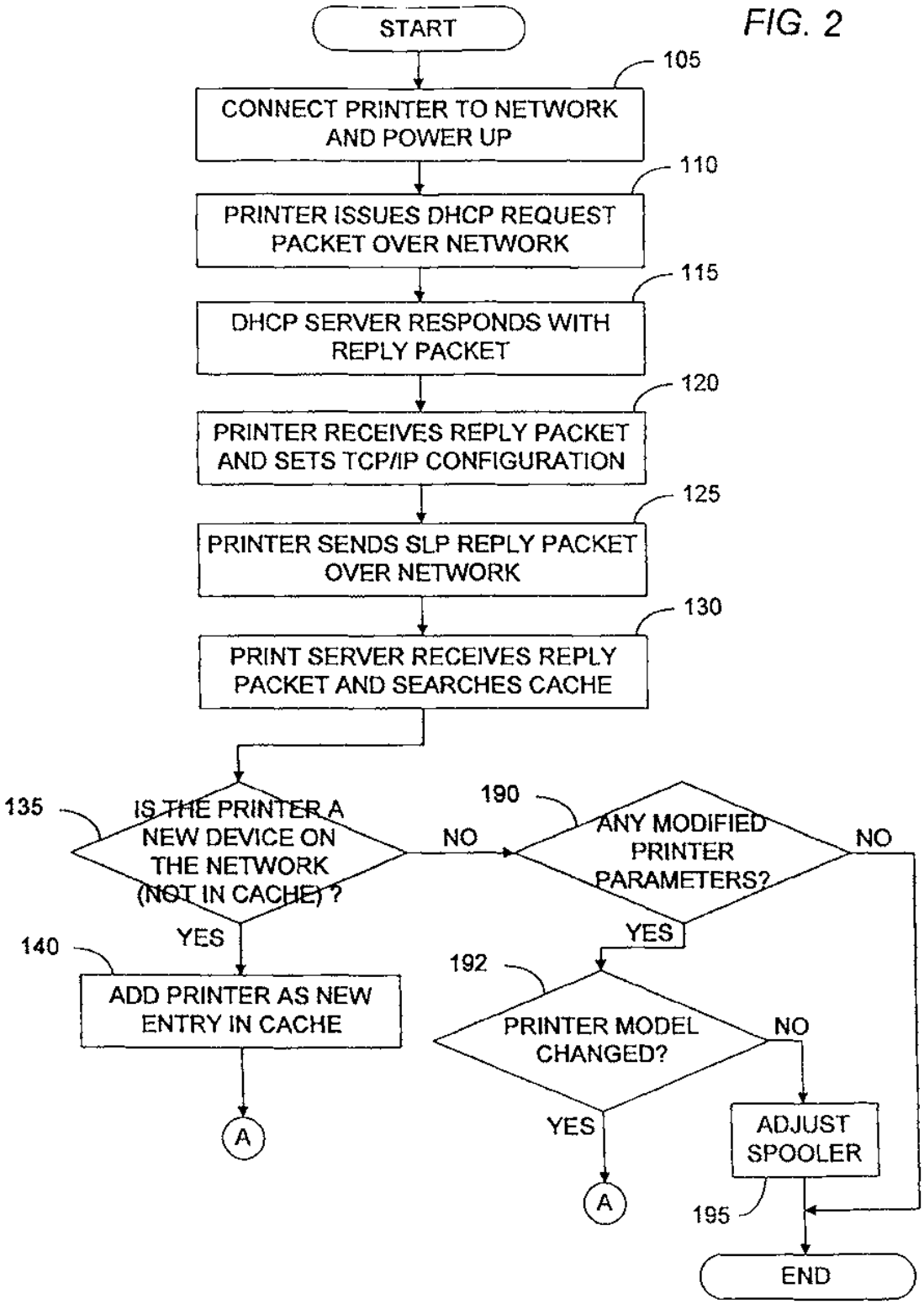
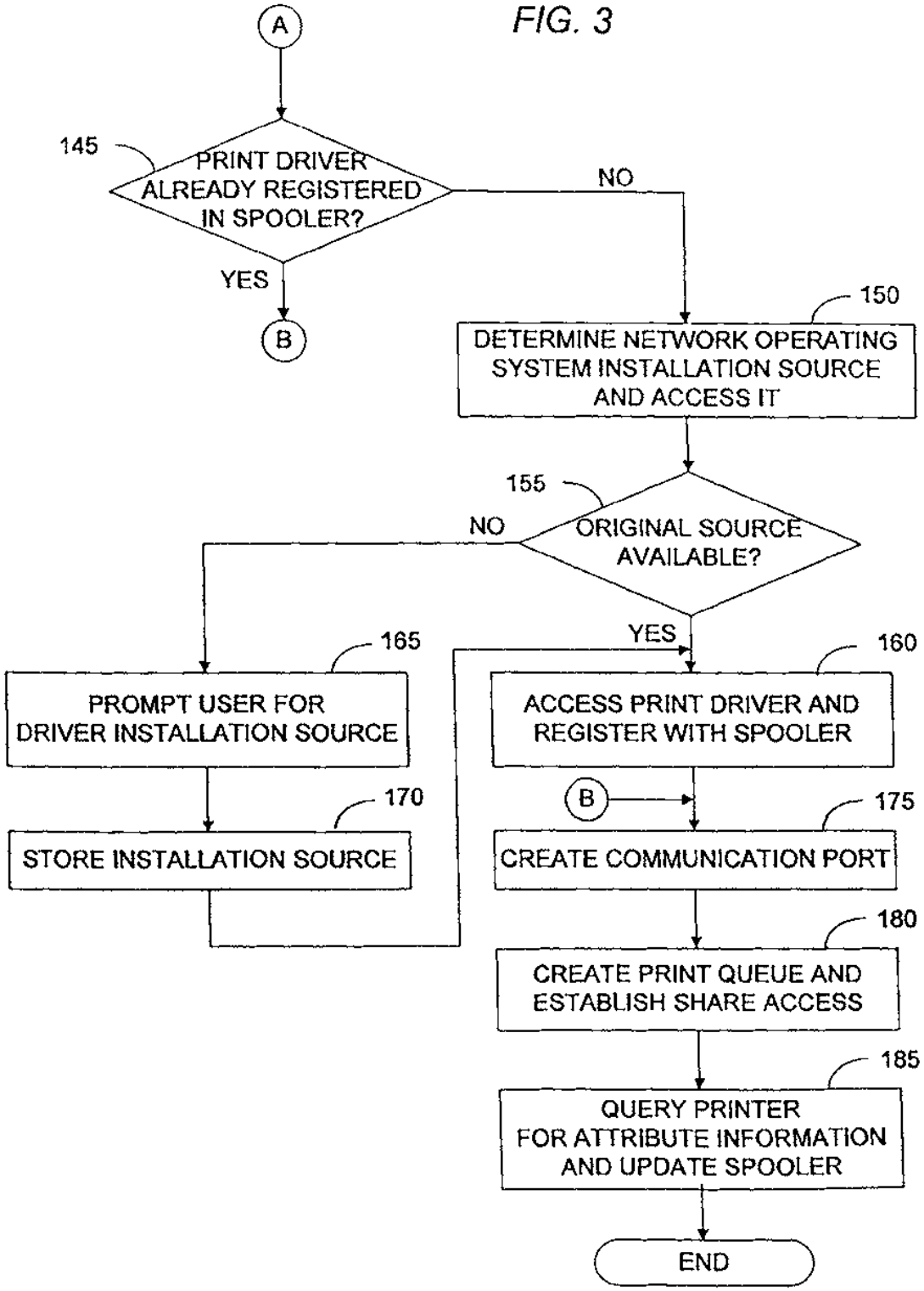

START
105
CONNECT PRINTER TO NETWORK AND POWER UP
110
PRINTER ISSUES DHCP REQUEST PACKET OVER NETWORK
115
DHCP SERVER RESPONDS WITH REPLY PACKET
120
PRINTER RECEIVES REPLY PACKET AND SETS TCP/IP CONFIGURATION
125
PRINTER SENDS SLP REPLY PACKET OVER NETWORK
130
PRINT SERVER RECEIVES REPLY PACKET AND SEARCHES CACHE
135
IS THE PRINTER A NEW DEVICE ON THE NETWORK (NOT IN CACHE) ?
NO
190
ANY MODIFIED PRINTER PARAMETERS?
NO
YES
140
ADD PRINTER AS NEW ENTRY IN CACHE
YES
192
PRINTER MODEL CHANGED?
NO
YES
ADJUST SPOOLER
195
A
A
END

FIG. 3



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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 11 8576

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 5 655 148 A (RICHMAN DARRYL STEVEN ET AL) 5 August 1997 (1997-08-05) * figures 1-7 * * column 12, line 20 - column 34, line 41 * ---	1,3-6, 8-10	G06F3/12
A	US 5 564 109 A (SALES MILTON S ET AL) 8 October 1996 (1996-10-08) * figures 1,2 * * column 2, line 38 - column 3, line 64 * -----	1,2,5-7, 9,10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			G06F G06K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	6 August 1999	Weiss, P

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 98 11 8576

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

06-08-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5655148 A	05-08-1997	US 5787246 A	28-07-1998
		US 5748980 A	05-05-1998
		US 5793979 A	11-08-1998
		US 5819107 A	06-10-1998
		US 5809329 A	15-09-1998
US 5564109 A	08-10-1996	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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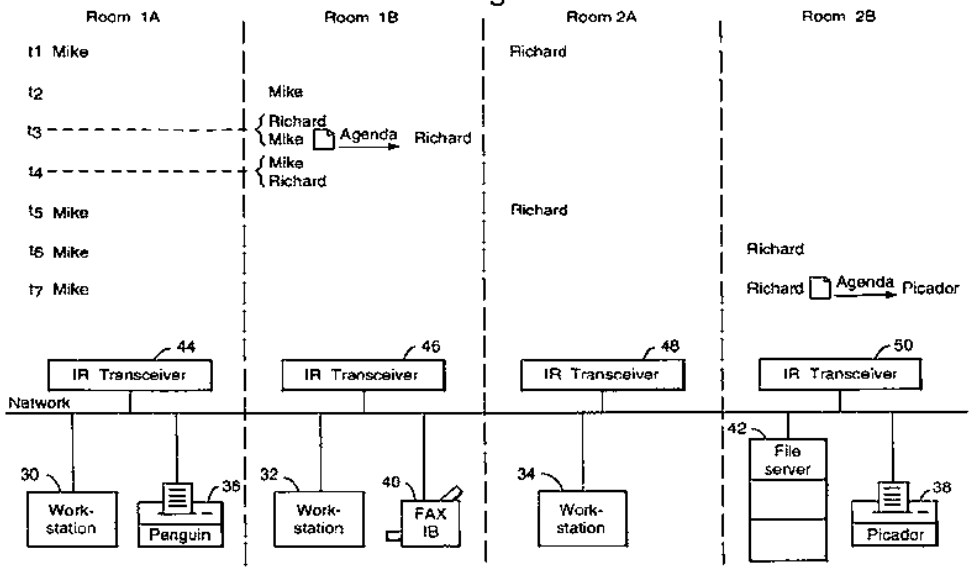
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(54) System for accessing and distributing electronic documents

(57) A system including any number workstations, file servers, printers and other fixed devices coupled in a network, and a number of portable devices carried by users and coupled to the network by infrared (IR) link. Each portable device emulates its user's personal satchel for documents: the device is programmed to receive transmit and store document references or tokens, each of which is associated with an electronic document stored in the database. Documents are distributed from one person to another by transmission of document references or tokens, and a document is sent to a printer by beaming that document's reference or token to an IR transceiver associated with that printer. The portable device is preferably a handheld or wristwatch computer with a graphical display for enabling the user to transfer documents, and the fixed devices preferably include a scanner/copier/printer having its own IR transceiver.

Fig.3.



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Printed by Rank Xerox (UK) Business Services
2.9/3.4

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Description

This invention relates generally to data access and distribution, and more particularly to a system for transferring electronic documents between portable computer devices, and between such devices and various forms of office equipment.

Electronic documents play an increasing role in our lives. Indeed nowadays many, if not most, documents are created electronically; and we take it for granted that electronic documents are easier to store, retrieve, copy, print, update and distribute than paper documents.

For desk-bound, document-intensive workers this may indeed be the situation, but for people whose jobs require them to be more mobile, existing technology does not greatly assist in such tasks. For a mobile worker, electronic documents are significantly less convenient to *locate, read and distribute*, and yet these activities appear to be the dominant document-intensive activities outside the office. When away from his office or workstation (e.g., for a meeting), a worker is rarely able to access all or most of his electronic documents, and he will often resort to carrying a bulky set of paper documents as a precaution, even though they may not in fact be needed for the meeting.

There are many situations in which a paper document is clearly the most effective medium for exchanging information. Sometimes the intended recipient has no immediate need for the information, but they see a potential need for it in the future. In this situation it seems preferable to exchange the document electronically. Nevertheless they are forced to carry the document back to their office or home (perhaps having first stopped off at a copier or printer to obtain it), and contribute to their stack of paper documents.

Although many documents are created electronically, a relatively small proportion is distributed in that way. For example, if a person (the sender) wants to give an electronic document to someone (the recipient) they are currently talking to, the process essentially requires that the sender must break off the conversation, go to a workstation, and search for the document they wish to hand over; find out the recipient's electronic address; check how best to encode the data for the recipient's machine; and then transfer the document. Compared with simply handing over a paper document this process is disruptive, time-consuming and unreliable. Furthermore, rarely can the sender or the recipient immediately confirm that the document has been successfully transferred between them. To do so requires the recipient to go to his workstation, search for the document and explicitly acknowledge to the sender that the document was received.

Another problem arises even when a person decides to hand over a paper copy to the recipient. If he doesn't have a paper copy to hand, to avoid disruption he will often promise to print the document later and hand it over after the meeting has concluded, a task he may simply forget to do. If it is decided to print out the document there and then, the person must break off from the conversation, find the electronic document, find a printer that isn't in use, send the document to the printer, and then *remember* to go and pick it up when printing is complete. However, people often forget to pick up their output; and if a confidential document has been printed on a shared (network) printer, the sender must ensure that he is on hand to collect it immediately.

A further problem exists for workers who are unable to gain access to their workstation or network: it is now commonplace for members of a committee to travel long distances to attend important meetings. For example, standards committees convene experts from all over the world; and participants try to arrive prepared with all the information they might need to present to their colleagues, respond to questions, or take decisions. Often the committee meets at one of several different locations each time: the European Parliament, for example, regularly moves between Brussels, Luxembourg and Strasbourg. It may be impossible for the attendees to anticipate the document needs, or they may not be able to afford to carry printed versions of everything. When a missing document is needed urgently, the situation can be remedied by a telephone call back to the office to someone who has access to the electronic document and can print it out or fax it to the meeting. At best this disrupts the flow of the meeting, and there is a risk that the document will not be received at all.

It is known to use infrared (IR) communication to transfer electronic documents from one portable computer to another during a meeting - e.g. the Apple® Newton. However, compared with existing electronic communications devices, the (IR) data transfer rate between such machines is very slow: to beam a simple electronic document from one to another, users may need to stand within a few feet of each other and point the IR transmitters of their machines at each other for several minutes.

A further problem is that it is not possible to store large numbers of electronic documents on a portable, hand-held or wristwatch computer. This is the case with documents in, e.g., PostScript, but may be an even greater problem with scanned (bitmapped) documents.

The present invention provides a system for accessing or distributing electronic documents, including: a database of electronic documents and corresponding document references, and a plurality of objects, at least one of said objects preferably being portable or mobile, each object including means for communicating with the or each other object and with a user interface, and means for receiving, storing or transmitting a document reference corresponding to one of said electronic documents.

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The present invention further provides a portable device for accessing or distributing electronic documents, including: means for communicating with fixed or mobile electronic devices and with a user interface, at least one of said devices including a database of electronic documents and corresponding document references, and means for receiving, storing or transmitting a document reference corresponding to one of said electronic documents.

The present invention further provides an apparatus for scanning, copying and/or printing documents, including: means for accessing a database electronic documents, each electronic document having a corresponding document reference, means for communicating with one or more of a plurality of objects, at least one of said objects preferably being portable or mobile, and with a user interface, and means for receiving, storing or transmitting a document reference corresponding to one of said electronic documents.

Each document reference corresponds to a single electronic document, and a document may have any number (e.g., originating from different users) of corresponding document references. For a very small electronic document, the document reference may include the electronic document itself. However, as an example, the document reference suitably comprises a universal resource locator (URL) as defined in the Worldwide Web Information system (see Berners-Lee T.J., Cailliau R., & Groff J.-F., *The Worldwide Web, Computer Networks and ISDN Systems* 25 (1992), pp. 454-459. North-Holland; and Mangers J.J, *World-Wide Web, Mosaic and More* (1995), MGraw-Hill, London).

Each electronic document or document reference has a corresponding user interface (UI) representation. The UI representation of the electronic document may comprise in particular an icon or text on a graphical display, a sound, any combination of these, or, boadly, any real or ephemeral object capable of being selected by means of the user interface. The UI command language may be text- or menu-based, or natural language or direct interaction (as in the embodiment described herein), or may use any other suitable method (see Preece J., *Human Computer Interaction* (1994). Addison Wesley).

Alternatively, according to the invention, the or each document reference for an electronic document may be invalidated or even absent (e.g. through deletion): the electronic document remains in the database, but remote access to it using document references/document satchel technology described herein is precluded.

The invention is particularly advantageous in that document references take up a comparatively small amount of storage space in memory, and their transmission from one (fixed or mobile) device to another may be accomplished very quickly.

The invention is advantageous, for example, for the worker who visits numerous sites where documents are to be given to him: instead of collecting a bundle of papers, he collects a string of documenst references in his portable device.

The present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a view of the portable device according to one embodiment of the invention;

Figure 2 shows diagramatically the user interface and icons employed in one embodiment of the invention (a) for a user's workstation, and (b) for the user's portable device;

Figure 3 is a schematic illustration of an embodiment of the networked system according to the invention;

Figure 4 shows successive displays on the portable device of each user corresponding to the sequence in Fig. 3;

Figure 5 is a flow chart of the process (a) carried out in a portable device in exchanging a document token, (b) carried out in a portable device in updating the display thereof, and (c) carried out in a fixed object such as a printer or multifunction machine when a nearby user prints out a document; and

Figure 6 shows schematic representations of various procedures for distributing documents which are may be performed using the present invention.

The present invention is based upon PARCTab technology; and the system hardware is described in detail in: (1) Adams N., Gold R., Schilit B.N., Tso M. & Want R., (1993), An Infrared Network for Mobile Computers, in *Proc. USENIX Symposium on Mobile & Location-independent Computing*, pp. 41-52, Cambridge, MA:USENIX; and (2) Schilit B.N., Adams N., Gold R., Tso M., Want R., (1993), The PARCTab Mobile Computing System, in *Proc. 4th Workshop on Workstation Operating Systems (WWOS-IV)*, pp.34-39, Napa, CA:IEEE.

The Tab is a form of personal digital assistant (PDA) - a small lightweight portable computer that can be attached to the belt, or carried in a handbag. In the following, the invention is described in particular in relation to the use of such Tabs; however, it will be appreciated that any suitable form of portable computer may be used, and the computer may take the form, for example and subject to design constraints, of a conventional wristwatch. An exemplary system, for transferring data such as document references to and from a wristwatch computer, is disclosed in British patent application No. 9425184.0.

As can be seen in Fig. 1, the Tab 2 is equipped with a small bitmap screen 4 which is touch sensitive, enabling user inputs by means of finger tip or pointer 6. The Tab is also provided with 19.2 Kb/s bi-directional IR communications facilities (diode transmitter/receiver) 8, and three buttons 10. It will be appreciated that the wireless communication may alternatively be implemented by means of suitable radio technology well known in the art (see, e.g., Weiser M., The Computer for the 21st Century, *Scientific American*, September 1991, pp. 66-75). As a further alternative, any of the

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communications links referred to in the present disclosure which are provide by IR links may, where appropriate, be implemented by wired links. The Tab further includes a tone generator 12 for use, for example, in giving audible signals to the user. Within a building, users can carry their Tabs 2 from room to room while moving into and out of contact, or maintaining contact, with a network of stationary servers which provide a wide variety of services. As part of the Tab user interface, various icons 14 are displayed on the screen 4 to provide to the user access to such services, as is well known in the art (see Smith et al., Designing the Star User Interface, *Byte* 7(4) (1982), pp. 242-282).

The invention is implemented by employing a user interface (for example, on each Tab, and elsewhere) whereby the Tab emulates a document satchel. The notion of a satchel is that of a portable holder of documents, enabling transport of the documents to a remote location for later use, distribution, etc. Although in the following an electronic document will be said to be stored in a satchel, a feature of the present invention is that it is an document reference, which identifies the electronic document, which is received by, stored on, and transmitted by the Tab. In the following description, the document reference takes the form of an electronic token which uniquely corresponds to a document. The documents themselves may be stored on a file server, or on the user's personal workstation, on the network. In some cases the token may contain the document, e.g. when the document is very tiny. A typical database of stored documents and respective tokens is illustrated in Table 1. The tokens are shown as 8-bit codes for the purpose of illustration only; and it will be appreciated that the tokens may have any suitable format to suit a desired application.

Document	Token
5000 Series machine specifications	01011010
5045 Maintenance Manual	01101001
Agenda	00101011
...	...
ODP sales pie charts	00010111
5053 Production schedule	01011110

Table 1: Typical documents and tokens in a database.

In any event, the token contains sufficient information for the system to locate the relevant document, as in the case of the above-mentioned URLs. A URL (uniform resource locator) is essentially a way for the World-Wide Webto specify where a particular resouce (e.g. document) is located on the Internet, while at the same time describing the tool that is required to access it and specifying the actual file's location on a particular internet host. The situation whereby files on a local machine may be embedded with subdirectories and may exists on different physical disk drives is true the Web also, except that all of this applies to a particular machine on the internet, of which there are hundreds of thousands. Since each machine's file locations differ widely, URLs are used to identify where they reside. In general URLs take the form:

http://www.ncsa.uiuc.edu/Mosaic/Demo/demo.html

Many resouce types are now available, including in particular ftp: for a FTP (File Transfer Protocol) server - the main method of moving files around on the internet. URLs allow a document to link with other services and documents on the internet.

As an alternative, the user interface may be fully or partially omitted from the PDAs, the PDAs in that case being designed, e.g., to reproduce a suitable user interface when in the vicinity of, and in communication with, a suitable device (e.g., workstation, printer, copier, fax machine, etc) having its own display. In such a case, the PDA may be programmed to emit a 'beep' from its tone generator to indicate transmission and/or receipt of a document; although here the person who has had an electronic 'document' sent to his PDA is unable immediately to determine what the document is.

Figure 2 shows diagramatically the user interface and icons employed in one embodiment of the invention (a) on the display of a user's workstation, and (b) on the display the user's portable device, so as to represent the contents of his satchel. It will be appreciated by a person skilled in the art that any user interface, icons and/or process for transferring documents from the electronic desktop over the IR link may be employed.

Electronic documents may placed into the user's satchel using his personal workstation, e.g. a Macintosh. Satchel owners have on their electronic desktop (Fig. 2(a)) a special small folder icon 16 called the Satchel folder, and this preferably has a special icon to distinguish it from other folders on the desktop. The satchel folder behaves just like any

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other folder, and the open Satchel window is shown at 18, including the user's name and a list of items in the satchel. An exception compared with other folders is that any document 20 dragged into the folder 18 by a user (e.g. using a conventional mouse to move a pointer 19) automatically initiates a data transfer operation (between the workstation and the user's Tab, e.g. by means of IR communication as discussed above) which results in the icon 22 of the document appearing in the satchel display 24 on the Tab. The information transmitted over the IR link includes the icon type, document name, and the corresponding token, the token being stored in the satchel's (Tab's) memory. It will be appreciated that such a data transfer operation may be accomplished in many other ways, e.g. by simply typing in a command on a keyboard. In one embodiment, a reference to a whole folder, filesystem or network of URLs may be transferred.

The satchel's user interface is implemented in such a way that the satchel contents are displayed on the screen (Fig. 2(b)) as a series of one line entries, each line corresponding to a document token and including a small icon and the name of the document. Down the right hand edge of the display is a scroll bar 26 enabling a user to scroll up or down by pressing (e.g. a pen) on the appropriate arrow 28 of the scroll bar, until the desired entry is found.

In a similar manner, any document appearing on the Tab satchel screen 24 automatically appears in the satchel folder 18 on the the user's desktop, provided the Tab has been within range of an IR transceiver coupled to his workstation, so as to enable the relevant satchel contents data to be downloaded to the workstation. From there, documents in the satchel folder can be opened and edited *in situ*, or they can be dragged out of the the satchel folder and onto the desktop.

Because the satchel (Tab) uses an IR wireless communications system it is easy to discover which other IR-linked devices are within its line of sight. The PARCtab network disclosed in the above-mentioned references (1) & (2) includes IR gateways, one per room, that provide the satchels with a link to the cable network services upon which they rely. However, any suitable location technique can be used to determine where the satchel is. Consequently, each satchel is context-sensitive: each one knows which room it is in at any instant, and which other satchels or IR-linked devices (e.g. printers) are there with it.

Each satchel (Tab) presents this context information to the user, and it takes the form of additional entries on the satchel screen. These entries are not input by the user, but pop up automatically as the user moves around the building carrying his satchel. So, for example, when Mike meets Richard, an entry representing Richard appears in Mike's satchel, and a corresponding entry representing Mike appears on Richard's. Similarly, when Mike is in the same room as a printer, an entry (icon 25 + name) showing the name of the printer appears in his satchel (see Fig. 2(b)). These pop-up entries provide a streamlined way for users to pass documents to eachother, or to exchange them with nearby devices.

Referring to Fig. 3, there is shown schematically a networked system for implementing the present invention, and a sequential procedure by which a document is distributed using document satchels. Connected on a conventional network (e.g. ethernet) are a number of electronic devices, such as workstations 30, 32, 34, printers, 36, 38, fax machine 40, and file server 42, these devices being referred to generally as "objects". For the purpose of illustration, that part of the network connecting four rooms is shown; and, for example, rooms 1A, 1B may be in a first building, while rooms 2A, 2B may be in a second building, remote from the first.

In each room 1A-2B at least one IR transceiver 44,46,48,50 is used to provide communication between any Tabs present in the room and the network (see the above-mentioned Schilit *et al.* references). Alternatively, any of the objects 30-42 may be provided with its own IR transceiver for communication with Tabs. Consequently, room 1A contains workstation 30, printer 36 and transceiver 44; room 2B contains file server 42, printer 38 and transceiver 50, and so on.

In Fig. 3, the document distribution process is illustrated by showing the positions of the Tabs of two people, Mike and Richard, and the operations which are performed, at intervals before and after their meeting in one of the rooms. The displays on Mike and Richard's Tabs at the instants t_1-t_7 during the process of Fig. 3 are shown in Fig. 4.

At time t_1, Mike is in room 1A (his office) and Richard is in room 2a. As shown in Fig. 4, Mikes satchel contains the (icon for the) document "Agenda" (and therefore has its token stored in its memory), and the icon for his printer (called "Penguin") 36, which appears automatically since printer 36 is located in room 1A. Next, at time t_2, Mike and Richard meet in room 1B: the icon for the Penguin printer has automatically disappeared from his satchel display; and the icon for Richard's satchel appears in Mike's satchel, and the icon for Mike's satchel appears in Richard's satchel. In addition, the icon for the fax machine 40 automatically appears in both satchels.

At time t_3, Mike decides to pass a copy of the electronic document "Agenda" to Richard. (If, say, Mike does not have the document he wants to pass on in his satchel, he may employ a memory aid and information retrieval system provided on his Tab, as disclosed in published European patent application EP-A-637,807, corresponding to U.S. application S.N. 08/279,961, in order to locate the document he wants and retrieve it's token.) To pass a copy of the electronic document "Agenda" to Richard, Mike simply selects the document icon on the touch screen of his tab using a pen or the like, and copies the icon onto Richard's satchel icon. This initiates a process wherein the digital token (see Table 1) for "Agenda" is beamed over the IR link from Mike's Tab to Richard's Tab. (The time taken for this will depend on the communication protocol used, the use of security encryption, and the size of the token, but in any event is likely to be a very small fraction of the time which would be needed to transfer the entire document via the same link, and typically the time taken will be a fraction of a second.) Thus the token for "Agenda" is stored on Richard's Tab for later distribution or use. When this operation is completed (t_4), the icon for "Agenda" also appears on the screen of Richard's Tab: it is now in his personal satchel.

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Next (t_5), Mike returns to room 1A and his satchel display reverts to that existing at t_1, which is described above. At the same time (say), Richard returns to room 2A: the icons for Mike's satchel and Fax 1B have automatically disappeared from his Tab screen, so that the only item left in his satchel is the document "Agenda" (Fig. 4). Richard now decides that he would like to print out "Agenda", but doesn't have a printer in his office. At t_6, therefore, he walks into room 2B in the same building which houses the printer 38 called "Picador". The icon for Picador automatically appears as an entry on Richard's Tab screen as a result of the IR communication and object sensing procedure discussed above.

To print out "Agenda", Richard, at time t_7, simply moves (using a pen to move the pointer on his touch screen) a copy of the icon for "Agenda" onto the Picador icon. As a result, an IR signal is beamed from Richard's Tab to the transceiver 50, or to Picador's own IR transceiver, the signal including the digital token for "Agenda". Using the token, the electronic document "Agenda" is fetched from the database in which is stored (e.g. file server 42; but it may be from any location on the network), or is accessed from Mike's workstation 30, and then printed out on Picador. In one embodiment, Picador may be a "confidential" printer, in which case the document is not printed straight away, but the print operation is deferred. Then, the next time Richard is in the vicinity of Picador, Richard's TAB and Picador sense this (via IR communication); the print operation is commenced by Picador; and Richard's TAB emits an audible 'beep' to tell him to collect the freshly printed document immediately upon printing.

In an alternative embodiment, Richard may submit the document "Agenda" for a third party service (e.g. OCR, summarising, and/or translation service) available on the network; and suitably this is achieved by dragging and dropping the icon for "Agenda" onto a corresponding icon for that service on the TAB screen.

Figure 5 shows a flow chart of the processing carried out in each Tab during an encounter with another Tab or IR-linked object. In step S1 the Tab broadcasts, or initiates the broadcast of, the tab user's identity code to the environment. (This code may be encrypted using shared key technology which is known in the art.) Next, at step S2, the software checks for a legal (valid) user input (in this example, the user copying a document icon to another satchel, or other object, using the touchscreen). If such a legal input is made, the document token is transmitted by IR to the recipient at step S3, and the processing returns to step S1. (The token transmission may include encryption using shared key technology which is known in the art, i.e. anything which has been encrypted with a user's private key can only be decrypted using the public key corresponding to that private key.)

If no such legal input is entered, the software checks at step S4 to see whether any IR signal (e.g. satchel or printer ID, or document token) has been received. If none has been received the processing returns to step S1.

If an IR signal has been received, the software then checks (step S5) to see whether it is an ID (e.g., another satchel). If so, then the received ID is displayed on the tab screen, at step S6, i.e. satchel icon + that satchel user's name. (Again this ID code may need to be decrypted using shared key technology which is known in the art.). The processing then returns to step S1.

If the signal is not an ID, then the software next checks at step S7 whether the received IR signal is a document token. If not, then there is a system error, and this is indicated on the Tab screen. If the received IR signal is a document token, then the document corresponding to the token (i.e. icon + document name) are displayed (step S8) on the tab screen. (Again this ID code may need to be decrypted using shared key technology which is known in the art.). The processing then returns to step S1.

Figure 5(b) is a schematic flow chart of the process carried out in a portable device, in one embodiment of the invention, in updating the display thereof. Figure 5(c) is a schematic flow chart of the process carried out in a fixed object such as a printer or multifunction machine, in one embodiment of the invention, when a nearby user prints out a document.

Figure 6 shows schematic representations of various procedures for distributing documents which may be performed using the present invention. In Fig. 6, item 60 is a multifunction machine equipped with IR communication facilities for wirelessly communicating with tabs, base stations in rooms, and any of the other objects mentioned above which are within range of its IR transmitter at a given time, the machine 60 also being hooked up to the network (see Fig. 3) so as to facilitate rapid transfer of electronic documents between itself and any number of other similar machines 60 or other objects on the network. The machine 60 may for example provide any combination of the functions of scanning, copying, faxing and printing, as is known in the art.

As can be seen in Fig. 6(a), document A is initially scanned by the multifunction machine 60 and its corresponding token is beamed by IR to Ann's Tab, and the relevant icon entry appears in her satchel. Some time later (e.g. when document A is not available), Ann beams the token to the machine 60 (by means of the icon-dragging process described above in relation to Figs 3 and 4, and the machine automatically prints out document A.

In Fig. 6(b), the document A has been created on a user's conventional workstation 62. The user then sends the electronic document to the multifunction machine 60, which then beams by IR the corresponding token to Ann's Tab.

Referring to Fig. 6(c), here two multifunction machines 60, 60' are coupled on a network. Initially document A is scanned in on machine 60 which beams the token to Ann's tab, as in Fig. 6(a). Some time later and, for example at a remote location, Ann decides she wants a hard copy of document A. She simply beams the token to nearby machine 60' (as described with reference to Fig. 6(a)); machine 60' thereupon retrieves the electronic document A over the network from machine 60 or an associated file server (not shown), and then prints out the document.

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The distribution and printing of a document (A) is again illustrated in Fig. 6(d). The process is the same as in Fig. 6 (c), except that the token is beamed from Ann to Bob for the latter to print out the document A on the second machine 60'. In an alternative embodiment, the token for document A may be characterised such that A nn is able to receive and transmit it, but not to obtain access to the document itself, e.g. by printing. In this way, Ann is able to 'trade' in a document which is inaccessable to her: she can thus act as a courier for confidential documents.

In Fig. 6(e), the case where the Tab owner is not in the vicinity of a multifunction machine is illustrated: here the machine is linked to a fax machine 66 over the telephone network 64. The document A has been scanned in and stored electronically in a database by machine 60. Later, Ann is at a location where she needs a hard copy of document A and has access to fax machine 66. Using the fax machine she dials up the multifunction machine 60 and, upon gaining access, she operates her Tab to transmit a tone signal down the telephone representing the token for document A and commanding the machine 60 to transmit document A to the fax machine 66. The machine promptly accesses the electronic document A and sends it down the telephone line to the fax machine 66 where it is printed out.

The same operation is illustrated in Fig. 6(f), with the exception that in this case the fax machine 66' is equipped with its own IR transceiver 68, enabling the token for document A'to be beamed by IR from Ann's Tab to the transceiver 68 and then electronically conveyed from the fax machine 66' to the multifunction machine 60.

The embodiment illustrated in Fig. 6(g) makes use of radiopaging technology. Bob is equipped with a radiopager, or a Tab which emulates a radiopager, and while away from his office contacts Ann to let her know that he requires a copy of document A. Ann scans in document A in the multifunction machine 60, and then commands the machine to transmit the token for document A over the pager network 70 to Bob's pager (Tab). Bob is then able to go to any printer, fax, etc adapted to receive such tokens, and to print out a copy of document A.

Numerous futher embodiments will be apparent to persons skilled in the art. For example, the satchel may be implemented using a (GSM) portable telephone coupled to a PCMCIA cellular data card which can be plugged into a palmtop or notebook computer. Alternatively, the satchel functionality may be incorporated into a pager or mobile phone.

Claims

1. A system for accessing or distributing electronic documents, including: a database of electronic documents and corresponding document references, and a plurality of objects, at least one of said objects preferably being portable or mobile, each object including means for communicating with the or each other object and with a user interface, and means for receiving, storing or transmitting a document reference corresponding to one of said electronic documents.

2. A portable device for accessing or distributing electronic documents, including: means for communicating with fixed or mobile electronic devices and with a user interface, at least one of said devices including a database of electronic documents and corresponding document references, and means for receiving, storing or transmitting a document reference corresponding to one of said electronic documents.

3. The device according to claim 2, wherein said user interface is integral with the device.

4. The device according to claim 2 or 3, further including means for displaying a representation of the or each document whose reference is stored in the device.

5. An apparatus for scanning, copying and/or printing documents, including: means for accessing a database of electronic documents, each electronic document having a corresponding document reference, means for communicating with one or more of a plurality of objects, at least one of said objects preferably being portable or mobile, and with a user interface, and means for receiving, storing or transmitting a document reference corresponding to one of said electronic documents.

6. The system, device or apparatus of any of the preceding claims, wherein the means for communicating includes an infrared transceiver.

7. The system, device or apparatus of any of the preceding claims, further including means for determining whether one or more other objects in located in the vicinity thereof.

8. The system, device or apparatus of claim 7, wherein the determining means includes means for identifying the or each object found to be in the vicinity thereof.

9. The system, device or apparatus of claim 8, further including means for displaying a representation of the or each object found to be in the vicinity thereof.

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10. The device of claim 9 when dependent on claim 4, wherein said user interface is adapted to highlight the representation of one of said documents upon its selection by a user, and the device further includes means for initiating transmission of the document reference corresponding to said one document to another object upon the user copying the representation of said document onto the representation of said object.

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Fig.1.

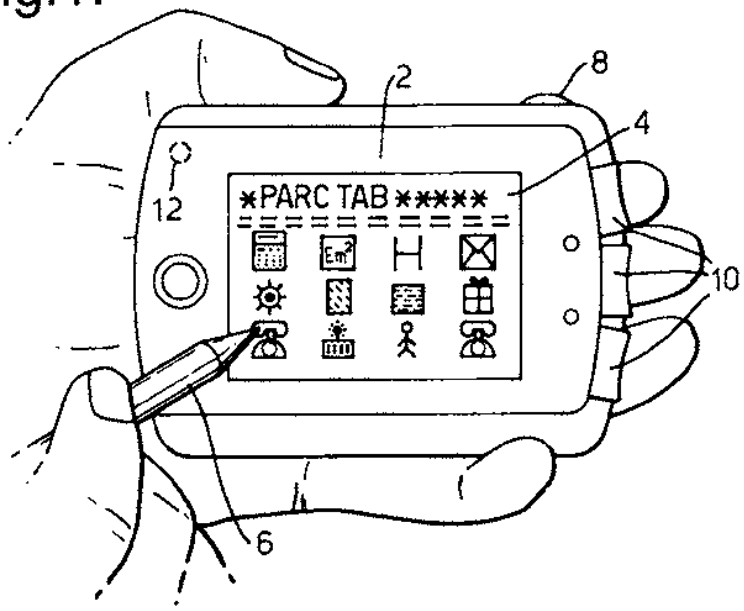


Fig.2(a).

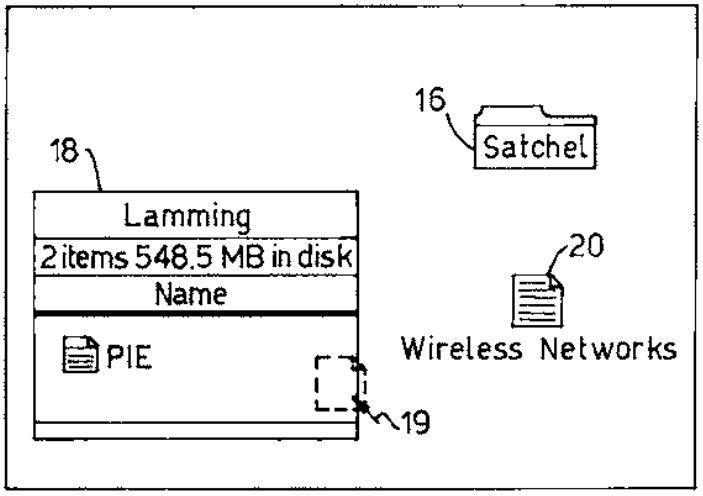
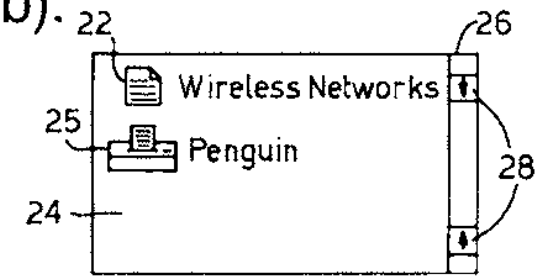
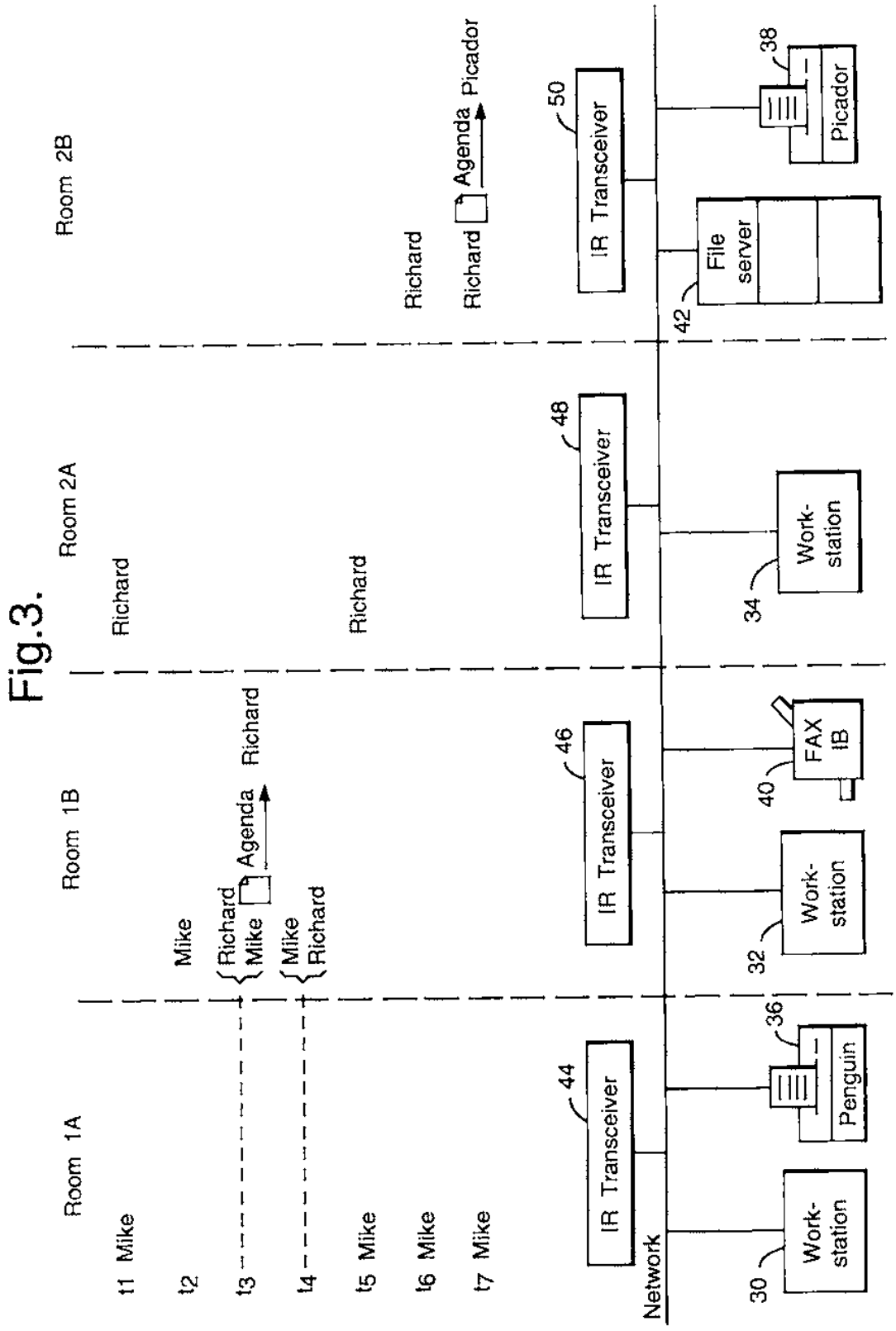


Fig.2(b).



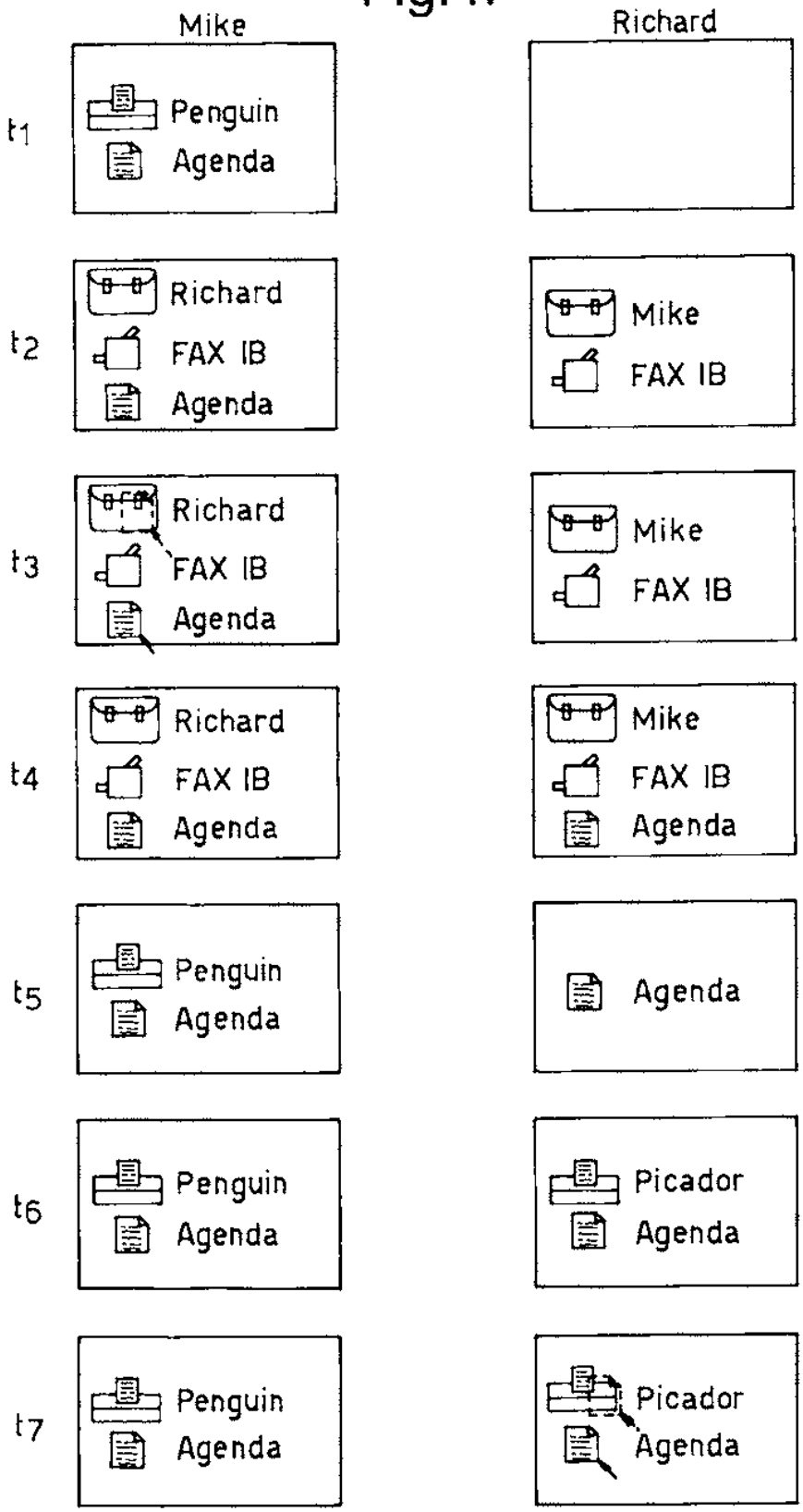
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Fig.3.



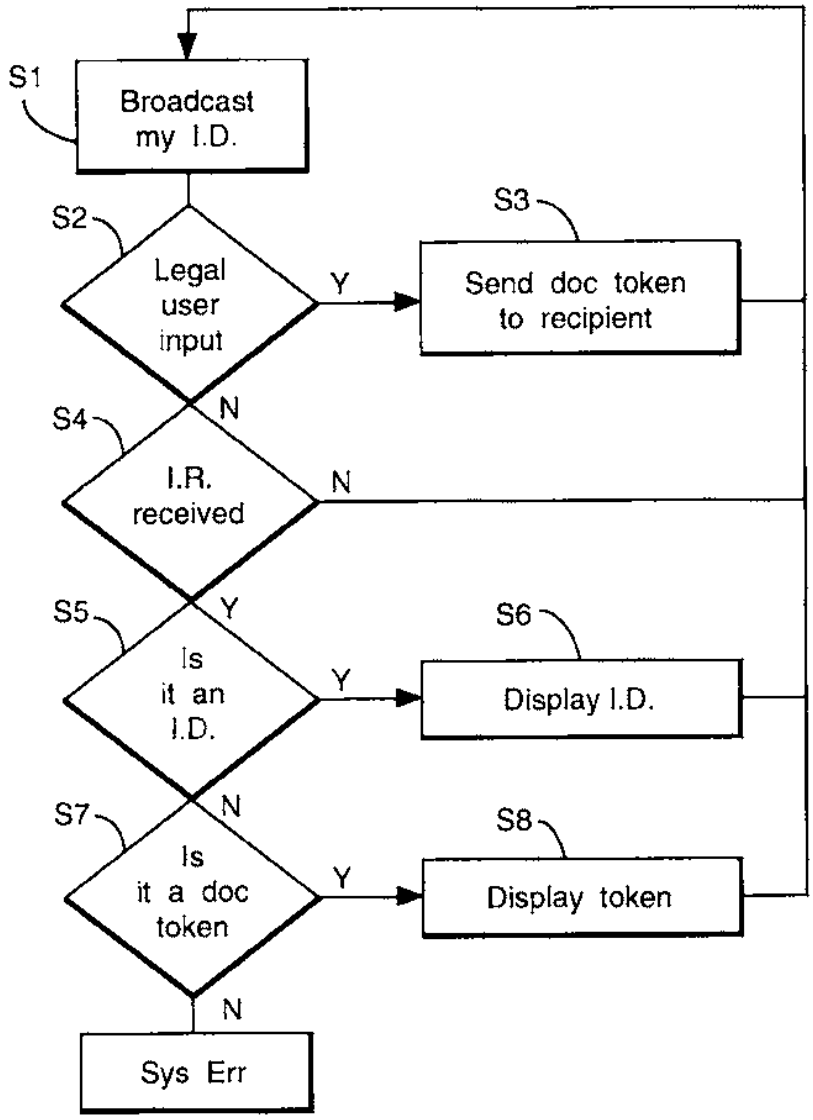
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Fig.4.



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Fig.5(a).



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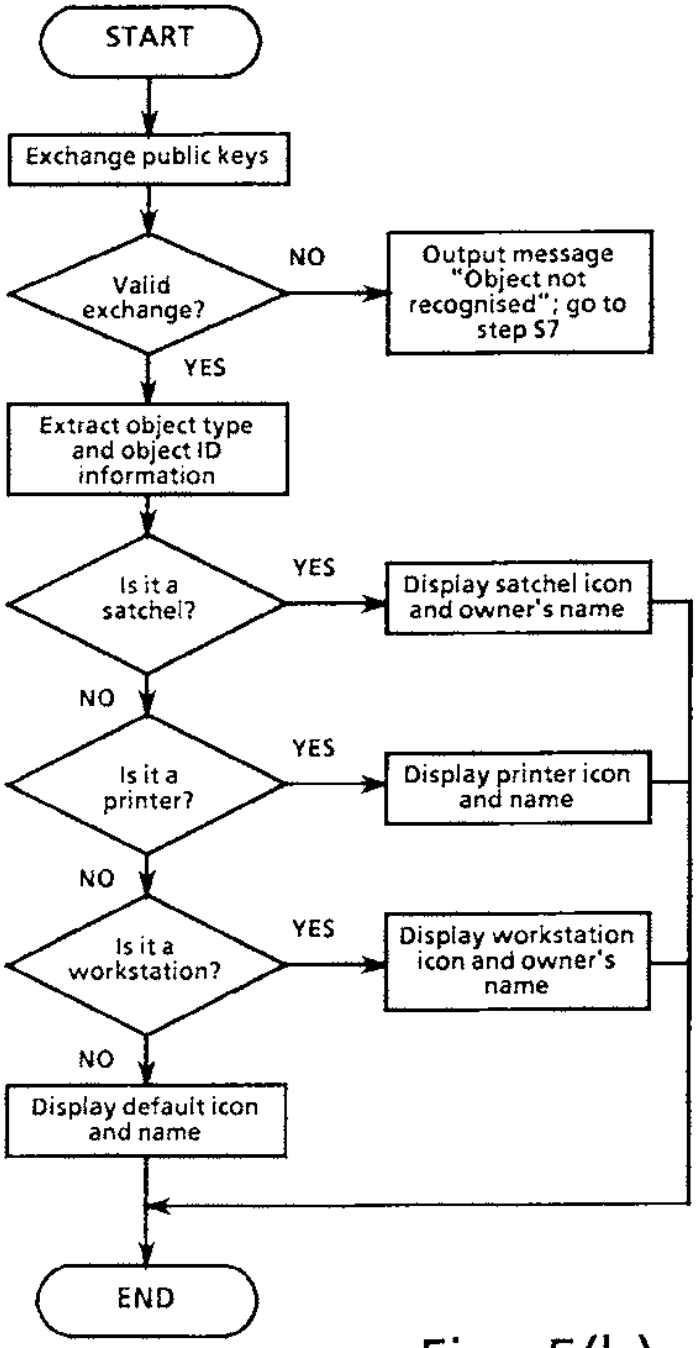


Fig. 5(b)

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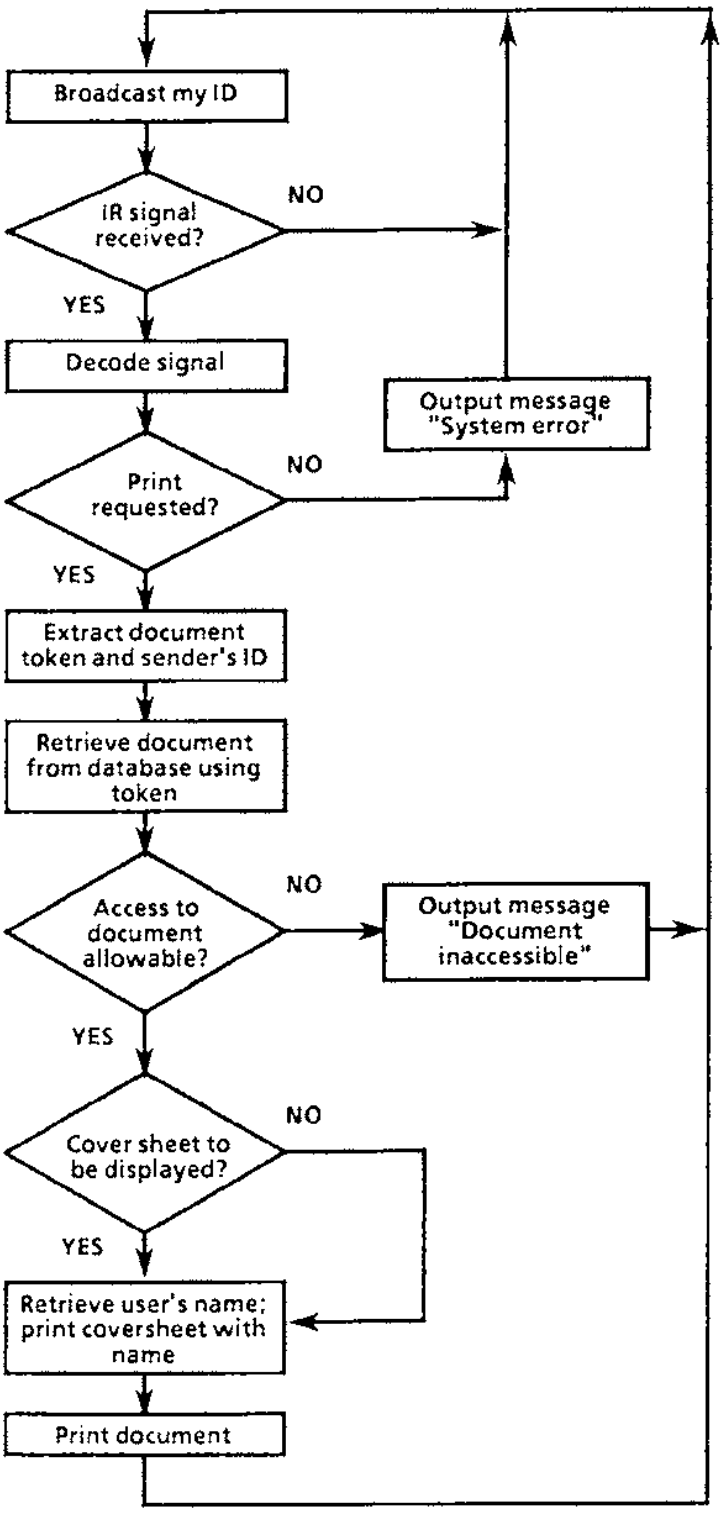


Fig. 5(c)

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Fig.6(a).

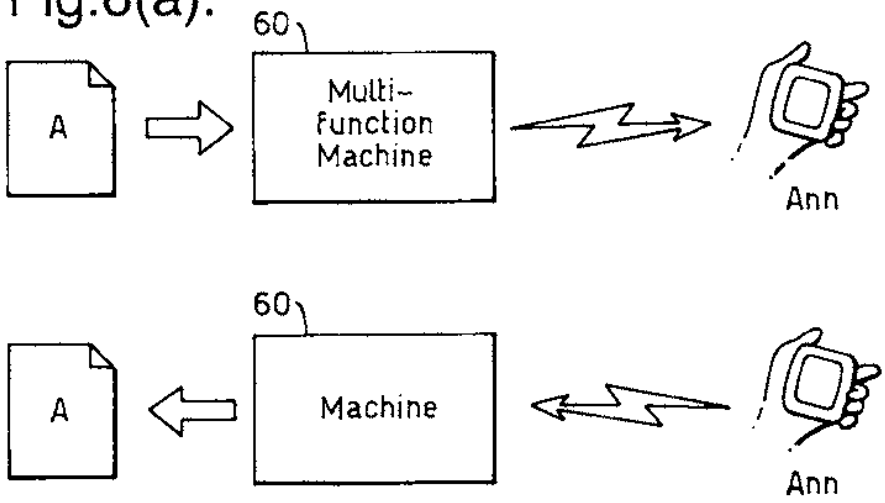


Fig.6(b).

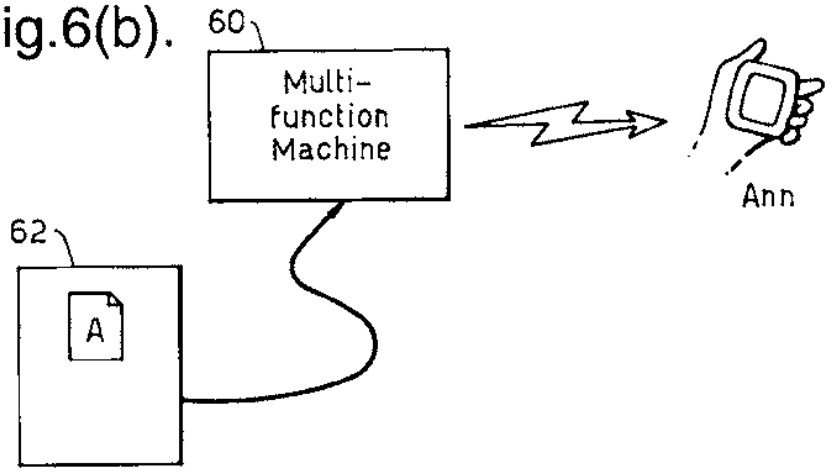
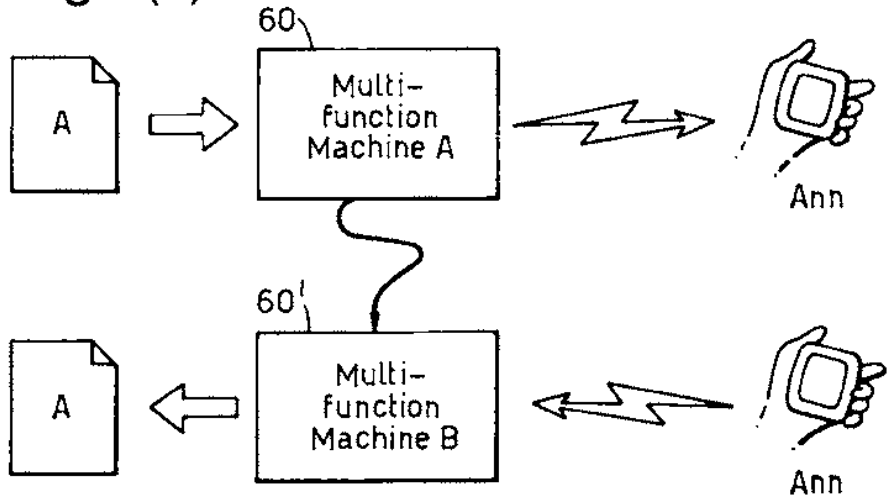


Fig.6(c).



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Fig.6(d).

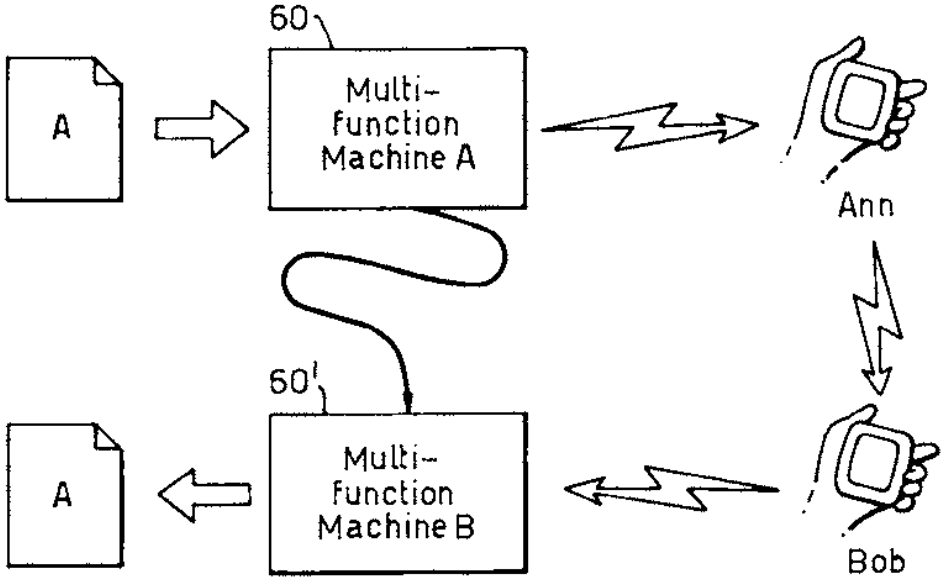
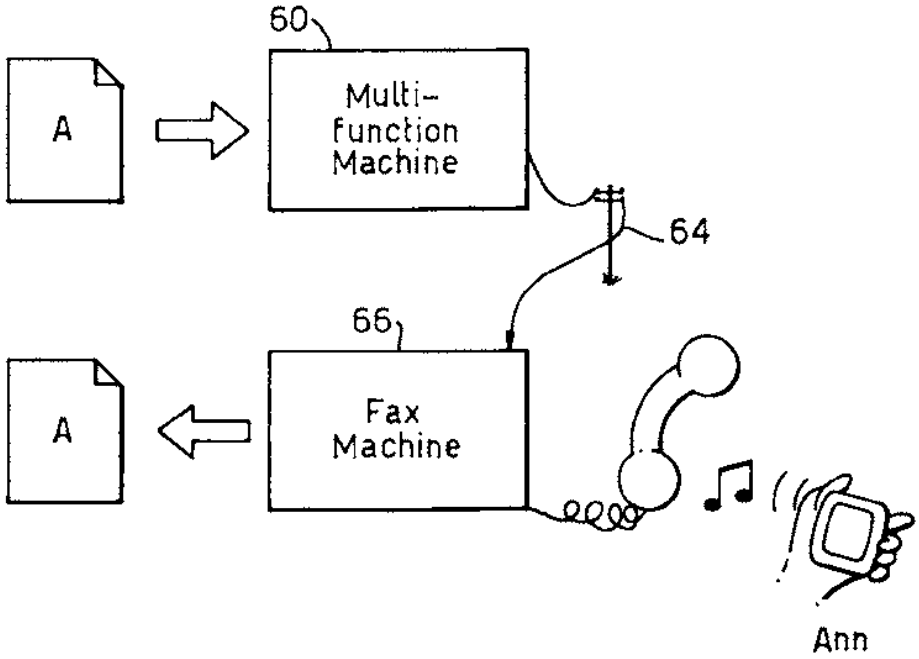


Fig.6(e).



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Fig.6(f).

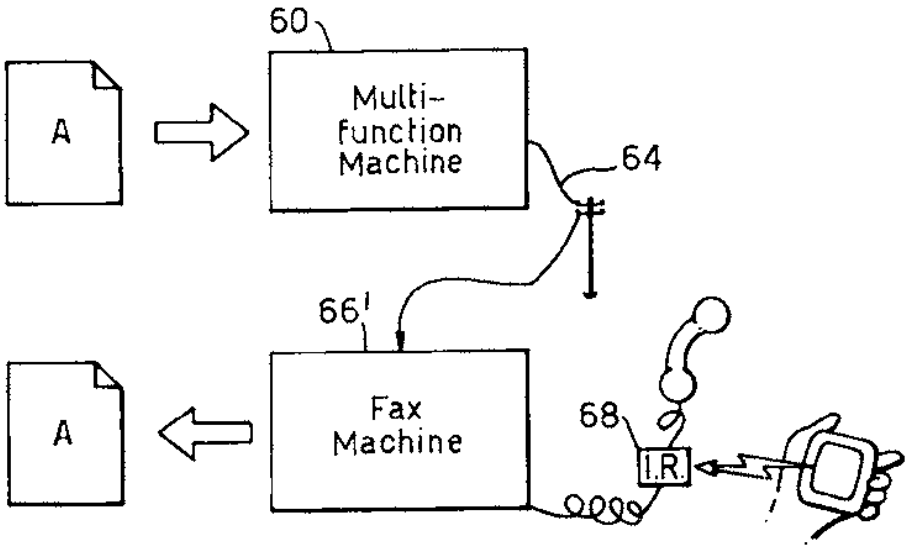
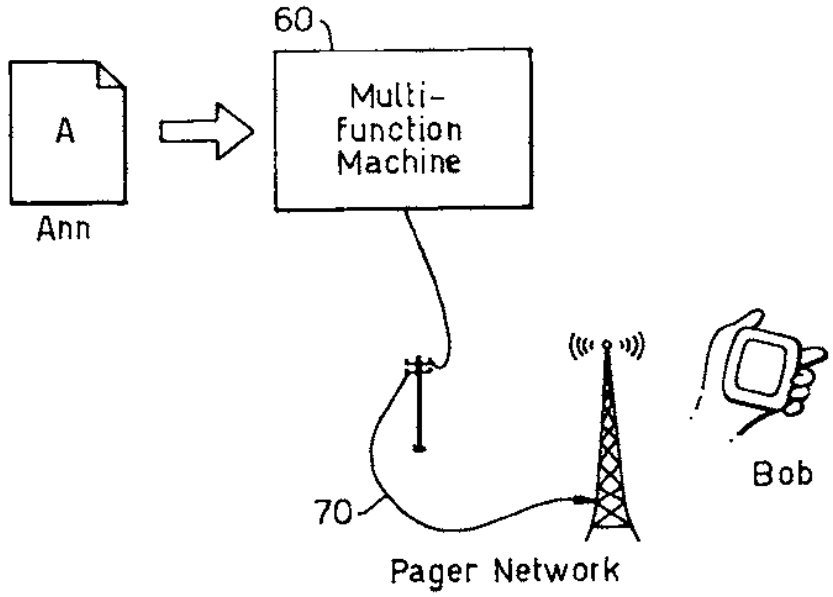


Fig.6(g).



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Electronic Patent Application Fee Transmittal

Application Number:	09992413
Filing Date:	18-Nov-2001
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Filer:	Edward Anderson/Veronica Gotelli
Attorney Docket Number:	FLEX.003

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

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Electronic Acknowledgement Receipt

EFS ID:	9192537
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Customer Number:	23442
Filer:	Edward Anderson
Filer Authorized By:	
Attorney Docket Number:	FLEX.003
Receipt Date:	10-JAN-2011
Filing Date:	18-NOV-2001
Time Stamp:	13:41:47
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	15
Deposit Account	111540
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)	

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	20110105_IDS_09992413.pdf	614632	no	11
Warnings:					
Information:					
2	Foreign Reference	EP952513A1_White.pdf	173081	no	10
Warnings:					
Information:					
3	Foreign Reference	EP691619A2_Flynn.pdf	257285	no	17
Warnings:					
Information:					
4	NPL Documents	20040706_OA_09992198.pdf	254549	no	7
Warnings:					
Information:					
5	NPL Documents	20050314_OA_09992183.pdf	358113	no	10
Warnings:					
Information:					
6	NPL Documents	20100430_OA_11933005.pdf	895070	no	26
Warnings:					
Information:					
7	NPL Documents	20050225_OA_09992420.pdf	769729	no	24
Warnings:					
Information:					
8	NPL Documents	20041027_OA_09992417.pdf	1038899	no	28
Warnings:					
Information:					

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9	NPL Documents	20100915_OA_12204689.pdf	290518 5811c977 [illegible]	no	9
Warnings:					
Information:					
10	NPL Documents	20101221_OA_12204695.pdf	439620 [illegible]	no	13
Warnings:					
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11	NPL Documents	20090909_OA_11933031.pdf	172077 [illegible]	no	5
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12	NPL Documents	20100929_OA_12684869.pdf	589135 [illegible]	no	17
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15	Fee Worksheet (PTO-875)	fee-info.pdf	30294 [illegible]	no	2
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Information:					
		Total Files Size (in bytes):	6546898		

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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,413	11/18/2001	William Ho Chang	FLEX.003	5528

23442 7590 12/17/2010

RYLANDER & ASSOCIATES PC
P.O. Box 250
VANCOUVER, WA 98660

EXAMINER	
BENOIT, ESTHER	

ART UNIT	PAPER NUMBER
2453	

MAIL DATE	DELIVERY MODE
12/17/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/992,413	CHANG ET AL.	
	Examiner	Art Unit	
	ESTHER BENOIT	2453	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 August 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *131-200* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *131-200* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendments

1. This Action is in Response to a Request for Continued Examination filed on August 25, 2010. Claims 131, 133, 137-139, 142, 148-149, 152, 156-157, 159-161, 166-169, 171-172, 177-178, 180-183, 186, 189, and 195-199 have been amended. Claims 131-200 are pending in this application.

Response to Arguments

2. Applicant's arguments, see Remarks, filed 8/25/2010 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Wolff (US 6,738,841 B1), in view of Larsson et al. (US 7,028,102 B1) and Eldridge et al. (US 6,515,988 B1).

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 131-147, 172-179, and 189-194 are rejected under 35 U.S.C. 112, second paragraph. Claims 131, 172, and 177 are indefinite because the means for performing the claimed functions lack corresponding structures. It is not clear in the specification, which elements by which the means plus function claims can be implemented. Therefore, the claims are indefinite. See MPEP §2181. Claims 132-147,

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173-176, 178-179, and 189-194 do not provide any additional support for the structures of the "means for" limitations of claims 131, 172, and 177 and thus, are also indefinite.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 131, 133-137, 142-159, 161-185, 187-194, and 196-200 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolff (US 6,738,841 B1), in view of Larsson et al. (US 7,028,102 B1).

With respect to claim 131, Wolff discloses a data output service system for rendering at an output device output content, managed from a information apparatus, the system having one or more servers for generating output data for rendering, the information apparatus being distinct and separate from the output device, and the one or more servers being distinct from the information apparatus and the output device (Abstract, *PDA sends request to printer for document printing*), the system comprising:

- means for receiving at the one or more servers a document object from the information apparatus over a network the document object relating to the output content (Col. 6, lines 1-6, *server receives request for document printing*)

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- means for receiving at the one or more servers an output device object from the information apparatus over a network, the output device object having one or more attributes corresponding to the output device, including an indication of a language and or data format that is acceptable as input to the output device for rendering (Col. 6, lines 43-63, *user requests document for printing and printer server formats document for performing document handling operations*);
- means for generating device dependent output data at the server with a server application, the device dependent output data being associated with the output content and related at least in part to the indication of a language or a data format included in the output device object received from the information apparatus for rendering the output content (Col. 6, lines 43-63, *user requests document for printing and printer server formats document for performing document handling operations*);
- means for delivering the output data to the output device for rendering the output content (Col. 5, lines 33-42, *document requested is printed*).

Wolff does not explicitly disclose means for receiving from the information apparatus at the one or more servers a security or authentication information associated with the user operating the information apparatus for authentication of the user, and in dependence of a successful authentication of the user, enabling the user access to the data output service;

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However, Larsson discloses means for receiving from the information apparatus at the one or more servers a security or authentication information associated with the user operating the information apparatus for authentication of the user, and in dependence of a successful authentication of the user, enabling the user access to the data output service (Col. 12, lines 12-41, *user sends authentication information to the information provider for authorization*);

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wolff with the teachings of Larsson to provide the server with authentication information, *because* it will prevent any unauthorized access from reaching the output device.

With respect to claim 133, Wolff discloses means for receiving from the information apparatus one or more job objects having one or more attributes corresponding to the output job, including output quality (Col. 6, lines 43-63).

With respect to claim 134, Wolff discloses in which the output device object includes a pointer or a reference to the language or the data format (Col. 6, lines 43-63).

With respect to claim 135, Wolff discloses in which the output device includes a display output control unit for displaying data content (Col. 12, lines 60-67 and Col. 13, lines 1-5).

With respect to claim 136, Wolff discloses in which the output device is a printer and the output data includes one or more of an image data, a graphics data, and text data (Abstract, *printing*).

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With respect to claim 137, Wolff discloses in which the information apparatus is a wireless information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance (PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera (Abstract, *PDA*).

With respect to claim 142, Wolff does not disclose obtaining authentication information from the information apparatus to authenticate permission for the information apparatus to access the data output service.

However, Larsson discloses obtaining authentication information from the information apparatus to authenticate permission for the information apparatus to access the data output service (Col. 12, lines 12-41, *user sends authentication information to the information provider for authorization*);

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wolff with the teachings of Larsson to provide the server with authentication information, *because* it will prevent any unauthorized access from reaching the output device.

With respect to claim 143, Wolff discloses means for establishing a communication channel between the information apparatus and the server application, the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network (Col. 4, lines 56-64).

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With respect to claim 144, Wolff discloses in which the output device is an audio output device and the output data includes audio data (Col. 12, lines 60-67 and Col. 13, lines 1-5).

With respect to claim 145, Wolff discloses in which the output device is a display device and the output data includes one or more of an image data, an audio data, and a video data (Col. 2, lines 14-37, *tool for capturing images and other media*).

With respect to claim 146, Wolff discloses in which the document object includes a reference or pointer related to the data content (Col. 6, lines 43-63).

With respect to claim 147, Wolff discloses in which the means for generating device dependent output data at the server includes one or more of invoking, launching, calling, utilizing, and involving one or more applications (Col. 5, lines 33-42).

With respect to claim 148, Wolff discloses a method for generating a device dependent output data acceptable for rendering at an output device, the device dependent output data corresponding to output content accessible at least partly by a information apparatus (Abstract, *PDA sends request to printer for document printing*), the method comprising:

- delivering from the information apparatus at least part of a document object and at least part of an output device object to the server over a network, the document object being associated with the output content and the output device object including an indication of a language and or data format that is acceptable to the output device for rendering (Col. 6,

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lines 43-63, *user requests document for printing and printer server formats document for performing document handling operations*);

- receiving from the server device dependent output data related at least in part to the indication of a language or a format included in the output device object delivered from the information apparatus (Col. 6, lines 43-63, *user requests document for printing and printer server formats document for performing document handling operations*);
- delivering the output data from the information apparatus to the output device for rendering of the output content (Col. 5, lines 33-42, *document requested is printed*).

Wolff does not explicitly disclose sending from the information apparatus to a server over a network, a security or authentication information associated with the user operating the information apparatus for authentication of the user, the server being distinct from the information apparatus and the output device, and in dependence of a successful authentication of the user, enabling the user access to the data output service;

However, Larsson discloses sending from the information apparatus to a server over a network, a security or authentication information associated with the user operating the information apparatus for authentication of the user, the server being distinct from the information apparatus and the output device, and in dependence of a successful authentication of the user, enabling the user access to the data output

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service (Col. 12, lines 12-41, *user sends authentication information to the information provider for authorization*);

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wolff with the teachings of Larsson to provide the server with authentication information, *because* it will prevent any unauthorized access from reaching the output device.

With respect to claims 149-159, 161-185, 187-194, and 196-200, the limitations of these claims are essentially similar to the limitations of claims 131-148. Claims 149-200 are simply variations of similar subject matter found in the claims above. For this reason, claims 149-200 are rejected for the same reasons as claims 131-148 above.

7. Claims 132, 138-141, 160, 186, and 195 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolff (US 6,738,841 B1), in view of Larsson et al. (US 7,028,102 B1) and further in view of Eldridge et al. (US 6,515,988 B1).

With respect to claim 132, Wolff and Larsson do not explicitly disclose means for obtaining payment information from the information apparatus as payment for the data output service provided at the output device or as payment for sending the output data from the server.

However, Eldridge discloses obtaining payment information from the information apparatus as payment for the data output service provided at the output device or as payment for sending the output data from the server (Col. 2, lines 57-63).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wolff and Larsson with the teachings of Eldridge to include payment information as payment for the service provided, *because* it will allow compensation to be acquired upon services furnished.

With respect to claim 138, Wolff and Larsson do not explicitly disclose in which the payment information is provided automatically by the information apparatus.

However, Eldridge discloses the payment information is provided automatically by the information apparatus (Col. 2, lines 57-63).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wolff and Larsson with the teachings of Eldridge to include automatic payment to be received, *because* it will allow compensation to be acquired upon services furnished.

With respect to claim 139, the claim is rejected for the same reasons as claim 138 above. In addition, Eldridge discloses in which the payment information is provided through the information apparatus as entered by a user in response to a prompt to enter payment information (Col. 2, lines 57-63).

With respect to claim 140, the claim is rejected for the same reasons as claim 138 above. In addition, Eldridge discloses in which the payment information includes service subscriber information corresponding to a pre-arranged subscription to the data output service system (Col. 2, lines 64-67 and Col. 3, lines 1-10).

With respect to claim 141, the claim is rejected for the same reasons as claim 138 above. In addition, Eldridge discloses correlating the data output service subscriber

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information with a subscriber database that stores subscriber profiles with subscription payment information (Col. 2, lines 64-67 and Col. 3, lines 1-10).

With respect to claims 160, 186, and 195, the limitations of these claims are essentially similar to the limitations of claims 132, 138-141. Claims 169, 186, and 195 are simply variations of similar subject matter found in the claims above. For this reason, claims 132, 138-141are rejected for the same reasons as claims 169, 186, and 195 above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Esther Benoit whose telephone number is 571-270-3807. The examiner can normally be reached on Monday through Friday between 7:30 a.m and 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Krista M. Zele can be reached on 571-272-7288. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

E.B.
December 13, 2010

/Krista M. Zele/
Supervisory Patent Examiner, Art Unit 2453

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Notice of References Cited	Application/Control No. 09/992,413	Applicant(s)/Patent Under Reexamination CHANG ET AL.	
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U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,515,988	02-2003	Eldridge et al.	370/389
*	B	US-6,738,841	05-2004	Wolff, Gregory J.	710/62
*	C	US-7,028,102	04-2006	Larsson et al.	709/246
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	04/02/2007	06/25/2007	03/29/2009	05/18/2010	12/11/2010				
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	33	÷	✓	-	-	-				

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CLAIM		DATE								
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	66			-	-	-				

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CLAIM		DATE								
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CLAIM		DATE								
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	131			✓	✓	✓				
	132			✓	✓	✓				

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CLAIM		DATE								
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CLAIM		DATE								
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=	Allowed	÷	Restricted	I	Interference	O	Objected

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CLAIM		DATE								
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SEARCHED

Class	Subclass	Date	Examiner
709	203-230, 245-48	6/13/07	AMN
715	500, 516-517,969	6/13/07	AMN
710	8, 10	6/13/07	AMN
358	1.1	3/29/09	AMN
	Update Search	12/9/2010	EB

SEARCH NOTES

Search Notes	Date	Examiner
East Search (USPAT; USPGPUB; EPO: JPO: DERWENT; IBM_TDB)	6/13/07	AMN
Inventor Name Search for ODP	6/16/07	AMN
updated East search	3/29/09	AMN
updated inventor name search	3/29/09	AMN
updated East search	1/18/09	AMN
updated classification and inventor name search	5/18/10	AMN
Update Search	12/9/2010	EB
Assignee Search	12/13/2010	EB

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	5	(printer (user or client) near3 ((mobile near2 device) or (phone) or (portable near2 (device or computer)))).ab. and payment	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/13 12:13
L4	6952	"710"/$3.ccls. and ((mobile near2 device) or (phone) or (portable near2 (device or computer)))	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/13 13:15
L5	0	flexiword.as.	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/13 13:17
L6	12	flexiworld.as.	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/13 13:18
S1	4	"09992413"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 11:17
S2	2	"20040057075"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 11:18
S3	2	"7593123"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 11:57
S4	15462	(mobile) (printer)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 12:04
S5	5486	(mobile) near4(printer)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 12:04

S6	16	(user or client) near3 (request$4) (mobile) near4 (printer)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 12:05
S7	0	("2002/0115451").URPN.	USPAT	WITH	ON	2010/12/09 12:06
S8	83	"6452692"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 12:07
S9	27101	(document near2 object)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 12:10
S10	122	(document adj object) printer	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 12:10
S11	0	(document adj object) printer ((mobile near2 device) or phone)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 12:10
S12	0	(document adj object) printer same ((mobile near2 device) or phone)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 12:10
S13	33	(document adj object) printer and ((mobile near2 device) or phone)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 12:10
S14	29	"6493104"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 12:14
S15	9	("5513302" | "5552957" | "5583912" | "5647484" | "5699495" | "5745733" | "5812531" | "5816725" | "6167514").PN.	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/09 12:20

S21	1	d18.clas. and ((mobile near2 device) or (phone) or (portable near2 (device or computer))) and (authenticat$7 or password or credential)	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/09 12:34
S22	5557	"358"/$3.ccls. and ((mobile near2 device) or (phone) or (portable))	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/09 12:35
S23	748	"358"/$3.ccls. and ((mobile near2 device) or (phone) or (portable near2 (device or computer))) and (authenticat$7 or password or credential)	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/09 12:35
S24	245	"358"/$3.ccls. and ((mobile near2 device) or (phone) or (portable near2 (device or computer))) same (authenticat$7 or password or credential)	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/09 12:35
S25	131	"358"/$3.ccls. and ((mobile near2 device) or (phone) or (portable near2 (device or computer))) (authenticat $7 or password or credential)	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/09 12:35
S26	216	printer ((mobile near2 device) or (phone) or (portable near2 (device or computer))) (authenticat $7 or password or credential)	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/09 12:47
S27	11	printer request$5 ((mobile near2 device) or (phone) or (portable near2 (device or computer))) (authenticat$7 or password or credential)	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/09 12:47
S28	96	(printer same ((mobile near2 device) or (phone) or (portable near2 (device or computer)))).ti.	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/09 12:49
S50	568	(printer same ((mobile near2 device) or (phone) or (portable near2 (device or computer)))).ab.	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/09 14:29

S51	6948	(printer same ((mobile near2 device) or (phone) or (portable near2 (device or computer)))).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 14:29
S52	540	(printer same (user or client) ((mobile near2 device) or (phone) or (portable near2 (device or computer)))).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 14:30
S53	201	(printer same (user or client) near3 ((mobile near2 device) or (phone) or (portable near2 (device or computer)))).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 14:30
S54	137	(printer (user or client) near3 ((mobile near2 device) or (phone) or (portable near2 (device or computer)))).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 14:30
S55	4	"2001042894"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 14:56
S56	2	"20010042894"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 14:57
S57	14	"7028102"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 15:01
S58	21	"6763336"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	WITH	ON	2010/12/09 15:08
S59	27	("2949776" | "5848415" | "5862321" | "6076076" | "6141688" | "6249809" | "6285889" | "6400810" | "6430601" | "6438585" | "6442595" | "6557029" | "6725300" | "6738841"). PN. OR ("7028102"). URPN.	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/09 15:10
S60	8807	709/217.ccls.	US-PGPUB; USPAT; USOCR	WITH	ON	2010/12/09 15:53

12/13/2010 1:22:05 PM
C:\Documents and Settings\ebenoit\My Documents\EAST\Workspaces\09992413.wsp

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Lexmark v. Flexiworld

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/992,413	11/18/2001	William Ho Chang	1282-011/MMM

CONFIRMATION NO. 5528

21034
IPSOLON LLP
111 SW COLUMBIA
SUITE 710
PORTLAND, OR 97201

POWER OF ATTORNEY NOTICE



Date Mailed: 09/03/2010

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/25/2010.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/skiflemariam/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/992,413	11/18/2001	William Ho Chang	FLEX.003

CONFIRMATION NO. 5528

23442
RYLANDER & ASSOCIATES PC
P.O. Box 250
VANCOUVER, WA 98660

POA ACCEPTANCE LETTER

OC000000043302909

Date Mailed: 09/03/2010

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/25/2010.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/skiflemariam/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	09/992,413	Filing Date	2001-11-18	Docket Number (if applicable)	FLEX.003	Art Unit	2455
First Named Inventor	William Ho Chang			Examiner Name	Asad M. Nawaz		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☐ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No _____

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

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Lexmark v. Flexiworld

PTO/SB/30EFS (07-09)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Jon C. Reali/	Date (YYYY-MM-DD)	2010-08-25
Name	Jon C. Reali	Registration Number	54391

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	09992413
Filing Date:	18-Nov-2001
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Filer:	Jon Charles Reali
Attorney Docket Number:	1282-011/MMM

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	810	810
		Total in USD ($)		**810**

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Electronic Acknowledgement Receipt

EFS ID:	8294221
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Customer Number:	21034
Filer:	Jon Charles Reali
Filer Authorized By:	
Attorney Docket Number:	1282-011/MMM
Receipt Date:	25-AUG-2010
Filing Date:	18-NOV-2001
Time Stamp:	21:33:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$810
RAM confirmation Number	8461
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

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1	Amendment Submitted/Entered with Filing of CPA/RCE	FLEX003-Response082410asfiled.pdf	79007 127c7cdce7d0c181892a9f1a34d4e0d41f08 c8f5b	no	28
Warnings:					
Information:					
2	Power of Attorney	FLEX003POA.pdf	48729 fb6f435e7f11fba269ce8514e6aac5388bb 661b	no	2
Warnings:					
Information:					
3	Request for Continued Examination (RCE)	FLEX003RCEtransmittal.pdf	697967 85d0444d6a6d12ca7a881eb5d8237e3a62 8592	no	3
Warnings:					
Information:					
4	Fee Worksheet (PTO-875)	fee-info.pdf	29859 4d2a489c4bb112cacbdb3e4e7c734e6a 590120	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	855562		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: : William Ho Chang

Serial No.: : 09/992,413

Filed: : November 18, 2001

For: : Method For Mobile And Pervasive Output

Examiner: : Asad M. Nawaz

TC/A.U.: : 2455

Date: : August 25, 2010

The Honorable Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR CONTINUED EXAMINATION

In response to the Final Office Action dated May 25, 2010, please accept a Request for Continued Examination, amend the application as follows, and consider the following remarks.

Amendments to the Claims are reflected in the listing of claims that begins on page 2 of this paper.

Remarks/Arguments begin on page 19 of this paper.

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REMARKS/ARGUMENTS

Claims 131-200 are currently pending in the application. Claims 131, 148, 157, 167, 172, 177, and 180 are in independent form. The listing of claims herein replaces all previous listing of claims. No new claims are added.

In the Final Office Action mailed May 25, 2010, the Examiner rejected Claims 131, 133-137, and 143-200 under 35 U.S.C. §103(c) as being unpatentable over Yacoub (U.S. Pat. No. 6,452,692) in view of Sugahara (U.S. Pat. No. 7,593,123). The Examiner further rejected Claims 132 and 138-142 under 35 U.S.C. §103(a) as being unpatentable over Yacoub in view of Sugahara and in further view of Stewart (U.S. Pat. App. Pub. No. 2004/0057075).

For at least the following reasons, Applicants traverse the Examiner's §103 rejections. More specifically, Applicants have articulated their response as an element-by-element discussion of at least multiple elements Applicants assert are patentable over the cited prior art.

1. . . . **receiving from the information apparatus at the one or more servers a security or authentication information associated with the user operating the information apparatus for authentication of the user. . .**

Applicants have amended claim 131 to add the above element. Support for the above-recited element can be found for example at least in paragraphs [0132], [0133], and [0134] of the as-filed specification.

The Examiner states that neither Yacoub nor Sugahara teaches receiving authentication information from an information apparatus at the server. The

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Examiner alleges, however, that Stewart paragraphs [0018] and [0046] teach receiving authentication information from an information apparatus at the server:

> *[0018] In yet another embodiment of the invention, there is a system for delivering a document over a network. The system includes, for example, an interface on a client to download a print driver from the network, the print driver creating a print file from the document, an authentication manager to verify that the print driver is valid by comparing predetermined information with components of the print driver stored in the print file.*
>
> *[0046] A caching server 340 manages the download of driver software and other common HTML and image data elements between the client 310 and the UPJA 320. The UPJA 320 (which is a server in the preferred embodiment and therefore includes the conventional components of a computer, including memory, storage and a process), in one embodiment, receives the document as it is transmitted from the client 310, via the ISP 312, across the network 300. The document is received by the UPJA 320, via the upload manager 310c, after the print driver 310b being used has been authenticated by the version manager 348, and the entire document has been sent to the port monitor 346. Replicating servers 350 (i.e. lightweight directory assistance protocol, or LDAP, servers) authenticate clients 310 requesting services from the UPJA 320 and web servers 315…*

As shown above, Stewart does not teach nor describe "receiving from the information apparatus at the one or more servers a security or authentication

information associated with the user operating the information apparatus for authentication of the user" as recited in claim 131. Instead, Stewart emphasizes the teaching of authentication of the printer driver running at the client 310 by an authentication manager ". . . *by comparing predetermined information with components of the print driver stored in the print file.*" Nothing in Stewart teaches authentication of the user by sending authentication information associated with the user from the information apparatus to the server.

Following Stewart, one skilled in the art will be lead to authenticate the printer driver by comparing the information stored in the print file generated by the printer driver and not to authenticate the user by receiving authentication information associated with the user.

Because of the explicit teaching by Stewart to authenticate the printer driver and not the user, Stewart cannot be combined with any other reference including Yacoub and/or Sugahara to describe authentication of the user.

Independent claims 131, 148, 157, 167, 172, 177, and 180 each recite at least an element analogous to "receiving from the information apparatus at the one or more servers a security or authentication information associated with the user operating the information apparatus for authentication of the user." This element alone is sufficient to distinguish independent claims 131, 148, 157, 167, 172, 177, and 180 from all cited references. Accordingly, for at least the reasons offered above with respect to currently amended independent claim 131, Applicants assert that currently amended independent claims 131, 148, 157, 167, 172, 177, and 180 are patentable. All dependent claims depending from

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independent claims 131, 148, 157, 167, 172, 177, and 180 are patentable at least based on their dependency from patentable independent claims.

2. . . . **receiving at the one or more servers an output device object from the mobile information apparatus over a network, the output device object having one or more attributes corresponding to the output device, including an indication of a language and or data format that is acceptable as input to the output device for rendering. . .**

Applicants have further amended claim 131 to add the above element.

The Examiner states that neither Yacoub nor Stewart teaches "an output device object" and "the output device object including an indication of a language and or data format that is acceptable as input to the output device for rendering". However, the Examiner alleges that Sugahara column 1 lines 42-65 teach an apparatus in which one such attribute is the language wherein the printing device are categorized by language group. The portion of Sugahara cited by the Examiner is provided below:

> *In consideration of such a problem, it is an object of the present invention to provide a printing system capable of carrying out a printing operation without waiting for a while even if printing jobs are concentrated in a printer.*
>
> *The present invention provides a printing system in which a plurality of printing devices are connected to each other through a network line and printing job data transmitted from a data processing device is received by the printing devices to carry out a printing operation, the printing system comprising at least printing means for causing the printing devices to*

execute a printing operation based on the printing job data, communicating means for transmitting and receiving data together with the other printing devices and storing means for storing device information of the other printing devices, wherein the printing devices are formed into groups based on a processable language, one of the printing devices belonging to the same language group is caused to act as a managing printing device, device information of all the printing devices belonging to a language group which can be processed by the managing printing device are stored, and job data is transferred to the other printing devices belonging to the same language group when the job data is transferred from any of the printing devices.

Applicants assert that Sugahara teaches a method to speed up a printing job by a printer using a plurality of printers. More specifically, Sugahara describes that a plurality of printers can be grouped based on a processed language group and that one of the printers in the group can act as the managing printer by passing the job data to other printers in the group for processing.

Applicants respectfully submit that nothing in Sugahara teaches anything akin to "receiving at the one or more servers an output device object from the information apparatus over a network." First, Sugahara does not teach anything akin to an object. Second, Sugahara does not teach receiving at a server an output device object. Instead Sugahara explicitly teaches that a printing device (managing printer) – not an information apparatus – sends the print job to other

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printers in the language group. And third, a printer (whether the managing printer or other printers) – not a server – receives the print job.

Moreover, Applicants respectfully submit that nothing in Sugahara teaches or describes "the output device object having one or more attributes corresponding to the output device, including an indication of a language and or data format that is acceptable as input to the output device for rendering." Again, Sugahara does not describe anything akin to an output device object. Sugahara further cannot teach receiving an output device object at a server from an information apparatus. And Sugahara further cannot teach that the output device object received from the information apparatus at the server "includes one or more attributes corresponding to the output device, including an indication of a language and or data format."

Independent claims 131, 148, 157, 167, 172, 177, and 180 each recite at least an element analogous to "receiving at the one or more servers an output device object from the mobile information apparatus over a network, the output device object having one or more attributes corresponding to the output device, including an indication of a language and or data format that is acceptable as input to the output device for rendering." This element alone is sufficient to distinguish independent claims 131, 148, 157, 167, 172, 177, and 180 from all cited references. Accordingly, for at least the reasons offered above, Applicants assert that currently amended independent claims 131, 148, 157, 167, 172, 177, and 180 are patentable. All dependent claims depending from independent

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claims 131, 148, 157, 167, 172, 177, and 180 are patentable at least based on their dependency from patentable independent claims.

3. . . . **generating device dependent output data at the server with a server application, the device dependent output data being associated with the output content and related at least in part to the indication of a language or a data format included in the output device object received from the information apparatus for rendering the output content. . .**

Applicants have further amended claim 131 to add the above element.

The Examiner states that neither Yacoub nor Stewart teaches "an output device object" and "the output device object including an indication of a language and or data format that is acceptable as input to the output device for rendering." However, the Examiner alleges that Sugahara column 1 lines 42-65 teach an apparatus in which one such attribute is the language wherein the printing device are categorized by language group.

Applicants respectfully submit that nothing in Sugahara teaches or describes anything akin to "generating device dependent output data at the server . . . the device dependent output data being . . . related at least in part to the indication of a language or a data format included in the output device object received from the information apparatus." Simply put, Sugahara is not even in the proper field of endeavor to solve the problem of "generating device dependent output data at the server." Instead, Sugahara teaches something else entirely, namely "an . . . invention to provide a printing system capable of carrying out a printing operation without waiting for a while even if printing jobs are concentrated in a printer."

Applicants submit that the only thing in Sugahara that can be mapped to the above element recited in currently amended claim 131 is the one word "language" and nothing else. Sugahara does not teach nor suggest anything to one of ordinary skill in the art relative to the element recited above. Accordingly, Applicants assert that Sugahara cannot be combined with any other reference including Yacoub and Stewart to teach "generating device dependent output data at the server with a server application, the device dependent output data being associated with the output content and related at least in part to the indication of a language or a data format included in the output device object received from the information apparatus."

Independent claims 131, 148, 157, 167, 172, 177, and 180 each recite at least an element analogous to "generating device dependent output data at the server with a server application, the device dependent output data being associated with the output content and related at least in part to the indication of a language or a data format included in the output device object received from the information apparatus for rendering the output content." This element alone is sufficient to distinguish independent claims 131, 148, 157, 167, 172, 177, and 180 from all cited references. Accordingly, for at least the reasons offered above, Applicants assert that currently amended independent claims 131, 148, 157, 167, 172, 177, and 180 are patentable. All dependent claims depending from independent claims 131, 148, 157, 167, 172, 177, and 180 are patentable at least based on their dependency from patentable independent claims.

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CONCLUSION

In addition to the three distinctions described above, independent claims 131, 148, 157, 167, 172, 177, and 180 further recite one or more elements not explicitly discussed by the Applicants. For example claim 167 recites "the document object including a pointer or reference to the output content for the one or more servers to retrieve the data content from a content server with the pointer or reference," which is not taught or described by Yacoub, Sugahara, and/or Stewart. Applicants respectfully assert that the additional distinctions over the cited references taken either alone or in combination shall be apparent after a reading of the listing of amended claims included herewith.

Applicants respectfully request reconsideration and allowance of all pending claims of the application as amended. For at least the foregoing distinctions outlined above, the Applicants respectfully assert that currently amended independent claims 131, 148, 157, 167, 172, 177, and 180 are patentable as each recites at least an element not taught or suggested by Yacoub, Sugahara, and Stewart, taken either alone or in combination. All dependent claims depending from independent claims 131, 148, 157, 167, 172, 177, and 180 are patentable at least for depending from a patentable independent claim.

The Examiner is encouraged to telephone the undersigned at (360) 750-9931 if it appears that an additional interview would be helpful in advancing the case. The Applicants respectfully submit that the rejection of the pending claims

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must be withdrawn, and that this application is in condition for allowance. Such is earnestly requested.

Respectfully submitted,

/Jon C. Reali/

JON C. REALI
USPTO Reg. No. 54,391

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406 West 12th Street
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POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Application Number	09/502,413
Filing Date	November 13, 2003
First Named Inventor	Alan M. Weiss
Title	Method for Making and Reassembling Units
Art Unit	2116
Examiner Name	Abdul M. Rahim
Attorney Docket Number	FLE 009

I hereby revoke all previous powers of attorney given in the above-identified application.

A Power of Attorney is submitted herewith.

OR

I hereby appoint the Practitioner(s) associated with the following Customer Number:

Number as my attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.

OR

I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified application to:

The address associated with the above-mentioned Customer Number

OR

The address associated with Customer Number:

OR

Firm or Individual Name

Address

City | State | Zip

Country

Telephone

Email

Application Number

OR

Assignee of record of the entire interest. See 37 C.F.R. 3.71.

Statement under 37 C.F.R. 3.73(b) is enclosed. (Form PTO/SB/96)

SIGNATURE of Applicant or Assignee of Record

Signature	
Name	Willis Hon Hang
Date	January 15, 2010
Telephone	503 3 1 05
Title and Company	President Flexiworld Technologies Inc

NOTE: Signature of all the inventors or assignees of record of the entire interest or their representative(s) required. Submit multiple forms if more than one signature is required, see below.

Total of forms are submitted.

This collection of information is required by 37 C.F.R. 1.31 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 C.F.R. 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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STATEMENT UNDER 37 CFR 3.73 b

Applicant/Patent Owner: FlexiWorld Technologies, Inc.

Application No./Patent No.: 09/902,213 Filed/Issue Date: November 16, 2001

Titled: Method for Mobile and Pervasive Output

FlexiWorld Technologies, Inc. Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. (X) the assignee of the entire right, title, and interest in;

2. ( ) an assignee of less than the entire right, title, and interest in;
(The extent (by percentage) of its ownership interest is ____ %)

3. ( ) the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. (X) An assignment from the inventors of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 09326, Frame 0122, or for which a copy thereof is attached.

OR

B. A chain of title from the inventor(s) of the patent application/patent identified above, to the current assignee as follows:

1. From: ____ To: ____
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Reel ____ Frame ____ or for which a copy thereof is attached.

2. From: ____ To: ____
The document was recorded in the United States Patent and Trademark Office at
Reel ____ Frame ____ or for which a copy thereof is attached.

3. From: ____ To: ____
The document was recorded in the United States Patent and Trademark Office at
Reel ____ Frame ____ or for which a copy thereof is attached.

( ) Additional documents in the chain of title are listed on a supplemental sheet(s).

(X) As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was or concurrently is being submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, for recordation pursuant to 37 CFR 3.11. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

January 4, 2010

Signature: ____ Date: ____

Ilian A. Chang President

Printed or Typed Name ____ Title ____

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 09/992,413	Filing Date 11/18/2001	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	08/25/2010	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	* 70	Minus	** 70	= 0	X $26 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 7	Minus	***7	= 0	X $110 =	0	OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)					
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/VIKKI SHORT/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Application Number	09/992,413
Filing Date	November 18, 2001
First Named Inventor	William Ho Chang
Title	Method for Mobile and Pervasive Output
Art Unit	2455
Examiner Name	Asad M. Nawaz
Attorney Docket Number	FLEX.003

I hereby revoke all previous powers of attorney given in the above-identified application.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith: **23442**

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☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified application to:

☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the:

☐ Applicant/Inventor.

OR

☒ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____

SIGNATURE of Applicant or Assignee of Record

Signature	William Chang	Date	January 15, 2010
Name	William Ho Chang	Telephone	503-381-7056
Title and Company	President, Flexiworld Technologies, Inc.		

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Flexiworld Technologies, Inc.

Application No./Patent No.: 09/992,413 Filed/Issue Date: November 18, 2001

Titled:
Method for Mobile and Pervasive Output

Flexiworld Technologies, Inc. , a corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. [X] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. [X] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 012325, Frame 0362, or for which a copy therefore is attached.

OR

B. [ ] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____
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Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet(s).

[X] As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

William Ho Chang — January 15, 2010
Signature — Date

William Ho Chang — President
Printed or Typed Name — Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-130. (Cancelled)

131. (Currently amended) A data output service system for rendering at an output device output content managed from a ~~mobile~~ information apparatus, the system having one or more servers for generating output data for rendering, the ~~mobile~~ information apparatus being distinct and separate from the output device, and the one or more servers being distinct from the information apparatus and the output device, the system comprising:

means for receiving from the information apparatus at the one or more servers a security or authentication information associated with the user operating the information apparatus for authentication of the user, and in dependence of a successful authentication of the user, enabling the user access to the data output service;

means for receiving at ~~a server application operated on a~~ the one or more servers a document object ~~and an output device object, the document object and the output device object being received at the server application~~ from the ~~mobile~~ information apparatus over a network ~~that is distinct from the information apparatus and the output device~~, the document object relating to the output content ~~and the output device object having one or more attributes corresponding to the output device, including an indication of a language and or data format that is acceptable as input to the output device for rendering~~;

means for receiving at the one or more servers an output device object from the information apparatus over a network, the output device object having one or more attributes corresponding to the output device, including an indication

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of a language and or data format that is acceptable as input to the output device for rendering;

means for generating device dependent output data at the server with ~~the~~ a server application, the device dependent output data being associated with the output content and related at least in part to the indication of a language or a data format included in the output device object received from the information apparatus for rendering the output content; and

means for delivering the output data to the output device for rendering the output content.

132. (Previously presented) The system of claim 131 further comprising means for obtaining payment information from the information apparatus as payment for the data output service provided at the output device or as payment for sending the output data from the server.

133. (Currently amended) The system of claim 131 further comprising means for receiving from the ~~mobile~~ information apparatus one or more job objects having one or more attributes corresponding to the output job, including output quality.

134. (Previously presented) The system of claim 131 in which the output device object includes a pointer or a reference to the language or the data format.

135. (Previously presented) The system of claim 131 in which the output device includes a display output control unit for displaying data content.

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136. (Previously presented) The system of claim 131 in which the output device is a printer and the output data includes one or more of an image data, a graphics data, and text data.

137. (Currently amended) The system of claim 131 in which the ~~mobile~~ information apparatus is a wireless ~~mobile~~ information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance(PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

138. (Currently amended) The system of claim 132 in which the payment information is provided automatically by the ~~mobile~~ information apparatus.

139. (Currently amended) The system of claim 132 in which the payment information is provided through the ~~mobile~~ information apparatus as entered by a user in response to a prompt to enter payment information.

140. (Previously presented) The system of claim 132 in which the payment information includes service subscriber information corresponding to a pre-arranged subscription to the data output service system.

141. (Previously presented) The system of claim 140 further comprising correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

142. (Currently amended) The system of claim 131 further comprising obtaining authentication information from the ~~mobile~~ information apparatus to authenticate permission for the information apparatus to access the data output service.

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143. (Previously presented) The system of claim 131 further comprising means for establishing a communication channel between the information apparatus and the server application, the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

144. (Previously presented) The system of claim 131 in which the output device is an audio output device and the output data includes audio data.

145. (Previously presented) The system of claim 131 in which the output device is a display device and the output data includes one or more of an image data, an audio data, and a video data.

146. (Previously presented) The system of claim 131 in which the document object includes a reference or pointer related to the data content.

147. (Previously presented) The system of claim 131 in which the means for generating device dependent output data at the server includes one or more of invoking, launching, calling, utilizing, and involving one or more applications.

148. (Currently amended) A method for generating a device dependent output data acceptable for rendering at an output device, the device dependent output data corresponding to output content accessible at least partly by a ~~mobile~~ information apparatus, the method comprising:

sending from the information apparatus to a server over a network, a security or authentication information associated with the user operating the information apparatus for authentication of the user, the server being distinct from the information apparatus and the output device, and in dependence of a

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successful authentication of the user, enabling the user access to the data output service;

delivering from the ~~mobile~~ information apparatus at least part of a document object and at least part of an output device object to a the server over a network, ~~the server being distinct from the mobile information apparatus and the output device,~~ the document object being associated with the output content and the output device object including an indication of a language and or data format that is acceptable to the output device for rendering;

receiving from the server device dependent output data related at least in part to the indication of a language or a format included in the output device object delivered from the information apparatus; and

delivering the output data from the information apparatus to the output device for rendering of the output content.

149. (Currently amended) The method of claim 148 further comprising establishing a communication channel between the ~~mobile~~ information apparatus and the output device; and

receiving at the ~~mobile~~ information apparatus over the communication channel one or more attributes corresponding to the output device.

150. (Previously presented) The method of claim 148 in which the server includes a computing device in a network and the network includes one or more of an Internet, a local area network, a cellular network, and a wide area network.

151. (Previously presented) The method of claim 148 in which the output device includes one or more of a display device, a projection device, a printing device or an audio output device.

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152. (Currently amended) The method of claim 148 further comprising discovering the selected output device as one of one or more output devices that are discovered by the ~~mobile~~ information apparatus as being available for rendering the output content.

153. (Previously presented) The method of claim 148 in which the document object includes the output content.

154. (Previously presented) The method of claim 148 in which the document object includes a pointer or reference related to the output content.

155. (Previously presented) The method of claim 148 in which the server obtains the output content based on a pointer or reference to the output content included in the document object.

156. (Currently amended) The method of claim 148 in which the ~~mobile~~ information apparatus is a wireless mobile information apparatus and the wireless mobile information apparatus includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance(PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

157. (Currently amended) A method for generating device dependent output data acceptable for rendering at each of one or more selected output devices, the device dependent output data for each selected output device corresponding to an output content accessible at least partly by a ~~mobile~~ information apparatus, the method comprising:

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establishing a communication channel between the ~~mobile~~ information apparatus and one or more output devices;

receiving at the ~~mobile~~ information apparatus over the communication channel one or more attributes corresponding to one or more output devices;

selecting at the ~~mobile~~ information apparatus one or more output devices for rendering the output content;

delivering from the ~~mobile~~ information apparatus at least partially a document object and one or more output device objects to one or more servers over a network, the one or more servers being distinct from the ~~mobile~~ information apparatus and the one or more selected output devices, the document object being associated with the output content, and the one or more output device objects having one or more attributes corresponding to each of the one or more selected output devices, including an indication of a language and or data format that is acceptable to each output device for rendering;

sending from the information apparatus to the one or more servers over a network, a security or authentication information associated with the user operating the information apparatus, and in dependence of a successful authentication of the user, enabling the user access to the data output service; and

receiving from the one or more servers device dependent output data ~~for rendering the~~ corresponding to the data content ~~at the one or more selected output devices~~, the device dependent output data further being related at least in part to the indication of a language or a data format included in the one or more output device objects delivered from the information apparatus.

158. (Previously presented) The method of claim 157 in which the one or more servers are connected to a computer network that includes the Internet.

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159. (Currently amended) The method of claim 157 in which the ~~mobile~~ information apparatus is a wireless mobile information apparatus that includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance (PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

160. (Currently amended) The method of claim 157 further comprising sending payment information from the ~~mobile~~ information apparatus to the one or more servers over the network as payment for the data output service.

161. (Currently amended) The method of claim 157 further comprising discovering with the ~~mobile~~ information apparatus one or more output devices as being available for rendering the output content.

162. (Previously presented) The method of claim 157 in which the document object includes the output content.

163. (Previously presented) The method of claim 157 in which the document object includes a pointer or reference related to the output content.

164. (Previously presented) The method of claim 157 in which the one or more servers obtain output content based on the pointer or reference to the output content included in the document object.

165. (Previously presented) The method of claim 157 further comprising delivering the device dependent output data to each selected output device for rendering of the output content.

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166. (Currently amended) The method of claim 157 further comprising sending from the ~~mobile~~ information apparatus the device dependent output data for rendering at each selected output device.

167. (Currently amended) A data output method for ~~rendering at a selected output device~~ output data corresponding to the output content ~~from~~ with a ~~mobile~~ information apparatus, comprising:

~~establishing a communication channel between the mobile information apparatus and the selected output device;~~

establishing a communication channel between the ~~mobile~~ information apparatus and one or more servers over a network;

delivering from the ~~mobile~~ information apparatus at least part of a document object and at least part of an output device object to the one or more servers, ~~which is or are~~ the one or more servers being distinct from the ~~mobile~~ information apparatus and the output device, the document object ~~being associated with~~ including a pointer or reference to the output content for the one or more servers to retrieve the data content from a content server with the pointer or reference, and the output device object including at least an indication related to a form or format that is acceptable for rendering at ~~the~~ a selected output device;

sending from the information apparatus to the one or more servers over a network, a security or authentication information associated with the user operating the information apparatus for authentication of the user;

receiving at the ~~mobile~~ information apparatus device dependent output data from the one or more servers, the output data corresponding to the output content and being related at least in part to the indication of a form or format that is acceptable to the selected output device for rendering~~; and~~

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~~delivering the device specific output data from the mobile information apparatus to the selected output device for rendering the output content~~.

168. (Currently amended) The method of claim 167 further comprising obtaining an output device object at the ~~mobile~~ information apparatus, the obtaining of the output device object including one or more of obtaining information from a user input, from a communication with the selected output device, and or from a default parameter or preference.

169. (Currently amended) The method of claim 167 further comprising discovering the selected output device as one of one or more output devices that are discovered by the ~~mobile~~ information apparatus as being available for rendering the output content.

170. (Previously presented) The method of claim 167 further comprising selecting an output device compatible for receiving the output data.

171. (Currently amended) The method of claim 167 further comprising conforming at the ~~mobile~~ information apparatus the output data into a form more suitable for rendering at the selected output device.

172. (Currently amended) A system for generating a device dependent output data acceptable for rendering at an output device, the device dependent output data corresponding to output content accessible at least partly by a ~~mobile~~ information apparatus, comprising:

a server that is distinct from the ~~mobile~~ information apparatus and the output device, the server being operable to receive a document object and at least part of an output device object, the document object being associated with

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the output content and the output device object having one or more attributes corresponding to the output device, including an indication of a language and or data format that is acceptable to the output device for rendering the output content;, the server being further operable to receive from the information apparatus a security or authentication information associated with the user operating the information apparatus for authentication of the user;

a server application on the server for receiving the document object and at least part of the output device object and for generating the device dependent output data related at least in part to the indication of a language or a data format included in the output device object received from information apparatus; and

means for delivering the device dependent output data to the output device for rendering of the output content.

173. (Previously presented) The system of claim 172 further comprising means for establishing a communication channel between the information apparatus and the server application, and the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

174. (Previously presented) The system of claim 172 in which the output device includes an audio output device and the output data includes audio data.

175. (Previously presented) The system of claim 172 in which the output device includes a display device and the output data includes one or more of an image data, an audio data, and a video data.

176. (Previously presented) The system of claim 172 in which the output device includes a printing device and the output data includes one or more of an image data, a graphics data, and a text data.

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177. (Currently amended) A system for generating device dependent output data acceptable for rendering at each of one or more selected output devices, the device dependent output data for each selected output device corresponding to an output content accessible at least partly by a ~~mobile~~ information apparatus, comprising:

a server that is accessible over a network and is distinct from the ~~mobile~~ information apparatus and the one or more selected output devices, the server being operable for receiving from the ~~mobile~~ information apparatus one or more document objects and one or more output device objects, the one or more document objects being associated with the output content and the one or more output device objects having one or more attributes corresponding to the one or more selected output devices, including an indication of a language and or data format that is acceptable to the output device for rendering;

means for establishing a communication channel between the server and the ~~mobile~~ information apparatus at least in part over an Internet;

means for receiving at the server from the information apparatus a security or authentication information associated with the user operating the information apparatus for authentication of the user; and

a server application operating at the server for generating device dependent output data associated with each of the corresponding one or more selected output devices, the device dependent output data being related at least in part to the indication of a language or a data format included in the output device object received from the information apparatus; and

means for delivering the device dependent output data to the ~~mobile~~ information apparatus over the communication channel.

178. (Currently amended) The system of claim 177 further comprising means for delivering the device dependent output data from the ~~mobile~~ information

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apparatus to the one or more selected output devices for rendering of the output content.

179. (Previously presented) The system of claim 177 in which each output device includes one of a display device and an audio output device and the output data including audio data.

180. (Currently amended) In a computer memory, client software operable from a ~~mobile~~ information apparatus for generating device dependent output data acceptable for rendering at a selected output device, the device dependent output data corresponding to output content accessible at least partly by the ~~mobile~~ information apparatus, the computer memory comprising:

software for delivering from the ~~mobile~~ information apparatus at least part of a document object and at least part of an output device object to a server that is distinct from the ~~mobile~~ information apparatus and the output device, the document object being associated with the output content and the output device object having one or more device dependent attributes corresponding to the selected output device and including an indication of a language or a data format that is acceptable to the output device for rendering, the document object and the output device object being required at the server for generating device dependent output data corresponding to the output content and acceptable for rendering at the selected output device;

software for sending from the information apparatus to the server over a network, a security or authentication information associated the user operating the information apparatus for authentication of the user;

software for receiving at the ~~mobile~~ information apparatus the output data for rendering at the selected output device; and

~~software for delivering the output data from the mobile information apparatus to the selected output device for rendering of the output content.~~

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181. (Currently amended) The computer memory of claim 180 further comprising software for establishing communication between the ~~mobile~~ information apparatus and one or more output devices.

182. (Currently amended) The computer memory of claim 180 further comprising software for establishing a communication channel between the ~~mobile~~ information apparatus and the server, the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

183. (Currently amended) The computer memory of claim 180 in which the information apparatus is a wireless ~~mobile~~ information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance (PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

184. (Previously presented) The computer memory of claim 180 in which the output device being one of a display device and an audio output device and the output data includes audio data.

185. (Previously presented) The computer memory of claim 180 in which the output device includes a printer and the output data include one or more of an image data, a graphics data, and text data.

186. (Currently amended) The computer memory of claim 180 further comprising software for obtaining payment information at the ~~mobile~~ information apparatus as payment for receiving the output data.

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187. (Previously presented) The computer memory of claim 181 in which the communication channel is a wireless communication channel and the computer memory further comprises software for discovering the one or more output devices over the wireless communication channel.

189. (Currently amended) The system of claim 177 in which the communication channel between the ~~mobile~~ information apparatus and one or more output devices includes a wireless communication channel.

190. (Previously presented) The system of claim 177 in which the output device includes a printing device and the output data includes one or more of an image data, a graphics data, and a text data.

191. (Previously presented) The system of claim 177 in which the document object includes a reference or pointer related to the data content.

192. (Previously presented) The system of claim 177 in which the output device object further includes an identification related to the output device, the identification including one or more of an output device brand, model, registration, and IP address.

193 (Previously presented) The system of claim 172 in which the document object includes a reference or pointer related to the data content.

194. (Previously presented) The system of claim 172 further comprising means for retrieving data content employing the document object.

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195. (Currently amended) The method of claim 167 further comprising obtaining payment information at the ~~mobile~~ information apparatus as payment for receiving the output data corresponding to the output content.

196. (Currently amended) The method of claim 167 further comprising obtaining a document object at the ~~mobile~~ information apparatus, including a user selecting at least a pointer or reference to a data content.

197. (Currently amended) The method of claim 167 in which the communication channel between the ~~mobile~~ information apparatus and the server includes one or more of an Internet, a local area network, a cellular network, and a wide area network.

198. (Currently amended) The method of claim 167 in which the communication channel between the ~~mobile~~ information apparatus and the selected output device includes a wireless communication channel and the method further comprises discovering the one or more output device over the wireless communication channel.

199. (Currently amended) The method of claim 167 in which the ~~mobile~~ information apparatus is a wireless ~~mobile~~ information apparatus and the information apparatus includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance(PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

200. (Previously presented) The method of claim 157 in which the communication channel includes a wireless communication channel and the

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method further comprises discovering the one or more output device over the wireless communication channel.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,413	11/18/2001	William Ho Chang	1282-011/MMM	5528

21034 7590 05/25/2010

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EXAMINER	
NAWAZ, ASAD M	
ART UNIT	PAPER NUMBER
2455	
MAIL DATE	DELIVERY MODE
05/25/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/992,413	CHANG ET AL.	
	Examiner	Art Unit	
	ASAD M. NAWAZ	2455	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/22/10*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *131-200* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *131-200* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is responsive to the amendments received 9/30/09. Claims 131-135, 147-149, 151, 157, 159-160, 163-164, 166-168, 172, 177-178, 180-187, and 192 have been amended. No new claims have been added and no claims have been canceled. Accordingly, claims 131-200 are pending.

Response to Arguments

2. Applicant's arguments with respect to claims 130-200 have been considered but are moot in view of the new ground(s) of rejection.

Examiner's Note - 35 USC § 112

3. The examiner has noted the use of 35 USC 112, 6th paragraph, means plus function language in the claims.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 131, 133-137, 143-200 are rejected under 35 U.S.C. 103(a) as being taught by Yacoub (US Patent No 6,452,692) further in view of Sugahara (US Patent No 7,593,123).

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As to claim 131, Yacoub teaches a data output service system for rendering at an output device output content managed from a mobile information apparatus, the mobile information apparatus being distinct and separate from the output device, the system comprising:

means for receiving at a server application operated on a server a document object and an output device object, the document object and the output device object being received at the server application from the mobile information apparatus over a network that is distinct from the information apparatus and the output device, the document object relating to the output content and the output device object having one or more attributes corresponding to the output device (col 2, liens 29-43; the mobile user sends a print document and the preferences to a server);

means for generating at the server with the server application device dependent output data related to the output device for rendering the output content (col 2, lines 29-53; the server automatically determines which printer of the printers on the network comply with the preferences, spools a job, and updates software/drivers) and

means for delivering the output data to the mobile information apparatus for rendering the output content at the output device (col 2, lines 29-43; printer prints job).

However, Yacoub does not explicitly indicate means for generating device dependent output data wherein the device dependent output data is related to a language and/or data format that is acceptable as input for rendering.

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Sugahara teaches an apparatus in which one such output device attribute is the language wherein the printing devices are categorized by language groups (see col 1, lines 42-65).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Suguhara into those of Yacoub to make the system more efficient. By allowing the system of Yacoub to receive device dependent data and allowing a group of device categorized as being able to serve the same data, more jobs can be served in less time.

As to claim 133, Yacoub teaches the system of claim 131 further comprising means for receiving from the mobile information apparatus one or more job objects having one or more attributes corresponding to the output job, including output quality (col 5, lines 29-42).

As to claim 134, Yacoub teaches the system of claim 133 in which the output object includes a pointer or a reference to the language or data format (see Sugahara col 1, lines 42-65).

As to claim 135, Yacoub teaches the system of claim 131 in which the output device includes a display output control unit for displaying data content (abstract).

As to claim 136, Yacoub teaches the system of claim 131 in which the output device is a printer and the output data includes one or more of an image data, a graphics data, and text data (col 2, lines 29-53).

As to claim 137, Yacoub teaches the system of claim 131 in which the mobile information apparatus is a wireless mobile information apparatus and includes one or

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more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance(PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera (col 12, lines 10-20).

As to claim 159, Yacoub teaches the method of claim 157 in which the generating of the output data for each selected output device includes one or more of invoking, launching, calling, utilizing, and involving one or more applications (col 2, lines 29-53).

As to claim 160, Yacoub teaches the method of claim 157 in which the generating of the output data for each selected output device includes at least partially one or more of a conversion operation and an raster image processing operation (col 2, lines 29-53).

As to claim 161, Yacoub teaches the method of claim 157 further comprising discovering with the mobile information apparatus one or more output devices as being available for rendering the output content (col 2, lines 29-53).

As to claims 143-158 and 162-200, the contain similar limitations as the claims above and are rejected under similar rationale.

6. Claims 132 and 138-142 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yacoub and Sugahara in view of Stewart (USPGPUB 2004/0057075).

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As to claim 132, Yacoub and Sugahara teach the system of claim 131 however, does not explicitly indicate means for obtaining payment information from the information apparatus as payment for the data output service provided at the output device or as payment for receiving the output data from the server.

Stewart teaches means for obtaining payment information from the information apparatus as payment for the data output service provided at the output device or as payment for sending the output data from the server (0052).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Yacoub and Sugahara to make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

As to claim 138, Yacoub and Sugahara teach the system of claim 132, however, Yacoub does not teach the payment information is provided automatically by the mobile information apparatus.

Stewart teches the payment information is provided automatically by the mobile information apparatus (0052).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Yacoub and Sugahara to make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

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As to claim 139, Yacoub and Sugahara teach the system of claim 132, however does not teach the payment information is provided through the mobile information apparatus as entered by a user in response to a prompt to enter payment information.

Stewart teaches the payment information is provided through the mobile information apparatus as entered by a user in response to a prompt to enter payment information (0052).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Yacoub and Sugahara to make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

As to claim 140, Yacoub and Sugahara teach the system of claim 132, however, does not explicitly indicate the payment information includes service subscriber information corresponding to a pre-arranged subscription to the data output service system.

Stewart teaches the payment information includes service subscriber information corresponding to a pre-arranged subscription to the data output service system (0052)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Yacoub and Sugahara to make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

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As to claim 141, Yacoub and Sugahara teach the system of claim 140, however, does not teach correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

Stewart teaches correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information (0052).

As to claim 142, Yacoub and Sugahara teaches the system of claim 131, however, does not teach obtaining authentication information from the mobile information apparatus to authenticate permission for the information apparatus to access the data output service.

Stewart teaches obtaining authentication information from the mobile information apparatus to authenticate permission for the information apparatus to access the data output service (0018, 0046).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Yacoub and Sugahara to make the system more secure.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ASAD M. NAWAZ whose telephone number is (571)272-3988. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Saleh Najjar can be reached on (571) 272-4006. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Asad M Nawaz/
Primary Examiner, Art Unit 2455

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Notice of References Cited	Application/Control No. 09/992,413	Applicant(s)/Patent Under Reexamination CHANG ET AL.	
	Examiner ASAD M. NAWAZ	Art Unit 2455	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,593,123	09-2009	Sugahara, Yoshinori	358/1.14
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
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	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	09992413	CHANG ET AL.
	Examiner	Art Unit
	Nawaz, Asad M	2455

SEARCHED

Class	Subclass	Date	Examiner
709	203-230, 245-48	6/13/07	AMN
715	500, 516-517,969	6/13/07	AMN
710	8, 10	6/13/07	AMN
358	1.1	3/29/09	AMN

SEARCH NOTES

Search Notes	Date	Examiner
East Search (USPAT; USPGPUB; EPO: JPO: DERWENT; IBM_TDB)	6/13/07	AMN
Inventor Name Search for ODP	6/16/07	AMN
updated East search	3/29/09	AMN
updated inventor name search	3/29/09	AMN
updated East search	1/18/09	AMN
updated classification and inventor name search	5/18/10	AMN

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

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✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
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CLAIM		DATE								
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CLAIM		DATE								
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CLAIM		DATE								
Final	Original	04/02/2007	06/25/2007	03/29/2009	05/18/2010					
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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
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✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
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CLAIM		DATE								
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CLAIM		DATE								
Final	Original	04/02/2007	06/25/2007	03/29/2009	05/18/2010					
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	199			✓	✓					
	200			✓	✓					

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	448108	printer near4 (accept$4 or tak $4) select$4 near4 (input or output or format)	US-PGPUB; USPAT	OR	ON	2010/01/19 10:11
L2	30777	printer near4 (accept$4 or tak $4) select$4 near4 (input or output or format) near6 only	US-PGPUB; USPAT	OR	ON	2010/01/19 10:12
L3	1006803	@rlad<="20001120"	US-PGPUB; USPAT	OR	ON	2010/01/19 10:15
L4	6201	3 and 2	US-PGPUB; USPAT	OR	ON	2010/01/19 10:15
L5	14966	printer near4 (accept$4 or tak $4) select$4 near4 (input or output or format) near6 only. ab.	US-PGPUB; USPAT	OR	ON	2010/01/19 10:15
L6	831079	"15" and 3	US-PGPUB; USPAT	OR	ON	2010/01/19 10:15
L7	3050	5 and 3	US-PGPUB; USPAT	OR	ON	2010/01/19 10:16
L8	16	printer near4 (accept$4 or tak $4) near4 (input or output or format) near6 only	US-PGPUB; USPAT	OR	ON	2010/01/19 10:18
L9	5	8 and 3	US-PGPUB; USPAT	OR	ON	2010/01/19 10:18
L10	27	printer near4 (accept$4 or tak $4) near4 (input or output or format).ab.	US-PGPUB; USPAT	OR	ON	2010/01/19 10:18
L11	2	10 and 3	US-PGPUB; USPAT	OR	ON	2010/01/19 10:18
L12	7	11 or 9	US-PGPUB; USPAT	OR	ON	2010/01/19 10:18

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L13	161	(select$4 or choos$4 or pick $4) near6 print$4 near4 (accept $4 or tak$4) near4 (input or output or format)	US-PGPUB; USPAT	OR	ON	2010/01/19 10:23
L14	26	13 and 3	US-PGPUB; USPAT	OR	ON	2010/01/19 10:23
L15	2	13.ab. and 3	US-PGPUB; USPAT	OR	ON	2010/01/19 10:23
L16	154	(select$4 or choos$4 or pick $4) near6 (output near2 device) near4 (accept$4 or tak $4) near4 (input or output or format)	US-PGPUB; USPAT	OR	ON	2010/01/19 10:40
L17	22	16 and 3	US-PGPUB; USPAT	OR	ON	2010/01/19 10:41
L18	1	"7593123".pn.	US-PGPUB; USPAT	OR	ON	2010/01/19 10:57

EAST Search History (Interference)

<This search history is empty>

1/19/10 11:06:12 AM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: : William Ho Chang

Serial No.: : 09/992,413

Filed: : November 18, 2001

For: : Method For Mobile And Pervasive Output

Examiner: : Asad M. Nawaz

TC/A.U.: : 2455

Date: : February 22, 2010

The Honorable Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NOTICE OF NON-COMPLIANT AMENDMENT

In response to the Notice of Non-Compliant Amendment dated January 22, 2010, please amend the application as follows and consider the following remarks:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 18 of this paper.

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REMARKS/ARGUMENTS

Claims 131-200 are currently pending in the application. Claims 131, 148, 157, 167, 172, 177, and 180 are in independent form. The listing of claims herein replaces the listing of claims filed on September 30, 2009.

Prior to this Response, a Notice of Non-Compliant Amendment was mailed January 22, 2010. In the Notice, the Examiner indicated that not all added claim limitations had been underlined. Specifically, the Examiner indicated that the amendment document filed on September 30, 2009 failed to comply with 37 C.F.R. § 1.121 because it failed to underline all claim limitations added relative to the previous claim set filed on January 23, 2009. As an example, the Examiner cited the claim 131 element "means for generating device dependent output data at the server" for which only "output data" was underlined in the amendment. The Examiner noted that other claims exhibited similar deficiencies.

Applicant has herein corrected the deficiencies cited by the Examiner. Moreover, Applicant has corrected additional errors and/or similar deficiencies for claims 131, 132, 167, and 172. For example, in claim 131 the amendment in the last paragraph "means for delivering the output data to the output device for rendering the output content" has been restored back to the claim element as recited in the prior version filed on January 23, 2009.

Applicant respectfully asserts that they have corrected each error and/or deficiency in the claims and that the current claim listing, including amendments,

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complies with 37 CFR § 1.121 as it includes appropriate underlining and strikethrough relative to the previous claim listing filed on January 23, 2009.

For clarity, Applicant confirms that the above listing of claims shall replace the listing of claims filed on September 30, 2009. Accordingly, the strikethrough and underlining shown in the listing of claims above are relative to the claims filed on January 23, 2009, and NOT relative to the listing of claims filed on September 30, 2009.

Respectfully submitted,

/Jon C. Reali/

JON C. REALI
USPTO Reg. No. 54,391

RYLANDER & ASSOCIATES PC
406 West 12th Street
Vancouver, Washington 98660
(360) 750-9931

Electronic Acknowledgement Receipt

EFS ID:	7063262
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Customer Number:	21034
Filer:	Jon Charles Reali
Filer Authorized By:	
Attorney Docket Number:	1282-011/MMM
Receipt Date:	22-FEB-2010
Filing Date:	18-NOV-2001
Time Stamp:	22:40:30
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	3741asfiled.pdf	53178 [illegible]	no	19

Warnings:	
Information:	

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Total Files Size (in bytes):	53178

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-130. (Cancelled)

131. (Currently amended) A data output service system for rendering at an output device output content managed from a mobile information apparatus, the mobile information apparatus being distinct and separate from the output device, the system comprising:

means for ~~delivering from the mobile information apparatus~~ receiving at a server application operated on a server a document object and an output device object, ~~to a server application operated on a server~~ the document object and the output device object being received at the server application from the mobile information apparatus over a network that is distinct from the information apparatus and the output device, the document object relating to the output content and the output device object having one or more attributes corresponding to the output device, including an indication of a language and or data format that is acceptable as input to the output device for rendering;

means for generating device dependent output data at the server with the server application, the device dependent output data being related at least in part to the indication of a language or a data format included in the output device object for rendering the output content; and

means for delivering the output data to the output device for rendering the output content.

132. (Currently amended) The system of claim 131 further comprising means for obtaining payment information from the information apparatus as payment for

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the data output service provided at the output device or as payment for ~~receiving~~ sending the output data from the server.

133. (Currently amended) The system of claim 131 ~~in which the means for delivering the document object and the output device object to the server application includes the document object and the output device object being delivered from the mobile information apparatus to the server application.~~ further comprising means for receiving from the mobile information apparatus one or more job objects having one or more attributes corresponding to the output job, including output quality.

134. (Currently amended) The system of claim ~~133 in which the means for delivering the output data to the output device also receives at the mobile information apparatus the output data from the server application and delivers the output data to the output device.~~ 131 in which the output device object includes a pointer or a reference to the language or the data format.

135. (Currently amended) The system of claim ~~133~~ 131 in which the output device includes a display output control unit for displaying data content.

136. (Previously presented) The system of claim 131 in which the output device is a printer and the output data includes one or more of an image data, a graphics data, and text data.

137. (Previously presented) The system of claim 131 in which the mobile information apparatus is a wireless mobile information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop computer, a

personal digital assistance(PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

138. (Previously presented) The system of claim 132 in which the payment information is provided automatically by the mobile information apparatus.

139. (Previously presented) The system of claim 132 in which the payment information is provided through the mobile information apparatus as entered by a user in response to a prompt to enter payment information.

140. (Previously presented) The system of claim 132 in which the payment information includes service subscriber information corresponding to a pre-arranged subscription to the data output service system.

141. (Previously presented) The system of claim 140 further comprising correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

142. (Previously presented) The system of claim 131 further comprising obtaining authentication information from the mobile information apparatus to authenticate permission for the information apparatus to access the data output service.

143. (Previously presented) The system of claim 131 further comprising means for establishing a communication channel between the information apparatus and the server application, the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

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144. (Previously presented) The system of claim 131 in which the output device is an audio output device and the output data includes audio data.

145. (Previously presented) The system of claim 131 in which the output device is a display device and the output data includes one or more of an image data, an audio data, and a video data.

146. (Previously presented) The system of claim 131 in which the document object includes a reference or pointer related to the data content.

147. (Currently amended) The system of claim 131 in which the means for generating device dependent output data at the server includes one or more of invoking, launching, calling, utilizing, and involving one or more applications. ~~the output device object includes an indication of a data form or data format that is acceptable as input to the output device for rendering the output content.~~

148. (Currently amended) A method for generating a device dependent output data acceptable for rendering at a an ~~selected~~ output device, the device dependent output data corresponding to output content accessible at least partly by a mobile information apparatus, the method comprising:

delivering from the mobile information apparatus at least part of a document object and at least part of an output device object to a server over a network, the server being distinct from the mobile information apparatus and the output device, the document object being associated with the output content and the output device object ~~having one or more device dependent attributes corresponding to the selected output device,~~ including an indication of a language and or data format that is acceptable to the output device for rendering;

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~~generating at~~ receiving from the server device dependent output data related at least in part to the indication of a language or a format included in the output device object ~~to output content and acceptable for rendering at the selected output device~~; and

delivering the output data from the information apparatus to the ~~selected~~ output device for rendering of the output content.

149. (Currently amended) The method of claim 148 further comprising establishing a communication channel between the mobile information apparatus and the ~~selected~~ output device; and

receiving at the mobile information apparatus over the communication channel one or more attributes corresponding to the ~~selected~~ output device.

150. (Previously presented) The method of claim 148 in which the server includes a computing device in a network and the network includes one or more of an Internet, a local area network, a cellular network, and a wide area network.

151. (Currently amended) The method of claim 148 in which the ~~generating of the output data includes at least partially one or more of a conversion operation and a raster image processing operation~~ output device includes one or more of a display device, a projection device, a printing device or an audio output device.

152. (Previously presented) The method of claim 148 further comprising discovering the selected output device as one of one or more output devices that are discovered by the mobile information apparatus as being available for rendering the output content.

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153. (Previously presented) The method of claim 148 in which the document object includes the output content.

154. (Previously presented) The method of claim 148 in which the document object includes a pointer or reference related to the output content.

155. (Previously presented) The method of claim 148 in which the server obtains the output content based on a pointer or reference to the output content included in the document object.

156. (Previously presented) The method of claim 148 in which the mobile information apparatus is a wireless mobile information apparatus and the mobile information apparatus includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance(PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

157. (Currently amended) A method for generating device dependent output data acceptable for rendering at each of one or more selected output devices, the device dependent output data for each selected output device corresponding to an output content accessible at least partly by a mobile information apparatus, the method comprising:

establishing a communication channel between the mobile information apparatus and one or more output devices;

receiving at the mobile information apparatus over the communication channel one or more attributes corresponding to one or more output devices;

selecting at the mobile information apparatus one or more output devices for rendering the output content;

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delivering from the mobile information apparatus at least partially a document object and one or more output device objects to one or more servers over a network, the one or more servers being distinct from the mobile information apparatus and the one or more selected output devices, the document object being associated with the output content, and the one or more output device objects having one or more attributes corresponding to each of the one or more selected output devices, including an indication of a language and or data format that is acceptable to each output device for rendering; and

~~generating at~~ receiving from the one or more servers device dependent output data for rendering the data content at the one or more selected output devices, the device dependent output data related at least in part to the indication of a language or a data format included in the one or more output device objects ~~associated with each of the corresponding one or more selected output devices~~.

158. (Previously presented) The method of claim 157 in which the one or more servers are connected to a computer network that includes the Internet.

159. (Currently amended) The method of claim 157 in which ~~the generating of the output data for each selected output device includes one or more of invoking, launching, calling, utilizing, and involving one or more applications~~ the mobile information apparatus is a wireless mobile information apparatus that includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance (PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

160. (Currently amended) The method of claim 157 further comprising sending payment information from the mobile information apparatus to the one or more servers over the network as payment for the data output service. ~~in which the generating of the output data for each selected output device includes at least~~

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~~partially one or more of a conversion operation and an raster image processing operation.~~

161. (Previously presented) The method of claim 157 further comprising discovering with the mobile information apparatus one or more output devices as being available for rendering the output content.

162. (Previously presented) The method of claim 157 in which the document object includes the output content.

163. (Previously presented) The method of claim 157 in which the document object includes a pointer or reference related to the output content.

164. (Currently amended) The method of claim 157 in which the one or more servers obtain ~~the document object~~ output content based on the pointer or reference to the output content included in the document object.

165. (Previously presented) The method of claim 157 further comprising delivering the device dependent output data to each selected output device for rendering of the output content.

166. (Currently amended) The method of claim 157 further comprising ~~receiving at the mobile information apparatus~~ sending from the mobile information apparatus the device dependent output data for rendering at each selected output device.

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167. (Currently amended) A data output method for rendering at a selected output device output content from a mobile information apparatus, comprising:

establishing a communication channel between the mobile information apparatus and the selected output device;

establishing a communication channel between the mobile information apparatus and a one or more servers over a network;

delivering from the mobile information apparatus at least part of a document object and at least part of an output device object to the one or more servers ~~server~~, which is or are distinct from the mobile information apparatus and the output device, the document object being associated with the output content and the output device object including at least an indication related to a form or format that is acceptable for rendering at the selected output device;

receiving at the mobile information apparatus device dependent output data from the ~~server~~ one or more servers, the output data corresponding to the output content and being related at least in part to the indication of a form or format that is ~~to the output content and~~ acceptable to the selected output device for rendering ~~at the selected output device~~; and

delivering the device specific output data from the mobile information apparatus to the selected output device for rendering the output content.

168. (Currently amended) The method of claim 167 further comprising obtaining an output device object at the mobile information apparatus, the obtaining of the output device object including one or more of obtaining information from a user input, from a communication with the selected output device, and or from a default parameter or preference.

169. (Previously presented) The method of claim 167 further comprising discovering the selected output device as one of one or more output devices that

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are discovered by the mobile information apparatus as being available for rendering the output content.

170. (Previously presented) The method of claim 167 further comprising selecting an output device compatible for receiving the output data.

171. (Previously presented) The method of claim 167 further comprising conforming at the mobile information apparatus the output data into a form more suitable for rendering at the selected output device.

172. (Currently amended) A system for generating a device dependent output data acceptable for rendering at an output device, the device dependent output data corresponding to output content accessible at least partly by a mobile information apparatus, comprising:

a server that is distinct from the mobile information apparatus and the output device, the server being operable to receive a document object and at least part of an output device object, the document object being associated with the output content and the output device object having one or more attributes corresponding to the output device, including an indication of a language and or data format that is acceptable to the output device for rendering the output content;

a server application on the server for receiving the document object and at least part of the output device object and for generating the device dependent output data related at least in part to the indication of ~~in a form~~ a language or a data format included in the output device object ~~that is acceptable to the output device~~; and

means for delivering the device dependent output data to the output device for rendering of the output content.

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173. (Previously presented) The system of claim 172 further comprising means for establishing a communication channel between the information apparatus and the server application, and the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

174. (Previously presented) The system of claim 172 in which the output device includes an audio output device and the output data includes audio data.

175. (Previously presented) The system of claim 172 in which the output device includes a display device and the output data includes one or more of an image data, an audio data, and a video data.

176. (Previously presented) The system of claim 172 in which the output device includes a printing device and the output data includes one or more of an image data, a graphics data, and a text data.

177. (Currently amended) A system for generating device dependent output data acceptable for rendering at each of one or more selected output devices, the device dependent output data for each selected output device corresponding to an output content accessible at least partly by a mobile information apparatus, comprising:

a server that is accessible over a network and is distinct from the mobile information apparatus and the one or more selected output devices, the server being operable for receiving from the mobile information apparatus one or more document objects and one or more output device objects, the one or more document objects being associated with the output content and the one or more

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output device objects having one or more attributes corresponding to the one or more selected output devices, including an indication of a language and or data format that is acceptable to the output device for rendering;

means for establishing a communication channel between the server and the mobile information apparatus at least in part over an Internet; and

a server application operating at the server for generating device dependent output data associated with each of the corresponding one or more selected output devices, the device dependent output data being related at least in part to the indication of a language or a data format included in the output device object; and

means for delivering the device dependent output data to the mobile information apparatus over the communication channel.

178. (Currently amended) The system of claim 177 further comprising means for delivering the device dependent output data from the mobile information apparatus to the one or more selected output devices for rendering of the output content.

179. (Previously presented) The system of claim 177 in which each output device includes one of a display device and an audio output device and the output data including audio data.

180. (Currently amended) In a computer ~~readable medium~~ memory, client software operable from a mobile information apparatus for generating device dependent output data acceptable for rendering at a selected output device, the device dependent output data corresponding to output content accessible at least partly by the mobile information apparatus, the ~~medium~~ computer memory comprising:

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software for delivering from the mobile information apparatus at least part of a document object and at least part of an output device object to a server that is distinct from the mobile information apparatus and the output device, the document object being associated with the output content and the output device object having one or more device dependent attributes corresponding to the selected output device and including an indication of a language or a data format that is acceptable to the output device for rendering, the document object and the output device object being required at the server for generating device dependent output data corresponding to the output content and acceptable for rendering at the selected output device;

software for receiving at the mobile information apparatus the output data for rendering at the selected output device; and

software for delivering the output data from the mobile information apparatus to the selected output device for rendering of the output content.

181. (Currently amended) The ~~medium~~ computer memory of claim 180 further comprising software for establishing communication between the mobile information apparatus and one or more output devices.

182. (Currently amended) The ~~medium~~ computer memory of claim 180 further comprising software for establishing a communication channel between the mobile information apparatus and the server, the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

183. (Currently amended) The ~~medium~~ computer memory of claim 180 in which the information apparatus is a wireless mobile information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop

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computer, a personal digital assistance (PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

184. (Currently amended) The ~~medium~~ computer memory of claim 180 in which the output device being one of a display device and an audio output device and the output data includes audio data.

185. (Currently amended) The ~~medium~~ computer memory of claim 180 in which the output device includes a printer and the output data include one or more of an image data, a graphics data, and text data.

186. (Currently amended) The ~~medium~~ computer memory of claim 180 further comprising software for obtaining payment information at the mobile information apparatus as payment for receiving the output data ~~corresponding to the output content~~.

187. (Currently amended) The ~~medium~~ computer memory of claim 181 in which the communication channel is a wireless communication channel and the ~~medium~~ computer memory further comprises software for discovering the one or more output devices over the wireless communication channel.

189. (Previously presented) The system of claim 177 in which the communication channel between the mobile information apparatus and one or more output devices includes a wireless communication channel.

190. (Previously presented) The system of claim 177 in which the output device includes a printing device and the output data includes one or more of an image data, a graphics data, and a text data.

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191. (Previously presented) The system of claim 177 in which the document object includes a reference or pointer related to the data content.

192. (Currently Amended) The system of claim 177 in which ~~generating device dependent output data at the server includes retrieving data content employing the document object.~~ the output device object further includes an identification related to the output device, the identification including one or more of an output device brand, model, registration, and IP address.

193 (Previously presented) The system of claim 172 in which the document object includes a reference or pointer related to the data content.

194. (Previously presented) The system of claim 172 further comprising means for retrieving data content employing the document object.

195. (Previously presented) The method of claim 167 further comprising obtaining payment information at the mobile information apparatus as payment for receiving the output data corresponding to the output content.

196. (Previously presented) The method of claim 167 further comprising obtaining a document object at the mobile information apparatus, including a user selecting at least a pointer or reference to a data content.

197. (Previously presented) The method of claim 167 in which the communication channel between the mobile information apparatus and the

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server includes one or more of an Internet, a local area network, a cellular network, and a wide area network.

198. (Previously presented) The method of claim 167 in which the communication channel between the mobile information apparatus and the selected output device includes a wireless communication channel and the method further comprises discovering the one or more output device over the wireless communication channel.

199. (Previously presented) The method of claim 167 in which the mobile information apparatus is a wireless mobile information apparatus and the information apparatus includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance(PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

200. (Previously presented) The method of claim 157 in which the communication channel includes a wireless communication channel and the method further comprises discovering the one or more output device over the wireless communication channel.

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PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 09/992,413	Filing Date 11/18/2001	☐ To be Mailed

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☒ RATE ($)	SMALL ENTITY ☒ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 02/22/2010	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 69	Minus	** 69	= 0	X $26 =	0	OR	X $ =	
Independent (37 CFR 1.16(h))	* 7	Minus	***7	= 0	X $110 =	0	OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/VENESSA JONES/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,413	11/18/2001	William Ho Chang	1282-01J/MMM	5528

21034 7590 01/22/2010

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PORTLAND, OR 97201

EXAMINER	
NAWAZ, ASAD M	
ART UNIT	PAPER NUMBER
2455	
MAIL DATE	DELIVERY MODE
01/22/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

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Notice of Non-Compliant Amendment (37 CFR 1.121)	Application No. 09/992,413	Applicant(s) CHANG ET AL.	
	Examiner ASAD M. NAWAZ	Art Unit 2455	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

The amendment document filed on *30 September 2009* is considered non-compliant because it has failed to meet the requirements of 37 CFR 1.121 or 1.4. In order for the amendment document to be compliant, correction of the following item(s) is required.

THE FOLLOWING MARKED (X) ITEM(S) CAUSE THE AMENDMENT DOCUMENT TO BE NON-COMPLIANT:

- ☐ 1. Amendments to the specification:
  - ☐ A. Amended paragraph(s) do not include markings.
  - ☐ B. New paragraph(s) should not be underlined.
  - ☐ C. Other _____.
- ☐ 2. Abstract:
  - ☐ A. Not presented on a separate sheet. 37 CFR 1.72.
  - ☐ B. Other _____.
- ☐ 3. Amendments to the drawings:
  - ☐ A. The drawings are not properly identified in the top margin as "Replacement Sheet," "New Sheet," or "Annotated Sheet" as required by 37 CFR 1.121(d).
  - ☐ B. The practice of submitting proposed drawing correction has been eliminated. Replacement drawings showing amended figures, without markings, in compliance with 37 CFR 1.84 are required.
  - ☐ C. Other _____.
- ☒ 4. Amendments to the claims:
  - ☐ A. A complete listing of all of the claims is not present.
  - ☐ B. The listing of claims does not include the text of all pending claims (including withdrawn claims)
  - ☐ C. Each claim has not been provided with the proper status identifier, and as such, the individual status of each claim cannot be identified. Note: the status of every claim must be indicated after its claim number by using one of the following status identifiers: (Original), (Currently amended), (Canceled), (Previously presented), (New), (Not entered), (Withdrawn) and (Withdrawn-currently amended).
  - ☐ D. The claims of this amendment paper have not been presented in ascending numerical order.
  - ☒ E. Other: *See Continuation Sheet*.
- ☐ 5. Other (e.g., the amendment is unsigned or not signed in accordance with 37 CFR 1.4):

_____

For further explanation of the amendment format required by 37 CFR 1.121, see MPEP § 714.

TIME PERIODS FOR FILING A REPLY TO THIS NOTICE:

1. Applicant is given **no new time period** if the non-compliant amendment is an after-final amendment or an amendment filed after allowance. If applicant wishes to resubmit the non-compliant after-final amendment with corrections, the **entire corrected amendment** must be resubmitted.

2. Applicant is given **one month**, or thirty (30) days, whichever is longer, from the mail date of this notice to supply the correction, if the non-compliant amendment is one of the following: a preliminary amendment, a non-final amendment (including a submission for a request for continued examination (RCE) under 37 CFR 1.114), a supplemental amendment filed within a suspension period under 37 CFR 1.103(a) or (c), and an amendment filed in response to a *Quayle* action. If any of above boxes 1. to 4. are checked, the correction required is only the **corrected section** of the non-compliant amendment in compliance with 37 CFR 1.121.

   Extensions of time are available under 37 CFR 1.136(a) only if the non-compliant amendment is a non-final amendment or an amendment filed in response to a *Quayle* action.

   Failure to timely respond to this notice will result in:
   Abandonment of the application if the non-compliant amendment is a non-final amendment or an amendment filed in response to a *Quayle* action; or
   Non-entry of the amendment if the non-compliant amendment is a preliminary amendment or supplemental amendment.

/Asad M Nawaz/ Primary Examiner, Art Unit 2455	

Continuation of 4(e) Other: Not all claim limitations added have been underlined. For example, claim 131 now states "means for generating device dependent output data at the server" with only output data underlined. However, the claims previously stated, "means for generating at the server with the server application device dependent output data" Other claims also exhibit similar deficiencies..

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Chang
Application Number: 09/992,413
Filing Date: November 18, 2001
Title: Method For Mobile And Pervasive Output

Confirmation No. 5528
Examiner: Nawaz, Asad M.
Art Unit: 2455

AMENDMENT

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Applicants respond as follows to the Patent and Trademark Office action dated April 1, 2009.

In the claims:

Claims 1-130. Cancelled.

131. (Currently amended) A data output service system for rendering at an output device output content managed from a mobile information apparatus, the mobile information apparatus being distinct and separate from the output device, the system comprising:

means for ~~delivering from the mobile information apparatus~~ receiving at a server application operated on a server a document object and an output device object, ~~to a server application operated on a server~~ the document object and the output device object being received at the server application from the mobile information apparatus over a network that is distinct from the information apparatus and the output device, the document object relating to the output content and the output device object having one or more attributes corresponding to the output device, including an indication of a language and or data format that is acceptable as input to the output device for rendering ~~the output content~~;

means for generating device dependent output data at the server with the server application, the device dependent output data being related at least in part to the indication of a language or a data format included in the output device object for rendering the output content; and

means for delivering the output data to the ~~output device~~ mobile information apparatus for rendering the output content at the output device.

132. (Currently amended) The system of claim 131 further comprising means for obtaining payment information from the information apparatus as payment for the data output service provided ~~at the output device~~ or as payment for ~~receiving~~ sending the output data ~~from the server~~.

133. (Currently amended) The system of claim 131 ~~in which the means for delivering the document object and the output device object to the server application includes the document object and the output device object being delivered from the mobile information apparatus to the server application.~~ further

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comprising means for receiving from the mobile information apparatus one or more job objects having one or more attributes corresponding to the output job, including output quality.

134. (Currently amended) The system of claim ~~133 in which the means for delivering the output data to the output device also receives at the mobile information apparatus the output data from the server application and delivers the output data to the output device.~~ 131 in which the output device object includes a pointer or a reference to the language or the data format.

135. (Currently amended) The system of claim ~~133~~ 131 in which the output device includes a display output control unit for displaying data content.

136. (Previously presented) The system of claim 131 in which the output device is a printer and the output data includes one or more of an image data, a graphics data, and text data.

137. (Previously presented) The system of claim 131 in which the mobile information apparatus is a wireless mobile information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance(PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

138. (Previously presented) The system of claim 132 in which the payment information is provided automatically by the mobile information apparatus.

139. (Previously presented) The system of claim 132 in which the payment information is provided through the mobile information apparatus as entered by a user in response to a prompt to enter payment information.

140. (Previously presented) The system of claim 132 in which the payment information includes service subscriber information corresponding to a pre-arranged subscription to the data output service system.

141. (Previously presented) The system of claim 140 further comprising correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

142. (Previously presented) The system of claim 131 further comprising obtaining authentication information from the mobile information apparatus to authenticate permission for the information apparatus to access the data output service.

143. (Previously presented) The system of claim 131 further comprising means for establishing a communication channel between the information apparatus and the server application, the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

144. (Previously presented) The system of claim 131 in which the output device is an audio output device and the output data includes audio data.

145. (Previously presented) The system of claim 131 in which the output device is a display device and the output data includes one or more of an image data, an audio data, and a video data.

146. (Previously presented) The system of claim 131 in which the document object includes a reference or pointer related to the data content.

147. (Currently amended) The system of claim 131 in which the means for generating device dependent output data at the server includes one or more of invoking, launching, calling, utilizing, and involving one or more applications. ~~the output device object includes an indication of a data form or data format that is acceptable as input to the output device for rendering the output content.~~

148. (Currently amended) A method for generating a device dependent output data acceptable for rendering at a an ~~selected~~ output device, the device dependent output data corresponding to output content accessible at least partly by a mobile information apparatus, the method comprising:

delivering from the mobile information apparatus at least part of a document object and at least part of an output device object to a server over a network, the server being distinct from the mobile information apparatus and the output device, the document object being associated with the output content and the output device object ~~having one or more device dependent attributes corresponding to the selected output device,~~ including an indication of a language and or data format that is acceptable to the output device for rendering;

~~generating at~~ receiving from the server device dependent output data related at least in part to the indication of a language or a format included in the output device object ~~to output content and acceptable for rendering at the selected output device~~; and

delivering the output data from the information apparatus to the ~~selected~~ output device for rendering of the output content.

149. (Currently amended) The method of claim 148 further comprising establishing a communication channel between the mobile information apparatus and the ~~selected~~ output device; and

receiving at the mobile information apparatus over the communication channel one or more attributes corresponding to the ~~selected~~ output device.

150. (Previously presented) The method of claim 148 in which the server includes a computing device in a network and the network includes one or more of an Internet, a local area network, a cellular network, and a wide area network.

151. (Currently amended) The method of claim 148 in which the ~~generating of the output data includes at least partially one or more of a conversion operation and a raster image processing operation~~ output device includes one or more of a display device, a projection device, a printing device or an audio output device.

152. (Previously presented) The method of claim 148 further comprising discovering the selected output device as one of one or more output devices that

are discovered by the mobile information apparatus as being available for rendering the output content.

153. (Previously presented) The method of claim 148 in which the document object includes the output content.

154. (Previously presented) The method of claim 148 in which the document object includes a pointer or reference related to the output content.

155. (Previously presented) The method of claim 148 in which the server obtains the output content based on a pointer or reference to the output content included in the document object.

156. (Previously presented) The method of claim 148 in which the mobile information apparatus is a wireless mobile information apparatus and the mobile information apparatus includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance(PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

157. (Currently amended) A method for generating device dependent output data acceptable for rendering at each of one or more selected output devices, the device dependent output data for each selected output device corresponding to an output content accessible at least partly by a mobile information apparatus, the method comprising:

establishing a communication channel between the mobile information apparatus and one or more output devices;

receiving at the mobile information apparatus over the communication channel one or more attributes corresponding to one or more output devices;

selecting at the mobile information apparatus one or more output devices for rendering the output content;

delivering from the mobile information apparatus at least partially a document object and one or more output device objects to one or more servers over a network, the one or more servers being distinct from the mobile information apparatus and the one or more selected output devices, the

document object being associated with the output content, and the one or more output device objects having one or more attributes corresponding to each of the one or more selected output devices, including an indication of a language and or data format that is acceptable to each output device for rendering; and

~~generating at~~ receiving from the one or more servers device dependent output data for rendering the data content at the one or more selected output devices, the device dependent output data related at least in part to the indication of a language or a data format included in the one or more output device objects ~~associated with each of the corresponding one or more selected output devices~~.

158. (Previously presented) The method of claim 157 in which the one or more servers are connected to a computer network that includes the Internet.

159. (Currently amended) The method of claim 157 in which ~~the generating of the output data for each selected output device includes one or more of invoking, launching, calling, utilizing, and involving one or more applications~~ the mobile information apparatus is a wireless mobile information apparatus that includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance (PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

160. (Currently amended) The method of claim 157 further comprising sending payment information from the mobile information apparatus to the one or more servers over the network as payment for the data output service. ~~in which the generating of the output data for each selected output device includes at least partially one or more of a conversion operation and an raster image processing operation.~~

161. (Previously presented) The method of claim 157 further comprising discovering with the mobile information apparatus one or more output devices as being available for rendering the output content.

162. (Previously presented) The method of claim 157 in which the document object includes the output content.

163. (Previously presented) The method of claim 157 in which the document object includes a pointer or reference related to the output content.

164. (Currently amended) The method of claim 157 in which the one or more servers obtain ~~the document object~~ output content based on the pointer or reference to the output content included in the document object.

165. (Previously presented) The method of claim 157 further comprising delivering the device dependent output data to each selected output device for rendering of the output content.

166. (Currently amended) The method of claim 157 further comprising ~~receiving at the mobile information apparatus~~ sending from the mobile information apparatus the device dependent output data for rendering at each selected output device.

167. (Currently amended) A data output method for rendering at a selected output device output content from a mobile information apparatus, comprising:

establishing a communication channel between the mobile information apparatus and the selected output device;

establishing a communication channel between the mobile information apparatus and a server over a network;

delivering from the mobile information apparatus at least part of a document object and at least part of an output device object to the one or more servers ~~server~~, which is or are distinct from the mobile information apparatus and the output device, the document object being associated with the output content and the output device object including at least an indication related to a form or format that is acceptable for rendering at the selected output device;

receiving at the mobile information apparatus device dependent output data from the ~~server~~ one or more servers, the output data corresponding to the output content and being related at least in part to the indication of a form or

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format that is ~~to the output content and~~ acceptable to the selected output device for rendering ~~at the selected output device~~; and

delivering the device specific output data from the mobile information apparatus to the selected output device for rendering the output content.

168. (Currently amended) The method of claim 167 further comprising obtaining an output device object at the mobile information apparatus, the obtaining of the output device object including one or more of obtaining information from a user input, from a communication with the selected output device, and or from a default parameter or preference.

169. (Previously presented) The method of claim 167 further comprising discovering the selected output device as one of one or more output devices that are discovered by the mobile information apparatus as being available for rendering the output content.

170. (Previously presented) The method of claim 167 further comprising selecting an output device compatible for receiving the output data.

171. (Previously presented) The method of claim 167 further comprising conforming at the mobile information apparatus the output data into a form more suitable for rendering at the selected output device.

172. (Currently amended) A system for generating a device dependent output data acceptable for rendering at an output device, the device dependent output data corresponding to output content accessible at least partly by a mobile information apparatus, comprising:

a server that is distinct from the mobile information apparatus and the output device, the server being operable to receive a document object and at least part of an output device object, the document object being associated with the output content and the output device object having one or more attributes corresponding to the output device, including an indication of a language and or data format that is acceptable to the output device for rendering the output content; and

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a server application on the server for receiving the document object and at least part of the output device object and for generating the device dependent output data related at least in part to the indication of ~~in~~ a ~~form~~ a language or a data format included in the output device object ~~that is acceptable to the output device~~; and

means for delivering the device dependent output data to the mobile information apparatus ~~output device~~ for rendering of the output content at the output device.

173. (Previously presented) The system of claim 172 further comprising means for establishing a communication channel between the information apparatus and the server application, and the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

174. (Previously presented) The system of claim 172 in which the output device includes an audio output device and the output data includes audio data.

175. (Previously presented) The system of claim 172 in which the output device includes a display device and the output data includes one or more of an image data, an audio data, and a video data.

176. (Previously presented) The system of claim 172 in which the output device includes a printing device and the output data includes one or more of an image data, a graphics data, and a text data.

177. (Currently amended) A system for generating device dependent output data acceptable for rendering at each of one or more selected output devices, the device dependent output data for each selected output device corresponding to an output content accessible at least partly by a mobile information apparatus, comprising:

a server that is accessible over a network and is distinct from the mobile information apparatus and the one or more selected output devices, the server being operable for receiving from the mobile information apparatus one or more

document objects and one or more output device objects, the one or more document objects being associated with the output content and the one or more output device objects having one or more attributes corresponding to the one or more selected output devices, including an indication of a language and or data format that is acceptable to the output device for rendering;

means for establishing a communication channel between the server and the mobile information apparatus at least in part over an Internet; and

a server application operating at the server for generating device dependent output data associated with each of the corresponding one or more selected output devices, the device dependent output data being related at least in part to the indication of a language or a data format included in the output device object; and

means for delivering the device dependent output data to the mobile information apparatus over the communication channel.

178. (Currently amended) The system of claim 177 further comprising means for delivering the device dependent output data from the mobile information apparatus to the one or more selected output devices for rendering of the output content.

179. (Previously presented) The system of claim 177 in which each output device includes one of a display device and an audio output device and the output data including audio data.

180. (Currently amended) In a computer ~~readable medium~~ memory, client software operable from a mobile information apparatus for generating device dependent output data acceptable for rendering at a selected output device, the device dependent output data corresponding to output content accessible at least partly by the mobile information apparatus, the ~~medium~~ computer memory comprising:

software for delivering from the mobile information apparatus at least part of a document object and at least part of an output device object to a server that

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is distinct from the mobile information apparatus and the output device, the document object being associated with the output content and the output device object having one or more device dependent attributes corresponding to the selected output device and including an indication of a language or a data format that is acceptable to the output device for rendering, the document object and the output device object being required at the server for generating device dependent output data corresponding to the output content and acceptable for rendering at the selected output device;

software for receiving at the mobile information apparatus the output data for rendering at the selected output device; and

software for delivering the output data from the mobile information apparatus to the selected output device for rendering of the output content.

181. (Currently amended) The ~~medium~~ computer memory of claim 180 further comprising software for establishing communication between the mobile information apparatus and one or more output devices.

182. (Currently amended) The ~~medium~~ computer memory of claim 180 further comprising software for establishing a communication channel between the mobile information apparatus and the server, the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

183. (Currently amended) The ~~medium~~ computer memory of claim 180 in which the information apparatus is a wireless mobile information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance (PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

184. (Currently amended) The ~~medium~~ computer memory of claim 180 in which the output device being one of a display device and an audio output device and the output data includes audio data.

185. (Currently amended) The ~~medium~~ computer memory of claim 180 in which the output device includes a printer and the output data include one or more of an image data, a graphics data, and text data.

186. (Currently amended) The ~~medium~~ computer memory of claim 180 further comprising software for obtaining payment information at the mobile information apparatus as payment for receiving the output data ~~corresponding to the output content~~.

187. (Currently amended) The ~~medium~~ computer memory of claim 181 in which the communication channel is a wireless communication channel and the ~~medium~~ computer memory further comprises software for discovering the one or more output devices over the wireless communication channel.

189. (Previously presented) The system of claim 177 in which the communication channel between the mobile information apparatus and one or more output devices includes a wireless communication channel.

190. (Previously presented) The system of claim 177 in which the output device includes a printing device and the output data includes one or more of an image data, a graphics data, and a text data.

191. (Previously presented) The system of claim 177 in which the document object includes a reference or pointer related to the data content.

192. (Currently Amended) The system of claim 177 in which ~~generating device dependent output data at the server includes retrieving data content employing the document object.~~ the output device object further includes an identification related to the output device, the identification including one or more of an output device brand, model, registration, and IP address.

193 (Previously presented) The system of claim 172 in which the document object includes a reference or pointer related to the data content.

194 (Previously presented) The system of claim 172 further comprising means for retrieving data content employing the document object.

195 (Previously presented) The method of claim 167 further comprising obtaining payment information at the mobile information apparatus as payment for receiving the output data corresponding to the output content.

196 (Previously presented) The method of claim 167 further comprising obtaining a document object at the mobile information apparatus, including a user selecting at least a pointer or reference to a data content.

197 (Previously presented) The method of claim 167 in which the communication channel between the mobile information apparatus and the server includes one or more of an Internet, a local area network, a cellular network, and a wide area network.

198 (Previously presented) The method of claim 167 in which the communication channel between the mobile information apparatus and the selected output device includes a wireless communication channel and the method further comprises discovering the one or more output device over the wireless communication channel.

199 (Previously presented) The method of claim 167 in which the mobile information apparatus is a wireless mobile information apparatus and the information apparatus includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance(PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

200 (Previously presented) The method of claim 157 in which the communication channel includes a wireless communication channel and the method further comprises discovering the one or more output device over the wireless communication channel.

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Remarks

Claims 131-200 are in the application. Claims 131, 148, 157, 167, 172, 177, and 180 are in independent form. Reconsideration is requested.

The specification is objected to under 37 CFR 1.75(d)(1) as lacking an antecedent basis for the "computer readable medium" or "medium" recited in claims 180-187. Claims 180-187 have been amended to change "computer readable medium" or "medium" to "computer memory." The computer memory is described in the specification at various locations, including paragraph [0037] in reference to an output device, paragraph [0048] in reference to an information apparatus, and paragraph [0084] in reference to an application server. Applicant submits that the subject matter of claims 180-187 is clearly described in the specification and request that the objection be withdrawn.

Claims 131, 133-137, and 143-200 stand rejected under 35 USC 102(e) for anticipation by Yacoub (US Pat. No. 6,452,692). Claims 132 and 138-142 stand rejected under 35 USC 103(a) for obviousness over Yacoub in view of Stewart (US Pat. Publ. No. 2004/0057075). Applicant responds as follows.

Yacoub describes a virtual printer that is coupled to a client station to generate a print job, the virtual printer receiving preferences from a user regarding the print job such as image quality and/or speed. The virtual printer sends the print job along with the user preferences over a network to a server. The server automatically determines which of the printers on the network comply with the user's print job preferences. The server automatically selects a printer that complies with the job preferences and is located physically near the user/client. When the job is complete, the server notifies the user through the virtual printer that the print job is complete and of the location of the printer selected by the server. If an error signal is returned by the selected printer before completion, the server automatically selects a different printer closely complying with the preferences. (Yacoub, col. 2, lines 29-44).

Each of independent claims 131, 148, 157, 167, 172, 177, and 180 has been amended to recite an output device object being received by a server or

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delivered from a mobile information apparatus, together with at least part of a document object. The output device object and the document object are referred to as separate objects and correspond to different features, namely, the attributes related to the output device and the output content, respectively. Yacoub provides no teaching or suggestion of delivering from an information apparatus an output device object that corresponds to an output device.

Rather, Yacoub describes receiving at the virtual printer user preferences regarding the print job, such as image quality and/or speed.

> At step 200, the user has selected the preferences of the job such as the quality of the print job, the speed and whether the image should be in black-and-white or in color. Though speed and quality are inversely related, with a higher quality leading to lower speed and a lower quality leading to a higher speed, the preferences can be treated as separate. The speed preference of the print job refers not to the user's choice of the number of pages-per-minute precisely, but rather whether the job should be rushed or can be delayed to guarantee that the print job preferences are better complied with. If a high quality image, with quality defined by the dots-per-inch (dpi) of the print image, is more important, then speed may be sacrificed. The print job preferences, namely, quality, speed, color, are only exemplary of three of the many preferences possible for a print job such as paper type, paper size, dithering, and so on. (Yacoub, col. 4, lines 44-59.)

These user preferences relate to job parameters or the manner in which a user would like a job to be printed, not to the actual characteristics or attributes of the output device or printer itself. As illustrated in Fig. 2 of Yacoub (reproduced below), the print server compares the user's print preferences against the characteristics of the available output devices or printers. The server automatically selects the most appropriate printer that complies with the print job preferences and is located nearest to the user. Yacoub teaches that "there is a need to reduce the level of user interaction in sending a print Job" [Col 4 line 16-17]. "A printer can automatically select an appropriate printer based on its location, capability and availability" [Col. 4 line 18-20]. Yacoub does not describe or teach that the print job preferences relate to the suitability or acceptability of data input to the printer so that the selected printer can suitably print the output data sent from the sever. Instead, Yacoub describes that "when a printer has an

error" [Col 4 line 21], "it should be the job of the server to automatically select another printer." [Col 4, line 22].

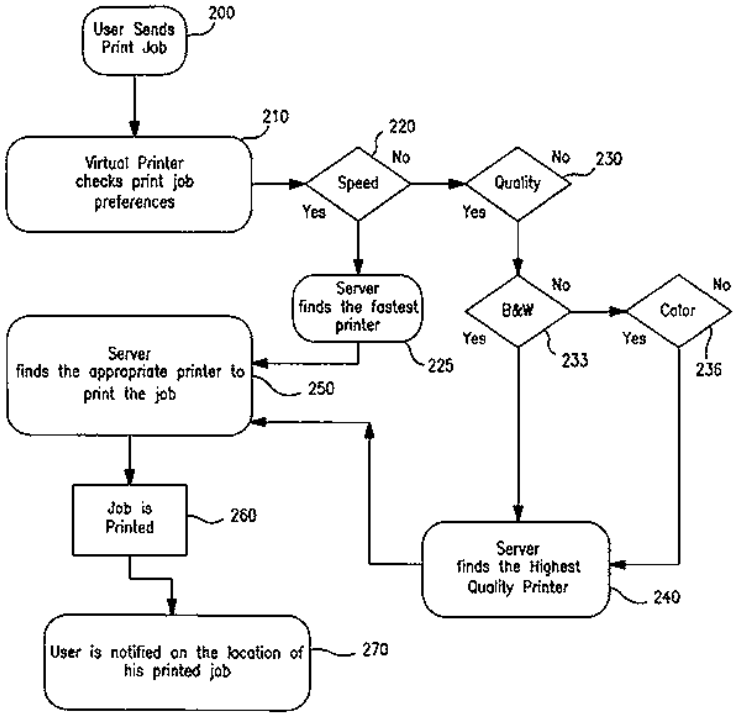


FIG. 2

Independent claim 131 recites a means receiving at a server application operated on a server a document object and an output device object, the document object and the output device object being received at the server application over a network that is distinct from the information apparatus and the output device.

Yacoub does not describe anything akin to an output device object. Yacoub does not describe or teach receiving at the server from the mobile information apparatus an output device object to a server, the output device object having one or more attributes corresponding to the output device. Instead, Yacoub teaches sending device independent print job preferences (e.g. printing

speed, color/black and white etc) to the server. The device independent print job preferences of Yacoub are not device dependent attributes of the printer.

In addition to the above distinction, independent claim 131 has also been amended to recite that the output device object includes "an indication of a language or a data format that is acceptable as input to the output device for rendering". Support for this feature can be found in the specification for example in paragraph [0038], which references the "type of input languages, formats and or output data supported by an output device". Yacoub does not describe or teach an output device object including an indication of a language or a data format that is acceptable as input to the output device for rendering. Following the teachings of Yacoub would lead one skilled in art to not send to the server attributes corresponding to the output device, including an indication of a language or a data format that is acceptable as input to the output device for rendering. In Yacoub, there is no motivation for one skilled in the art to send printer dependent attributes from the client device to the server because Yacoub emphasizes that the server automatically selects a printer. As a result, the server in Yacoub inherently must already have the printer dependent attributes to make the printer selection, thereby leading one skilled in the art away from sending printer dependent attributes from the client device to the server.

Independent claims 148, 157, 167, 172, 177, and 180 have been amended similarly.

Independent claims 131, 148, 157, 167, 172, 177, and 180 clarify the distinction between the output device object of the present invention and the user print job preferences of Yacoub. The user print job preferences of Yacoub relate to the manner (e.g., speed, black/white or color) in which a print job is to be printed. Print job preferences are independent of which printer. In contrast, the output device object of the present invention relates to the output device, and includes suitability or acceptability of the language, data form or format provided to the printer, as described in paragraph [0038] of the application. The user preference information of Yacoub does not relate at all to the suitability or

acceptability of the language, data form or format provided to the printer. The system of Yacoub presumes that the print job source is synchronized with the format requirements of the printer. If a printer in the system of Yacoub responds with an error, the server automatically selects another printer. In contrast, the use of an output device object as recited in the claims allows output content managed from a mobile information apparatus to be rendered more accurately at an output device with less potential error.

In addition to the above-described distinctions from Yacoub, amended independent claim 131 also recites that the device dependent output data are related at least in part to the indication of the language or data format included in the output device object for rendering the output content. Support for this feature can be found in the specification at paragraph [0087], which states that "converting the digital document into an output data [is] related at least in part to the output device object". Yacoub does not describe or teach an output device object and accordingly does not describe device dependent output data that are related at least in part to the indication of a language or a data format included in the output device object.

Independent claims 148, 157, 167, 172, and 177 have also been amended to recite this feature. Analogously, independent claim 180 recites that the output device object is required at the server for generating device dependent output data corresponding to the output content and acceptable for rendering at the selected output device.

Moreover, claim 133 has been amended to recite "means for receiving from the mobile information apparatus one or more job objects having one or more attributes corresponding to the output job, including output quality." The job object is described and supported in the specification at paragraphs [0039]-[0041], and the receiving of the job object is described at paragraph [0108], for example. The job object is distinct from the output device object and emphasizes and clarifies the distinction between the output device object recited in the claims and the device independent print job preferences used and described by Yacoub.

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Furthermore, independent claim 131 has been further amended to clarify that the output data is delivered to the mobile information apparatus for rendering the output content at the output device. In contrast to delivering the output data to the mobile information apparatus, Yacoub describes the server as automatically sending the print job to a printer that is selected by the server. When the print job is complete, the server notifies the user of the the print job completion and of the location of the selected printer. (Yacoub, col 2, line 36-41.) Accordingly, Yacoub does not describe or suggest that the output data is delivered to the mobile information apparatus for rendering the output content at the output device.

In view of the numerous distinctions over the cited reference as described above, applicant believes the application is in condition for consideration and respectfully requests the same.

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Electronic Patent Application Fee Transmittal

Application Number:	09992413
Filing Date:	18-Nov-2001
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Filer:	Mark Meininger
Attorney Docket Number:	1282-011/MMM

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with $0 paid	1253	1	1110	1110

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	1110

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Electronic Acknowledgement Receipt

EFS ID:	6181018
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Customer Number:	21034
Filer:	Mark Meininger
Filer Authorized By:	
Attorney Docket Number:	1282-011/MMM
Receipt Date:	30-SEP-2009
Filing Date:	18-NOV-2001
Time Stamp:	19:00:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1110
RAM confirmation Number	11147
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

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1	Amendment/Req. Reconsideration-After Non-Final Reject	09992413Amend4Filed.pdf	126768 2f5a8e5da2417a108c078c0123914c6dc80a4fe11e	no	20
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	29758 190812e80495c2714617fe59b0cab5aaaec105281	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	156526		

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
09/992,413	11/18/2001	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☒ RATE ($)	SMALL ENTITY ☒ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 09/30/2009

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 69	Minus	** 69	= 0	X $26 =	0	OR	X $ =	
Independent (37 CFR 1.16(h))	* 7	Minus	***7	= 0	X $110 =	0	OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/STEFANIE BRYCE/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,413	11/18/2001	William Ho Chang	1282-011/MMM	5528

21034 7590 04/01/2009

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PORTLAND, OR 97201

EXAMINER	
NAWAZ, ASAD M	
ART UNIT	PAPER NUMBER
2455	
MAIL DATE	DELIVERY MODE
04/01/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/992,413	CHANG ET AL.	
	Examiner	Art Unit	
	ASAD M. NAWAZ	2455	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *131-200* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *131-200* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is responsive to the RCE received 1/23/09. Claims 1-130 have been canceled. Claims 131-200 have been newly added. Accordingly, claims 131-200 are pending.

Specification

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Claims 180-187 recite the limitation "computer readable medium" and "the medium" without any mention as to what it could be in the specification.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 131, 133-137, 143-200 are rejected under 35 U.S.C. 102(e) as being taught by Yacoub (US Patent No 6,452,692).

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

As to claim 131, Yacoub teaches a data output service system for rendering at an output device output content managed from a mobile information apparatus, the mobile information apparatus being distinct and separate from the output device, the system comprising:

means for delivering from the mobile information apparatus a document object and an output device object to a server application operated on a server over a network that is distinct from the information apparatus and the output device, the document object relating to the output content and the output device object having one or more attributes corresponding to the output device (col 2, liens 29-43; the mobile user sends a print document and the preferences to a server);

means for generating at the server with the server application device dependent output data related to the output device for rendering the output content (col 2, lines 29-53; the server automatically determines which printer of the printers on the network comply with the preferences, spools a job, and updates software/drivers) and

means for delivering the output data to the output device for rendering the output content (col 2, lines 29-43; printer prints job).

As to claim 133, Yacoub teaches the system of claim 131 in which the means for delivering the document object and the output device object to the server application includes the document object and the output device object being delivered from the mobile information apparatus to the server application.

Lexmark, Exhibit 1003
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134. (New) The system of claim 133 in which the means for delivering the output data to the output device also receives at the mobile information apparatus the output data from the server application and delivers the output data to the output device (col 4, lines 30-60).

As to claim 135, Yacoub teaches the system of claim 133 in which the output device includes a display output control unit for displaying data content (abstract).

As to claim 136, Yacoub teaches the system of claim 131 in which the output device is a printer and the output data includes one or more of an image data, a graphics data, and text data (col 2, lines 29-53).

As to claim 137, Yacoub teaches the system of claim 131 in which the mobile information apparatus is a wireless mobile information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance(PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera (col 12, lines 10-20).

As to claim 159, Yacoub teaches the method of claim 157 in which the generating of the output data for each selected output device includes one or more of invoking, launching, calling, utilizing, and involving one or more applications (col 2, lines 29-53).

As to claim 160, Yacoub teaches the method of claim 157 in which the generating of the output data for each selected output device includes at least partially one or more of a conversion operation and an raster image processing operation (col 2, lines 29-53).

Lexmark, Exhibit 1003
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As to claim 161, Yacoub teaches the method of claim 157 further comprising discovering with the mobile information apparatus one or more output devices as being available for rendering the output content (col 2, lines 29-53).

As to claims 143-158 and 162-200, the contain similar limitations as the claims above and are rejected under similar rationale.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 132 and 138-142 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yacoub in view of Stewart (USPGPUB 2004/0057075).

As to claim 132, Yacoub teaches the system of claim 131 however, does not explicitly indicate means for obtaining payment information from the information apparatus as payment for the data output service provided at the output device or as payment for receiving the output data from the server.

Stewart teaches means for obtaining payment information from the information apparatus as payment for the data output service provided at the output device or as payment for receiving the output data from the server (0052).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Tan to

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make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

As to claim 138, Yacoub teaches the system of claim 132, however, Yacoub does not teach the payment information is provided automatically by the mobile information apparatus.

Stewart teches the payment information is provided automatically by the mobile information apparatus (0052).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Tan to make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

As to claim 139, Yacoub teaches the system of claim 132, however does not teach the payment information is provided through the mobile information apparatus as entered by a user in response to a prompt to enter payment information.

Stewart teaches the payment information is provided through the mobile information apparatus as entered by a user in response to a prompt to enter payment information (0052).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Tan to make the system more user friendly. By providing a large pool of resources to the

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users and letting them decide whether the fee is fair, a user friendly system can be achieved.

As to claim 140, Yacoub teaches the system of claim 132, however, does not explicitly indicate the payment information includes service subscriber information corresponding to a pre-arranged subscription to the data output service system.

Stewart teaches the payment information includes service subscriber information corresponding to a pre-arranged subscription to the data output service system (0052)

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Tan to make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

As to claim 141, Yacoub teaches the system of claim 140, however, does not teach correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

Stewart teaches correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information (0052).

As to claim 142, Yacoub teaches the system of claim 131, however, does not teach obtaining authentication information from the mobile information

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apparatus to authenticate permission for the information apparatus to access the data output service.

Stewart teaches obtaining authentication information from the mobile information apparatus to authenticate permission for the information apparatus to access the data output service (0018, 0046).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Tan to make the system more secure.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ASAD M. NAWAZ whose telephone number is (571)272-3988. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Saleh Najjar can be reached on (571) 272-4006. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Asad M Nawaz/
Examiner, Art Unit 2455

Lexmark, Exhibit 1003
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Notice of References Cited	Application/Control No. 09/992,413	Applicant(s)/Patent Under Reexamination CHANG ET AL.	
	Examiner ASAD M. NAWAZ	Art Unit 2455	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,043,898	03-2000	Jacobs, Norman A.	358/1.15
*	B	US-6,452,692	09-2002	Yacoub, Yousef R.	358/1.15
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L3	910	(select$4 or choos $4) near6 (appropriate or suitable) near6 (printer or printing near2 (terminal or device or appartus))	US-PGPUB; USPAT	OR	ON	2009/03/29 20:22
L4	772248	(mobile or wireless or palmtop or handheld or laptop or pda or smartphone or smart adj1 phone or ((wireless or mobile) near2 camera))	US-PGPUB; USPAT	OR	ON	2009/03/29 20:22
L5	20	3 same L4	US-PGPUB; USPAT	OR	ON	2009/03/29 20:22
L6	7	5 same server	US-PGPUB; USPAT	OR	ON	2009/03/29 20:23
L7	37	(send$4 or transmit$4) near8 (request or document or content or file) near8 (appropriate or suitable) near6 (printer or printing near2 (terminal or device or appartus)) same (profile or preference or	US-PGPUB; USPAT	OR	ON	2009/03/29 20:25

		format$4 or capabilit$4)				
L8	1	(send$4 or transmit$4) near8 (request or document or content or file) near8 (appropriate or suitable) near6 (printer or printing near2 (terminal or device or appartus)) same (profile or preference or format$4 or capabilit$4).ab.	US-PGPUB; USPAT	OR	ON	2009/03/29 20:25
L9	10	7 same 4	US-PGPUB; USPAT	OR	ON	2009/03/29 20:27
L10	21	7 and 4	US-PGPUB; USPAT	OR	ON	2009/03/29 20:29
L11	11	10 not 9	US-PGPUB; USPAT	OR	ON	2009/03/29 20:30
L12	1	"6760745".pn.	US-PGPUB; USPAT	OR	ON	2009/03/29 20:30
L13	8	(send$4 or transmit$4 or forward$4) near6 (proxy or server) near8 (appropriate or suitable) near6 (printer or printing near2 (terminal or device or appartus)) same (profile or preference or format$4 or capabilit$4)	US-PGPUB; USPAT	OR	ON	2009/03/29 20:33

L14	7	(send$4 or transmit$4 or forward$4) near6 (proxy or server) near8 (appropriate or suitable) near6 (printer or printing near2 (terminal or device or appartus)) same (profile or preference or format$4 or capabilit$4) and 4	US-PGPUB; USPAT	OR	ON	2009/03/29 20:35
S1	1	"6883033".pn.	US-PGPUB; USPAT	OR	ON	2009/03/26 19:23
S3	772248	(mobile or wireless or palmtop or handheld or laptop or pda or smartphone or smart adj1 phone or ((wireless or mobile) near2 camera))	US-PGPUB; USPAT	OR	ON	2009/03/29 18:34
S4	78	(send$4 or transmit$4) near4 (request or document or content or file) near4 (profile or preference or format$4 or capabilit$4) near4 (server or printserv) same printer	US-PGPUB; USPAT	OR	ON	2009/03/29 18:37

S5	0	S3 near4 (send$4 or transmit$4) near4 (request or document or content or file) near4 (profile or preference or format$4 or capabilit$4) near4 (server or printserv) same printer	US-PGPUB; USPAT	OR	ON	2009/03/29 18:37
S6	6	S3 same (send$4 or transmit$4) near4 (request or document or content or file) near4 (profile or preference or format$4 or capabilit$4) near4 (server or printserv) same printer	US-PGPUB; USPAT	OR	ON	2009/03/29 18:37

3/29/09 8:37:25 PM

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	09992413	CHANG ET AL.
	Examiner	Art Unit
	Nawaz, Asad M	2155

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	04/02/2007	06/25/2007	03/29/2009						
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	2	÷	-	-						
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	36	÷	✓	-						

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CLAIM		DATE								
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CLAIM		DATE								
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CLAIM		DATE								
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	142			✓						
	143			✓						
	144			✓						

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CLAIM		DATE								
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	180			✓						

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CLAIM		DATE								
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	197			✓						
	198			✓						
	199			✓						
	200			✓						

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	09992413	CHANG ET AL.
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SEARCHED

Class	Subclass	Date	Examiner
709	203-230, 245-48	6/13/07	AMN
715	500, 516-517,969	6/13/07	AMN
710	8, 10	6/13/07	AMN
358	1.1	3/29/09	AMN

SEARCH NOTES

Search Notes	Date	Examiner
East Search (USPAT; USPGPUB; EPO: JPO: DERWENT; IBM_TDB)	6/13/07	AMN
Inventor Name Search for ODP	6/16/07	AMN
updated East search	3/29/09	AMN
updated inventor name search	3/29/09	AMN

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

PTO/SB/30EFS (12-08)
Approved for use through 01/31/2009. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	09992413	Filing Date	2001-11-18	Docket Number (if applicable)	1282-011/MMM	Art Unit	2455
First Named Inventor	Chang			Examiner Name	Nawaz, Asad		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☐ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No _____

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (12-08)
Approved for use through 01/31/2009. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Mark M. Meininger/	Date (YYYY-MM-DD)	2009-01-23
Name	Mark M. Meininger	Registration Number	32428

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	09992413
Filing Date:	18-Nov-2001
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Filer:	Mark Meininger
Attorney Docket Number:	1282-011/MMM

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	2202	5	26	130
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Lexmark, Exhibit 1003
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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 3 months with $0 paid	2253	1	555	555
Miscellaneous:				
Request for continued examination	2801	1	405	405
		Total in USD ($)		**1090**

Lexmark, Exhibit 1003
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Electronic Acknowledgement Receipt

EFS ID:	4669862
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Customer Number:	21034
Filer:	Mark Meininger
Filer Authorized By:	
Attorney Docket Number:	1282-011/MMM
Receipt Date:	23-JAN-2009
Filing Date:	18-NOV-2001
Time Stamp:	19:35:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1090
RAM confirmation Number	6437
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

Lexmark, Exhibit 1003
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1	Amendment Submitted/Entered with Filing of CPA/RCE	09992413Amend3Filed.pdf	119473 24dd128745210f8ab4f9c9ca788e10e9589 5a9df	no	21
Warnings:					
Information:					
2	Request for Continued Examination (RCE)	09999241RCE.pdf	697265 1c1727699985251346b7137a65aaaa010b26 92ff	no	3
Warnings:					
Information:					
3	Fee Worksheet (PTO-06)	fee-info.pdf	33535 ba1c94ad2d0a01ccc09ca1b3e1df8d12e11ba c6a98	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	850273		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Chang
Application Number: 09/992,413
Filing Date: November 18, 2001
Title: Method For Mobile And Pervasive Output

Confirmation No. 2155
Examiner: Nawaz, Asad M.
Art Unit: 2155

AMENDMENT

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Applicants respond as follows to the Patent and Trademark Office action dated July 24, 2008.

In the claims:

Claims 1-130. Cancelled.

131. (New) A data output service system for rendering at an output device output content managed from a mobile information apparatus, the mobile information apparatus being distinct and separate from the output device, the system comprising:

means for delivering from the mobile information apparatus a document object and an output device object to a server application operated on a server over a network that is distinct from the information apparatus and the output device, the document object relating to the output content and the output device object having one or more attributes corresponding to the output device;

means for generating at the server with the server application device dependent output data related to the output device for rendering the output content; and

means for delivering the output data to the output device for rendering the output content.

132. (New) The system of claim 131 further comprising means for obtaining payment information from the information apparatus as payment for the data output service provided at the output device or as payment for receiving the output data from the server.

133. (New) The system of claim 131 in which the means for delivering the document object and the output device object to the server application includes the document object and the output device object being delivered from the mobile information apparatus to the server application.

134. (New) The system of claim 133 in which the means for delivering the output data to the output device also receives at the mobile information apparatus the output data from the server application and delivers the output data to the output device.

135. (New) The system of claim 133 in which the output device includes a display output control unit for displaying data content.

136. (New) The system of claim 131 in which the output device is a printer and the output data includes one or more of an image data, a graphics data, and text data.

137. (New) The system of claim 131 in which the mobile information apparatus is a wireless mobile information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance(PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

138. (New) The system of claim 132 in which the payment information is provided automatically by the mobile information apparatus.

139. (New) The system of claim 132 in which the payment information is provided through the mobile information apparatus as entered by a user in response to a prompt to enter payment information.

140. (New) The system of claim 132 in which the payment information includes service subscriber information corresponding to a pre-arranged subscription to the data output service system.

141. (New) The system of claim 140 further comprising correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

142. (New) The system of claim 131 further comprising obtaining authentication information from the mobile information apparatus to authenticate permission for the information apparatus to access the data output service.

143. (New) The system of claim 131 further comprising means for establishing a communication channel between the information apparatus and the server application, the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

144. (New) The system of claim 131 in which the output device is an audio output device and the output data includes audio data.

145. (New) The system of claim 131 in which the output device is a display device and the output data includes one or more of an image data, an audio data, and a video data.

146. (New) The system of claim 131 in which the document object includes a reference or pointer related to the data content.

147. (New) The system of claim 131 in which the output device object includes an indication of a data form or data format that is acceptable as input to the output device for rendering the output content.

148. (New) A method for generating a device dependent output data acceptable for rendering at a selected output device, the device dependent output data corresponding to output content accessible at least partly by a mobile information apparatus, the method comprising:

delivering from the mobile information apparatus at least part of a document object and at least part of an output device object to a server over a network, the server being distinct from the mobile information apparatus and the output device, the document object being associated with the output content and the output device object having one or more device dependent attributes corresponding to the selected output device;

generating at the server device dependent output data related to output content and acceptable for rendering at the selected output device; and

delivering the output data from the information apparatus to the selected output device for rendering of the output content.

149. (New) The method of claim 148 further comprising establishing a communication channel between the mobile information apparatus and the selected output device; and

receiving at the mobile information apparatus over the communication channel one or more attributes corresponding to the selected output device.

150. (New) The method of claim 148 in which the server includes a computing device in a network and the network includes one or more of an Internet, a local area network, a cellular network, and a wide area network.

151. (New) The method of claim 148 in which the generating of the output data includes at least partially one or more of a conversion operation and a raster image processing operation.

152. (New) The method of claim 148 further comprising discovering the selected output device as one of one or more output devices that are discovered by the mobile information apparatus as being available for rendering the output content.

153. (New) The method of claim 148 in which the document object includes the output content.

154. (New) The method of claim 148 in which the document object includes a pointer or reference related to the output content.

155. (New) The method of claim 148 in which the server obtains the output content based on a pointer or reference to the output content included in the document object.

156. (New) The method of claim 148 in which the mobile information apparatus is a wireless mobile information apparatus and the mobile information apparatus includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance(PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

157. (New) A method for generating device dependent output data acceptable for rendering at each of one or more selected output devices, the device dependent output data for each selected output device corresponding to an output content accessible at least partly by a mobile information apparatus, the method comprising:

establishing a communication channel between the mobile information apparatus and one or more output devices;

receiving at the mobile information apparatus over the communication channel one or more attributes corresponding to one or more output devices;

selecting at the mobile information apparatus one or more output devices for rendering the output content;

delivering from the mobile information apparatus at least partially a document object and one or more output device objects to one or more servers over a network, the one or more servers being distinct from the mobile information apparatus and the one or more selected output devices, the document object being associated with the output content, and the one or more output device objects having one or more attributes corresponding to each of the one or more selected output devices; and

generating at the one or more servers device dependent output data associated with each of the corresponding one or more selected output devices.

158. (New) The method of claim 157 in which the one or more servers are connected to a computer network that includes the Internet.

159. (New) The method of claim 157 in which the generating of the output data for each selected output device includes one or more of invoking, launching, calling, utilizing, and involving one or more applications.

160. (New) The method of claim 157 in which the generating of the output data for each selected output device includes at least partially one or more of a conversion operation and an raster image processing operation.

161. (New) The method of claim 157 further comprising discovering with the mobile information apparatus one or more output devices as being available for rendering the output content.

162. (New) The method of claim 157 in which the document object includes the output content.

163. (New) The method of claim 157 in which the document object includes a pointer or reference related to the output content.

164. (New) The method of claim 157 in which the one or more servers obtain the document object based on the pointer or reference to the output content included in the document object.

165. (New) The method of claim 157 further comprising delivering the device dependent output data to each selected output device for rendering of the output content.

166. (New) The method of claim 157 further comprising receiving at the mobile information apparatus device dependent output data for rendering at each selected output device.

167. (New) A data output method for rendering at a selected output device output content from a mobile information apparatus, comprising:

establishing a communication channel between the mobile information apparatus and the selected output device;

establishing a communication channel between the mobile information apparatus and a server over a network;

delivering from the mobile information apparatus at least part of a document object and at least part of an output device object to the server, which is distinct from the mobile information apparatus and the output device, the document object being associated with the output content and the output device object including at least an indication related to a form or format that is acceptable for rendering at the selected output device;

receiving at the mobile information apparatus device dependent output data from the server, the output data being related to the output content and acceptable for rendering at the selected output device; and

delivering the device specific output data from the mobile information apparatus to the selected output device for rendering the output content.

168. (New) The method of claim 167 comprising obtaining an output device object at the mobile information apparatus, the obtaining of the output device object including one or more of obtaining information from a user input,

from a communication with the selected output device, and from a default parameter or preference.

169. (New) The method of claim 167 further comprising discovering the selected output device as one of one or more output devices that are discovered by the mobile information apparatus as being available for rendering the output content.

170. (New) The method of claim 167 further comprising selecting an output device compatible for receiving the output data.

171. (New) The method of claim 167 further comprising conforming at the mobile information apparatus the output data into a form more suitable for rendering at the selected output device.

172. (New) A system for generating a device dependent output data acceptable for rendering at an output device, the device dependent output data corresponding to output content accessible at least partly by a mobile information apparatus, comprising:

a server that is distinct from the mobile information apparatus and the output device, the server being operable to receive a document object and at least part of an output device object, the document object being associated with the output content and the output device object having one or more attributes corresponding to the output device; and

a server application on the server for receiving the document object and at least part of the output device object and for generating the device dependent output data in a form or format that is acceptable to the output device; and

means for delivering the device dependent output data to the output device for rendering of the output content.

173. (New) The system of claim 172 further comprising means for establishing a communication channel between the information apparatus and the server application, and the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

174. (New) The system of claim 172 in which the output device includes an audio output device and the output data includes audio data.

175. (New) The system of claim 172 in which the output device includes a display device and the output data includes one or more of an image data, an audio data, and a video data.

176. (New) The system of claim 172 in which the output device includes a printing device and the output data includes one or more of an image data, a graphics data, and a text data.

177. (New) A system for generating device dependent output data acceptable for rendering at each of one or more selected output devices, the device dependent output data for each selected output device corresponding to an output content accessible at least partly by a mobile information apparatus, comprising:

a server that is accessible over a network and is distinct from the mobile information apparatus and the one or more selected output devices, the server being operable for receiving from the mobile information apparatus one or more document objects and one or more output device objects, the one or more document objects being associated with the output content and the one or more output device objects having one or more attributes corresponding to the one or more selected output devices;

means for establishing a communication channel between the server and the mobile information apparatus at least in part over an Internet; and

a server application operating at the server for generating device dependent output data associated with each of the corresponding one or more selected output devices; and

means for delivering the device dependent output data to the mobile information apparatus over the communication channel.

178. (New) The system of claim 177 further comprising means for delivering the device dependent output data the mobile information apparatus to one or more selected output devices for rendering of the output content.

179. (New) The system of claim 177 in which each output device includes one of a display device and an audio output device and the output data including audio data.

180. (New) In a computer readable medium, client software operable from a mobile information apparatus for generating device dependent output data acceptable for rendering at a selected output device, the device dependent output data corresponding to output content accessible at least partly by the mobile information apparatus, the medium comprising:

software for delivering from the mobile information apparatus at least part of a document object and at least part of an output device object to a server that is distinct from the mobile information apparatus and the output device, the document object being associated with the output content and the output device object having one or more device dependent attributes corresponding to the selected output device, the document object and the output device object being required at the server for generating device dependent output data corresponding to the output content and acceptable for rendering at the selected output device;

software for receiving at the mobile information apparatus the output data for rendering at the selected output device; and

software for delivering the output data from the mobile information apparatus to the selected output device for rendering of the output content.

181. (New) The medium of claim 180 further comprising software for establishing communication between the mobile information apparatus and one or more output devices.

182. (New) The medium of claim 180 further comprising software for establishing a communication channel between the mobile information apparatus

and the server, the communication channel including one or more of an Internet, a local area network, a cellular network, and a wide area network.

183. (New) The medium of claim 180 in which the information apparatus is a wireless mobile information apparatus and includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance (PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

184. (New) The medium of claim 180 in which the output device being one of a display device and an audio output device and the output data includes audio data.

185. (New) The medium of claim 180 in which the output device includes a printer and the output data include one or more of an image data, a graphics data, and text data.

186. (New) The medium of claim 180 further comprising software for obtaining payment information at the mobile information apparatus as payment for receiving the output data corresponding to the output content.

187. (New) The medium of claim 181 in which the communication channel is a wireless communication channel and the medium further comprises software for discovering the one or more output devices over the wireless communication channel.

189. (New) The system of claim 177 in which the communication channel between the mobile information apparatus and one or more output devices includes a wireless communication channel.

190. (New) The system of claim 177 in which the output device includes a printing device and the output data includes one or more of an image data, a graphics data, and a text data.

191. (New) The system of claim 177 in which the document object includes a reference or pointer related to the data content.

192. (New) The system of claim 177 in which generating device dependent output data at the server includes retrieving data content employing the document object.

193 (New) The system of claim 172 in which the document object includes a reference or pointer related to the data content.

194 (New) The system of claim 172 further comprising means for retrieving data content employing the document object.

195 (New) The method of claim 167 further comprising obtaining payment information at the mobile information apparatus as payment for receiving the output data corresponding to the output content.

196 (New) The method of claim 167 further comprising obtaining a document object at the mobile information apparatus, including a user selecting at least a pointer or reference to a data content.

197 (New) The method of claim 167 in which the communication channel between the mobile information apparatus and the server includes one or more of an Internet, a local area network, a cellular network, and a wide area network.

198 (New) The method of claim 167 in which the communication channel between the mobile information apparatus and the selected output device includes a wireless communication channel and the method further comprises discovering the one or more output device over the wireless communication channel.

199 (New) The method of claim 167 in which the mobile information apparatus is a wireless mobile information apparatus and the information apparatus includes one or more of a palmtop computer, a handheld computer, a laptop computer, a personal digital assistance(PDA), a smart phone, a screen phone, Internet pad, internet appliance, and a digital camera.

200 (New) The method of claim 157 in which the communication channel includes a wireless communication channel and the method further comprises

discovering the one or more output device over the wireless communication channel.

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Remarks

Claims 131-200 are in the application. Claims 131, 148, 157, 167, 172, 177, and 180 are in independent form. Reconsideration is requested.

Restriction is required under 35 USC 121 between:

I. Original claims 11-22 and 32-58

II. Claims 66-80 and 119-130

III. Claims 81-119.

The Examiner states that claims 66-130 are distinct from the subject matter of original claims 11-22 and 32-58, which were elected in response to a restriction requirement dated April 6, 2007. Applicant elects original claims 11-22 and 32-58 of group I and submits herewith claims 131, 132, 135-142, 148-155, 157-165, and 167-171 with subject matter generally the same as the elected original claims. Remaining added claims 133, 134, 143-147, 156, and 166 depend from claims corresponding to the original elected claims, and claims 172-200 include independent and dependent claims that are included in the elected species.

In the June 29, 2007 Office action, claims 11, 13-15 and 32-58 were rejected under 35 USC 102(e) for anticipation by Tan (US Pat. No. 6,760,745), and claims 12 and 16-22 were rejected under 35 USC 103(a) for obviousness over Tan in view of Stewart et al. (US Pat Publ. No. 2004/0057075). Applicant responds as follows with reference to current claims 131-167.

The Examiner supports the rejection of claims 11, 13-15, and 32-58 with citation to Tan from col. 3, line 52 to col. 4, line 27, which is reproduced below:

> A method for operating a server is described along with a claim for a server according to one aspect of the invention. The server retrieves a document from a data storage device, typically resident on the server. The server executing a filtering routine generates a variable, comprising information necessary for another server to reproduce the document. The filter routine appends the variable to the document, and the server transmits the document through a network connection to a client computer.
>
> In variations of this aspect of the invention, the retrieved document is customized based on information provided by a requesting party to create a dynamically-generated document. Typically, the document is written in a markup

language such as HTML. The variable may comprise an entire copy of the data and information from the dynamically-generated document, preferably in a compressed and encrypted format.

A method for operating a server receiving the variable is also described. The server receives the variable, typically from a client computer that is requesting to establish an interactive session with another client computer. The server uses the variable to replicate the document associated with the information contained within the variable. The document is then transmitted to the other client computer.

In variations of this aspect of the invention, the server caches the replicated document before or after sending a copy to the other client computer. Additionally, the server may add applets to the replicated document to assist in the operation of the interactive session and transmit the applet-endowed document back to the client to replace the version of the document on the client computer without the applets.

A method of operating a client computer displaying a document containing the variable is also described according to another aspect of the invention. A dynamically-generated document is received from the server. The client renders the document on its display. The displayed document includes a hypertext link or icon that may be selected to transmit the variable to an associated server. In variations of this aspect of the invention, the selection of the icon or link may be in order to initiate an interactive session with another client or server computer.

Tan is directed to a system by which a customer service representative can concurrently view the same Web pages as a customer. The two parties can manipulate the concurrently viewed web pages, move from one page to another together, control each others navigation, markup the pages using a whiteboard feature, and chat with each other whether through IP telephony or through a text chat box. (Tan, col. 1, line 67 to col. 2, line 4.) The system is illustrated in Fig. 4 (reproduced below), which includes a pair of servers on which the concurrently viewed web page is replicated to be viewed and manipulated by both the customer and the customer service representative.

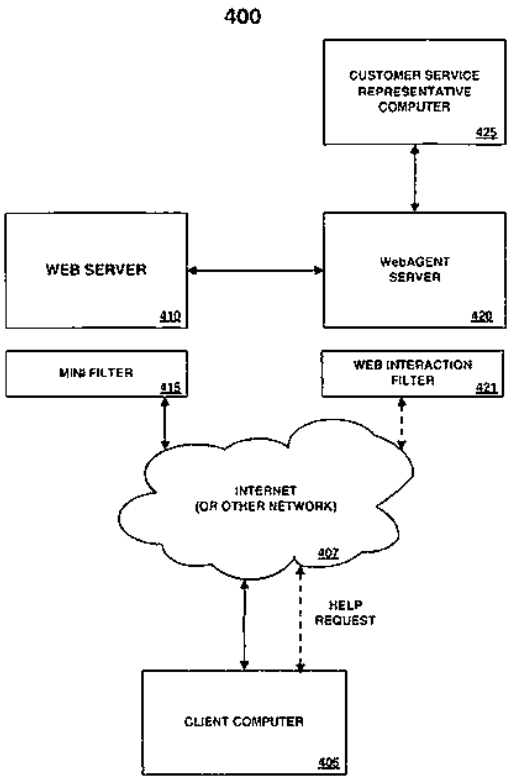


FIG. 4

Claim 131, which corresponds to original claim 11, recites a data output service system for rendering at an output device output content managed from a mobile information apparatus, the mobile information apparatus being distinct and separate from the output device, the system comprising:

> means for delivering from the mobile information apparatus a document object and an output device object to a server application operated on a server over a network that is distinct from the information apparatus and the output device, the document object relating to the output content and the output device object having one or more attributes corresponding to the output device;

means for generating at the server with the server application device dependent output data related to the output device for rendering the output content; and

means for delivering the output data to the output device for rendering the output content.

Applicant submits that Tan does not teach or suggest each of the elements recited in claim 131, which is therefore patentably distinct from Tan for the following reasons.

Claim 131 recites an output device on which is rendered output content managed from a mobile information apparatus. As recited in the claim, the mobile information apparatus and the output device are distinct and separate from each other. Tan does not teach or suggest an information apparatus and a separate distinct output device. Tan does describe a customer's client computer and a customer service representative's computer, neither of which is described as a mobile information apparatus. In addition, neither the customer's client computer nor the customer service representative's computer is described as being an output device that is distinct and separate from the computer itself.

Moreover, Tan cannot be interpreted such that one of the customer's client computer and the customer service representative's computer is an "output device" relative to the other, because Tan provides no teaching or suggestion of delivering to the servers an "output device object having one or more attributes corresponding to the output device," as recited in the claim. Nothing in Tan is directed to the attributes of the customer or the customer service representative computers. Tan describes providing customer or account information from a server, not an output device object having one or more attributes corresponding to an output device.

Tan does not teach or suggest means for generating device dependent output data related to the output device for rendering the output content. Also, Tan does not teach or suggest generating such device dependent output data at

the server or with a server application Tan is directed to mirroring customer information to be viewed concurrently by a customer and a customer service representative. Following the teaching of Tan would lead one skill in the art to generate output data with attributes related to the content being displayed at the client's computer screen and not to the attributes related to the output device. Nothing in Tan teaches or suggests a server application that provides output data relating to an output device or that the output data is device dependent to the output device.

More specifically, even if one of the customer's computer or the client service representative's computer could possibly be an "output device" by the Examiner's interpretation of Tan, the servers in Tan do not provide output data related to the attributes of either of those computers. In mirroring the content provided on the customer computer and the client service representative computer, Tan is directed to providing outputs that are independent of the either such "output device." As described by Tan, the mirroring process is independent or unrelated to the "output device" being used.

For the foregoing reasons, applicant submits that claim 131 is patentably distinct from Tan.

Original independent claims 32, 41 and 52 were rejected for the same reasons as original claim 11. Applicant submits that current independent claims 148, 157, 167, 172, 177, and 180 are patentably distinct from Tan for the reasons set forth above with regard to claim 131.

In addition, independent claims 148, 157, 167, 172, 177, and 180 also recite generating output data accessible by a mobile information apparatus and generating output data according to attributes of a selected output device. Tan is directed to matching on two computers, a customer computer and a customer service representative computer, the information that is available from a server. Tan is not at all related to generating device dependent output data related to output content accessible by a mobile information apparatus, and Tan is not at all related to generating output data according to attributes of a selected output

device. The recitation of the mobile information apparatus in the claims further clarifies the distinction between such a mobile device and the customer service server in the system of Tan with which the content is mirrored in the customer service computer and the client's computer. Applicant submits, therefore, that independent claims 148, 157, 167, 172, 177, and 180 are additionally patentably distinct from Tan.

Moreover, claim 157 further recites"

> establishing a communication channel between the mobile information apparatus and one or more output devices;
>
> receiving at the mobile information apparatus over the communication channel one or more attributes corresponding to one or more output devices;
>
> selecting at the mobile information apparatus one or more output devices for rendering the output content;

which substantially corresponds to the subject matter of original claims 42 and 43. The recitation of the communication channel between the mobile information apparatus and the one or more output devices further clarifies the distinction between the claimed subject matter and the system of Tan in which information is provided from a customer service server to a client's computer. Tan does not teach or suggest any manner of communication between a mobile information apparatus and an output device. Moreover Tan provides not teaching or suggestion of receiving at the mobile information apparatus over the communication channel one or more attributes corresponding to one or more output devices and selecting at the mobile information apparatus one or more output devices for rendering the output content. Accordingly, applicant submits that independent claim 157 is additionally patentably distinct from Tan.

Original dependent claims 13-15 were rejected with a citation only to Tan, col. 4, lines 3-27, which is reproduced above. Original dependent claims 33-40, 42-51, and 53-58, corresponding to current claims 144-151, 153-162, and 164-169, respectively, were rejected for the same reasons as original claims 13-15. As described above, however, applicants note that Tan describes only a

customer's computer or a customer service representative's computer that might be the claimed output device. Tan provides no teaching or suggestion that either computer includes means for delivering a document object and an output device object to a server or a server application. Tan also provides no teaching or suggestion means of delivering to an output device output data that are based on a document object and an output device object, as recited in various current claims. Rather, the replicated data provided by the server in Tan is directed to customer information stored on the server and is not related to an output device, as recited in the present claims.

With regard to the subject matter of original claims 12 and 16-22, the Examiner cites Stewart as disclosing means for obtaining payment information (original claim 12), a printer output device (original claim 16), an information apparatus that includes a portable computing device (original claim 17), automatically providing payment information (original claim 18), providing payment information in response to a prompt (original claim 19), payment information that includes information corresponding to a pre-arranged subscription (original claim 20), correlating subscriber information with a subscribed database (original claim 21), and authenticating permission for access to the data output service (original claim 22).

The Examiner states in the June 29, 2007 office action that it would have been obvious to one skilled in the art to apply the teachings of Stewart into those of Tan to make the system more "user friendly." Applicant submits that the Tan and Stewart et al. are directed to unrelated fields and that the combination of the references is improper.

More specifically, Tan is directed to a system by which customer service representative can concurrently view the same Web pages as a customer is viewing. The two parties can manipulate the concurrently viewed web pages, move from one page to another together, control each others navigation, markup the pages using a whiteboard feature, and chat with each other whether through IP telephony or through a text chat box. (Tan, col. 1, line 67 to col. 2, line 4.)

Nothing in Tan suggests a need for "user friendliness" to include obtaining payment features described in Stewart. Applicant submits that any suggestion for a need to include payment information, automatic payment information, subscriber payment information, or authentication in the customer service replicating system of Tan is based on improper hindsight from the teaching of applicant's patent application. Applicant submits, therefore, that the current claims are patentably distinct from the combination of Tan and Stewart et al.

Added independent claim 172 corresponds generally to the subject matter of claims 131 and 148 (original claims 11 and 32), and independent claim 177 corresponds to the subject matter of claim 157 (original claim 41), and claim 180 corresponds to the subject matter of claim 131. In particular, added claims 172 and 177 recite systems that correspond to method claims 148 and 157 in the same manner that claim 131 (original claim 11) of the elected species also recites a system corresponding to the method of claim 148 (original claim 32). Claim 180 recites a computer readable medium with software that performs the steps recited in claim 131. Applicant submits, therefore, that added claims 172, 177, and 180, and their respective dependent claims, fall with the elected species of the present application.

Applicant believes the application is in condition for consideration and respectfully requests the same.

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Respectfully Submitted,

/Mark M. Meininger/

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Registration No. 32,428

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
09/992,413	11/18/2001	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☒ RATE ($)	SMALL ENTITY ☒ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	69 minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	7 minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 01/23/2009	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 69	Minus	** 65	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	* 7	Minus	***7	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/PEGGY YARBOROUGH/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,413	11/18/2001	William Ho Chang	1282-011/MMM	5528

21034 7590 07/24/2008
IPSOLON LLP
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SUITE 710
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EXAMINER	
NAWAZ, ASAD M	
ART UNIT	PAPER NUMBER
2155	
MAIL DATE	DELIVERY MODE
07/24/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/992,413	CHANG ET AL.	
	Examiner	Art Unit	
	ASAD M. NAWAZ	2155	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *66-130* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *66-130* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is responsive to the amendments filed 4/25/08. Claims 1-65 have been canceled and claims 66-130 have been newly added. Accordingly, claims 66-130 are pending.

Election/Restrictions

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 11-22 and 32-58, drawn to a data output method in which the document object is delivered, classified in class 709, subclass 203.

II. Claims 66-80 and 119-130, drawn to a composite message including authentication payment and a reference pointer, classified in class 709, subclass 248.

III. Claims 81-119, drawn to an indication of a language, format, data type and audio/video, classified in class 709, subclass 200.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct if they do not overlap in scope and are not obvious variants, and if it is shown that at least one subcombination is separately usable. In the instant case, subcombination III has separate utility such as language and data format indications. See MPEP § 806.05(d).

The examiner has required restriction between subcombinations usable together. Where applicant elects a subcombination and claims thereto are subsequently found

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

3. Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and examination burden if restriction were not required because one or more of the following reasons apply:

(a) the inventions have acquired a separate status in the art in view of their different classification;

(b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;

(c) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing different search queries);

(d) the prior art applicable to one invention would not likely be applicable to another invention;

(e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

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Lexmark v. Flexiworld

4. Newly submitted claims 66-130 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: see restriction requirement above.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 66-130 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

5. The amendment filed on 4/25/08 canceling all claims drawn to the elected invention and presenting only claims drawn to a non-elected invention is non-responsive (MPEP § 821.03). The remaining claims are not readable on the elected invention because the applicant has canceled them.

Since the above-mentioned amendment appears to be a *bona fide* attempt to reply, applicant is given a TIME PERIOD of ONE (1) MONTH or THIRTY (30) DAYS, whichever is longer, from the mailing date of this notice within which to supply the omission or correction in order to avoid abandonment. EXTENSIONS OF THIS TIME PERIOD UNDER 37 CFR 1.136(a) ARE AVAILABLE.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ASAD M. NAWAZ whose telephone number is (571)272-3988. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Saleh Najjar can be reached on (571) 272-4006. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AMN

/saleh najjar/

Supervisory Patent Examiner, Art Unit 2155

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	09992413	CHANG ET AL.
	Examiner	Art Unit
	Nawaz, Asad M	2155

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	04/02/2007	06/25/2007							
	1	÷	-							
	2	÷	-							
	3	÷	-							
	4	÷	-							
	5	÷	-							
	6	÷	-							
	7	÷	-							
	8	÷	-							
	9	÷	-							
	10	÷	-							
	11	÷	✓							
	12	÷	✓							
	13	÷	✓							
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	27	÷	-							
	28	÷	-							
	29	÷	-							
	30	÷	-							
	31	÷	-							
	32	÷	✓							
	33	÷	✓							
	34	÷	✓							
	35	÷	✓							
	36	÷	✓							

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	09992413	CHANG ET AL.
	Examiner	Art Unit
	Nawaz, Asad M	2155

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	04/02/2007	06/25/2007							
	37	÷	✓							
	38	÷	✓							
	39	÷	✓							
	40	÷	✓							
	41	÷	✓							
	42	÷	✓							
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	65	÷	-							

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	09/992,413	CHANG ET AL.	
	Examiner	Art Unit	
	ASAD M. NAWAZ	2155	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Chang
Application Number: 09/992,413
Filing Date: November 18, 2001
Title: Method For Mobile And Pervasive Output

Confirmation No. 2155
Examiner: Nawaz, Asad M.
Art Unit: 2155

CORRECTED AMENDMENT

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Applicants respond as follows to the Patent and Trademark Office action dated June 29, 2007.

In the claims:

Claims 1-65. Cancelled.

66. (New) A data output service method for outputting data content at an output device, comprising

establishing a wireless communication channel between a mobile, wireless information apparatus and a server over a network that includes a wireless communication channel;

providing a composite message from the information apparatus to the server over the wireless communication channel, the composite message including at least one of a job object or a data content object, the job object indicating at least one of authentication and payment information and the data content object including a reference or pointer to data content;

receiving output data at the information apparatus from the server corresponding to the data content; and

delivering the output data from the information apparatus to an output device for outputting the data content.

67. (New) The method of claim 66 in which the network further includes one of an Internet, a local area network, a cellular telephone network and a wide area network.

68. (New) The method of claim 66 in which the output device is an audio output device and the output data includes audio data.

69. (New) The method of claim 66 in which the output device is a display device and the output data includes one or more of image data, audio data, and a video data.

70. (New) The method of claim 66 in which the output device is a printing device and the output data includes printing data.

71. (New) The method of claim 66 further comprising providing from the information apparatus and to the server one or more of an authentication

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information, a quality of service information, a priority information and subscription service information.

72. (New) The method of claim 66 in which delivering the output data from the information apparatus to an output device includes a wireless communication channel that is is one of a Bluetooth, IRDA, IEEE 802.11, and one that operates in the 2.4 GHz frequency range.

73. (New) The method of claim 66 further comprising the information apparatus discovering the output device prior to delivering the output data.

74. (New) The method of claim 73 in which discovering the output device includes discovering it from among plural available output devices that are available to the information apparatus for outputting the output content.

75. (New) The method of claim 66 in which the output data is delivered from the information apparatus to the output device over a wired connection.

76. (New) The method of claim 66 in which the composite message further includes an indication of at least one of a language, format, or data type corresponding to the data content.

77. (New) The method of claim 66 in which the information apparatus and output device includes a Bluetooth communication unit and the information apparatus communicates with the output device via Bluetooth communication.

78. (New) The method of claim 66 in which the output device further includes an output controller that is externally connected to the output device, and the method further comprising transmitting the output data from the information apparatus to the output controller, and the output controller delivering the output data to the output device.

79. (New) The method of claim 78 in which the output controller is connected to the output device via a wired connection.

80. (New) The method of claim 66 further comprising obtaining at the server data content from a content server employing at least partly the reference or pointer to data content received from the information apparatus.

81. (New) A data output service method, comprising

establishing a wireless communication channel between a mobile, wireless information apparatus and a server over a wireless communication network;

providing a composite message from the information apparatus to the server, the composite message including at least a reference or pointer to data content and an indication of at least one of a language, format or data type acceptable for outputting the data content at an output device;

receiving output data at the information apparatus from the server corresponding to the data content and being in a form that is acceptable for rendering at the output device; and

delivering the output data from the information apparatus to the output device for outputting the data content.

82. (New) The method of claim 81 in which the output device is an audio output device and the output data includes audio data.

83. (New) The method of claim 81 in which the output device is a display device and the output data includes one or more of image data, audio data, and a video data.

84. (New) The method of claim 81 in which the output data is delivered from the information apparatus to the output device over a data output wireless communication channel.

85. (New) The method of claim 81 further comprising the information apparatus discovering the output device prior to delivering the output data.

86. (New) The method of claim 85 in which discovering the output device includes discovering it from among plural available output devices that are available to the information apparatus for outputting the output content.

87. (New) The method of claim 81 in which the output data is delivered from the information apparatus to the output device over a wired connection.

88. (New) The method of claim 81 further comprising providing from the information apparatus and to the server one or more of an authentication information, an identification information, and a subscription service information.

89. (New) The method of claim 81 further comprising sending payment information from the information apparatus to the server corresponding to payment for the data output service.

90. (New) The method of claim 89 in which the payment information includes data output service subscriber information corresponding to a pre-arranged subscription to the data output service.

91. (New) The method of claim 90 further comprising correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

92. (New) The method of claim 81 further comprising obtaining authentication information from the information apparatus to authenticating permission for the information apparatus to access the data output service.

93. (New) The method of claim 81 in which the output device and the information apparatus includes a Bluetooth communication unit and the information apparatus communicates with the output device via Bluetooth communication.

94. (New) The method of claim 81 further comprising obtaining at the server data content from a content server employing the reference or pointer to data content.

95. (New) The method of claim 94 in which the obtaining of the data content includes obtaining data content related at least in part to the indication included in the composite message.

96. (New) The method of claim 81 further comprising generating at the server output data that is in accordance at least partly to the indication included in the composite message.

97. (New) A data output service method, comprising

establishing a cellular telephone communication channel between a mobile, wireless information apparatus and a server over a cellular telephone communication network;

providing a composite message from the information apparatus to the server, the composite message including at least a reference or pointer to data content and an indication of at least one of a language, format, instruction, or data type acceptable for outputting the data content at an output device;

receiving output data at the information apparatus from the server corresponding to the data content and being in a form that is related at least partly to the indication included in the composite message;; and

delivering the output data from the information apparatus to the output device for outputting the data content.

98. (New) The method of claim 97 in which the output device is an audio output device and the output data includes audio data.

99. (New) The method of claim 97 in which the output device is a display device and the output data includes one or more of image data, audio data, and a video data.

100. (New) The method of claim 97 further comprising providing from the information apparatus and to the server one or more of an authentication information, an identification information, and a subscription service information.

101. (New) The method of claim 97 further comprising sending payment information from the information apparatus to the server corresponding to payment for the data output service.

102. (New) The method of claim 101 in which the payment information includes data output service subscriber information corresponding to a pre-arranged subscription to the data output service.

103. (New) The method of claim 102 further comprising correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

104. (New) The method of claim 97 further comprising obtaining authentication information from the information apparatus to authenticating permission for the information apparatus to access the data output service.

105. (New) The method of claim 97 further comprising obtaining at the server data content from a content server employing at least partly the reference or pointer to data content.

106. (New) A data output service system, comprising

a wireless communication channel on a wireless communication network between a mobile, wireless information apparatus and a server;

means for providing from the information apparatus to the server, at least a reference or pointer to data content and an indication of at least one of a language, format or data type acceptable for outputting the data content at an output device;

means for receiving output data at the information apparatus from the server corresponding to the data content and being in a form that is related at least partly to the indication provided from the information apparatus to the server; and

means for delivering the output data from the information apparatus to the output device for outputting the data content.

107. (New) The method of claim 106 in which the output device is an audio output device and the output data includes audio data.

108. (New) The method of claim 106 in which the output device is a display device and the output data includes one or more of image data, audio data, and a video data.

109. (New) The method of claim 106 in which the output data is delivered from the information apparatus to the output device over a data output wireless communication channel.

110. (New) The method of claim 106 further comprising the information apparatus discovering the output device prior to delivering the output data.

111. (New) The method of claim 106 in which the output data is delivered from the information apparatus to the output device over a wired connection.

112. (New) The method of claim 106 further comprising providing from the information apparatus and to the server one or more of an authentication information, an identification information and subscription service information.

113. (New) The method of claim 106 further comprising sending payment information from the information apparatus to the server corresponding to payment for the data output service.

114. (New) The method of claim 113 in which the payment information includes data output service subscriber information corresponding to a pre-arranged subscription to the data output service.

115. (New) The method of claim 106 further comprising means for generating at the server an output data that compatible to the indication received from the information apparatus.

116. (New) The method of claim 106 in which the output device further includes an output controller that is externally connected to the output device, and the method further comprising delivering the output data from the information apparatus to the output controller for outputting data content at the output device.

117. (New) The method of claim 116 in which the information apparatus is connected to the output controller via a wireless communication.

118. (New) The method of claim 116 in which the information apparatus is connected to the output controller via a wired connection.

119. (New) A data output service method for outputting data content at an output device, comprising

establishing a wireless communication channel between a mobile, wireless information apparatus and a server over a network that includes a wireless communication channel;

providing a composite message from the information apparatus to the server, the composite message including at least one of a job object or a data content object, the job object indicating at least one of authentication and payment information and the data content object including a reference or pointer to a data content that includes audio data;

receiving at least an audio output data at the information apparatus from the server corresponding to the audio data content; and

delivering at least the audio output data from the information apparatus to an output device that includes audio output function for outputting the data content.

120. (New) The method of claim 119 in which the network further includes one of an Internet, a local area network and a wide area network.

121. (New) The method of claim 119 in which the output device is a display device and the output data further includes one or more of image data, audio data, and a video data.

122. (New) The method of claim 119 further comprising providing from the information apparatus and to the server authentication information and subscription service information.

123. (New) The method of claim 119 further includes establishing a wireless communication channel between the information apparatus and the output device.

124. (New) The method of claim 123 in which the output device is a Bluetooth audio output device. .

125. (New) The method of claim 123 in which establishing the wireless communication channel includes a security or authentication procedures.

126. (New) The method of claim 119 further comprising the information apparatus discovering the output device prior to delivering the output data.

127. (New) The method of claim 119 in which the output data is delivered from the information apparatus to the output device over a wired connection.

128. (New) The method of claim 119 further comprising obtaining at the server data content from a content server employing at least partly the reference or pointer to the data content.

129. (New) The method of claim 119 in which the output device further includes an output controller that is externally connected to the output device, and the method further comprising delivering the output data from the information apparatus to the output controller for outputting data content at the output device.

130. (New) The method of claim 119 in which the output device is connected to the output controller via a wired connection.

Remarks

Claims 66- 130 are in the application. Claims 66, 81, 97, 106, and 119 are in independent form. Reconsideration is requested.

Claims 11, 13-15 and 32-58 stand rejected under 35 USC 102(e) for anticipation by Tan (US Pat. No. 6,760,745). Claims 12 and 16-22 stand rejected under 35 USC 103(a) for obviousness over Tan in view of Stewart et al (US Pat Publ. No. 2004/0057075). Applicant responds as follows.

Claims 1-65 have been cancelled and replaced with claims 66- 130. Claims 66, 81, 97, 106, and 119 are in independent form and are each direct to a data output service method or system for outputting data content at an output device. Applicant submits that 66-130 are patentably distinct over the cited references for the following reasons.

Claim 66 recites:

> A data output service method for outputting data content at an output device, comprising
>
> establishing a wireless communication channel between a mobile, wireless information apparatus and a server over a network that includes a wireless communication channel;
>
> providing a composite message from the information apparatus to the server and over the wireless communication channel, the composite message including at least one of a job object or a data content object, the job object indicating at least one of authentication and payment information and the data content object including a reference or pointer to data content;
>
> receiving output data at the information apparatus from the server corresponding to the data content; and
>
> delivering the output data from the information apparatus to an output device for outputting the data content.

Claim 66 recites "a mobile, wireless information apparatus" as a clarification of the "portable" device recited in original elected claim 17. Examples of such an apparatus are referred to at paragraph [0047] as "palmtop computer, handheld device, laptop computer, personal digital assistant (PDA), smart phone, screen phone, e-book, Internet pad, communication pad, Internet

appliance, pager, digital camera, etc." As described at paragraph [0050], the wireless aspect of the apparatus is a species that is exemplified as follows:

> Information apparatus 100 may be coupled to network 108 through wired or wireless connections, or a combination of them. As an example, information apparatus 100 may subscribe to a wireless data network in which packet data is transmitted through, for example, radio links between information apparatus 100 and a plurality of base stations. A wireless communication connection may include a cellular telephone communication channel. As another example, information apparatus 100 may be connected to network 108 through wired lines such as, without limitation, telephone lines, Ethernet, WAN links (e.g., T1, T3, 56kb, X.25) or broadband connections (e.g., ISDN, Frame Relay and ATM), among others.

The job object and data content object of the composite message are described in the application beginning at, for example, paragraphs [0039] and [0042], respectively. The use of these objects in a composite message is described, for example, at paragraph [0108] of the application. The job object clarifies the structure of the payment and authentication information recited in original elected claims 12 and 22, respectively, and the data content object recites the subject matter recited in original elected claim 38.

Tan is directed to a method of operating a server to facilitate an interactive session between two or more computers. A document server dynamically-generates a document generated with an attached variable that contains information necessary to replicate the document on another server, thereby allowing the other server to generate a replicated version of the document to be sent to a second client computer as shown in Fig. 4, a customer service representative computer 425 to establish an interactive session between two or more client computers.

Stewart et al. is directed to a method for delivering a document over a network, including generating a postscript document from a client by a print driver at the client shown in Fig. 7A, 650 and uploading the postscript document to a storage unit via the network, verifying print driver information, and downloading the document from the storage unit to a facility for printing. As

described at paragraph [0044] of Stewart et al., the client 310 stores local applications 310a that can be used to create or download a document that the user can ultimately forward to the print side 300c for shipping and/or delivery to a specified location. Stewart et al. refers to an interface for entering user payment information.

Neither of the cited references teaches or suggests the data output service method of claim 66. Tan is directed to facilitating an interactive session between client computers by replicating documents on a pair of servers. Stewart et al. is directed to uploading a document from a client to a server and then forwarding the document from the server to a print site. Neither reference teaches or suggests a data output service method that includes establishing a wireless communication channel between a mobile, wireless information apparatus and a server over a network that includes a wireless communication channel, providing a composite message from the information apparatus to the server, the composite message including at least one of a job object or a data content object, and receiving output data at the information apparatus from the server corresponding to the data content.

More specifically, Tan is directed to facilitating an interactive session and not remotely directed to outputting data. Stewart et al. describes outputting data, but uploads the data from the client to a server from which the data is then sent by the server at the website co-location as shown in Fig 7A to a print site for output. Stewart et al. provides no teaching or suggestion of receiving output data at the information apparatus from the server and delivering the output data from the information apparatus to an output device for outputting the data content. Moreover, neither reference provides any teaching or suggestion of a job object indicating authentication information or a data content object including a reference or pointer to data content. Applicants submit, therefore, that claim 66 and its dependent claims are patentably distinct from the cited references.

Moreover, applicants submit that independent claims 81, 97, 106, and 119, and their dependent claims, are patentably distinct from the cited references. Claim 81 recites:

> providing a composite message from the information apparatus to the server, the composite message including at least a reference or pointer to data content and an indication of at least one of a language, format or data type acceptable for outputting the data content at an output device;
>
> receiving output data at the information apparatus from the server corresponding to the data content and being in a form that is acceptable for rendering at the output device;

Neither of the cited references teaches or suggests a reference or pointer to data content and an indication of at least one of a language, format or data type acceptable for outputting the data content at an output device and receiving output data at the information apparatus from the server corresponding to the data content and being in a form that is acceptable for rendering at the output device.

Tan is directed to facilitating an interactive session and not remotely directed to outputting data. Stewart et al. describes outputting data, but uploads the data from the client to a server from which the data is sent to a print site for output. Stewart et al. provides no teaching or suggestion of receiving output data at the information apparatus from the server delivering the output data from the information apparatus to an output device for outputting the data content. Moreover, neither reference provides any teaching or suggestion of a composite message that includes a reference or pointer to data content or an indication of at least one of a language, format or data type acceptable for outputting the data content at an output device. Neither reference provides any mentions of an indication of a language, format or data type as being acceptable for outputting the data content at an output device. Applicants submit, therefore, that claim 81 and its dependent claims are patentably distinct from the cited references.

Claim 97 recites subject matter analogous to claim 81, but further recites a cellular telephone communication channel between a mobile, wireless information apparatus and a server over a cellular telephone communication network. Claim 97 is patentably distinct from the cited references for the reasons set forth above in reference to claim 81, and is further patentably distinct because the cited references do not teach or suggest cellular telephone communication channel between a mobile, wireless information apparatus and a server over a cellular telephone communication network.

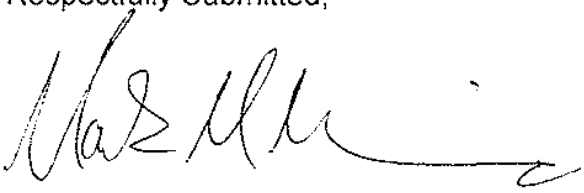
Claim 106 recites a system analogous to the method subject matter of claim 81. Claim 106 is patentably distinct from the cited references for the reasons set forth above in reference to claim 81.

Claim 119 recites subject matter analogous to claim 81, but further recites that the data content includes audio data content, as described in the application at paragraph [0058], for example. Claim 119 is patentably distinct from the cited references for the reasons set forth above in reference to claim 81, and is further patentably distinct because the cited references do not teach or suggest the outputting of data content that includes audio data.

Applicant believes the application is in condition for consideration and respectfully requests the same.

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Respectfully Submitted,



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Electronic Acknowledgement Receipt

EFS ID:	3212328
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Customer Number:	21034
Filer:	Mark Meininger
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Attorney Docket Number:	1282-011/MMM
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Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment - After Non-Final Rejection	09992413Amend1Corrected.pdf	621445 b459a4e629ac8a17411d8a88b3b54ca02771ddc	no	15

Warnings:	
Information:	

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Total Files Size (in bytes):	621445

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 09/992,413	Filing Date 11/18/2001	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	04/25/2008	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 65	Minus	** 65	= 0	X $25 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 5	Minus	***7	= 0	X $105 =	0	OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/SHERRY A. DAVIS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
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09/992,413	11/18/2001	William Ho Chang	1282-011/MMM	5528

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EXAMINER	
NAWAZ, ASAD M	
ART UNIT	PAPER NUMBER
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03/25/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

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Notice of Non-Compliant Amendment (37 CFR 1.121)	Application No. 09/992,413	Applicant(s) CHANG ET AL.	
	Examiner ASAD M. NAWAZ	Art Unit 2155	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

The amendment document filed on *31 December 2007* is considered non-compliant because it has failed to meet the requirements of 37 CFR 1.121 or 1.4. In order for the amendment document to be compliant, correction of the following item(s) is required.

THE FOLLOWING MARKED (X) ITEM(S) CAUSE THE AMENDMENT DOCUMENT TO BE NON-COMPLIANT:

- ☐ 1. Amendments to the specification:
  - ☐ A. Amended paragraph(s) do not include markings.
  - ☐ B. New paragraph(s) should not be underlined.
  - ☐ C. Other _____.
- ☐ 2. Abstract:
  - ☐ A. Not presented on a separate sheet. 37 CFR 1.72.
  - ☐ B. Other _____.
- ☐ 3. Amendments to the drawings:
  - ☐ A. The drawings are not properly identified in the top margin as "Replacement Sheet," "New Sheet," or "Annotated Sheet" as required by 37 CFR 1.121(d).
  - ☐ B. The practice of submitting proposed drawing correction has been eliminated. Replacement drawings showing amended figures, without markings, in compliance with 37 CFR 1.84 are required.
  - ☐ C. Other _____.
- ☒ 4. Amendments to the claims:
  - ☐ A. A complete listing of all of the claims is not present.
  - ☐ B. The listing of claims does not include the text of all pending claims (including withdrawn claims)
  - ☒ C. Each claim has not been provided with the proper status identifier, and as such, the individual status of each claim cannot be identified. Note: the status of every claim must be indicated after its claim number by using one of the following status identifiers: (Original), (Currently amended), (Canceled), (Previously presented), (New), (Not entered), (Withdrawn) and (Withdrawn-currently amended).
  - ☐ D. The claims of this amendment paper have not been presented in ascending numerical order.
  - ☐ E. Other: _____.
- ☐ 5. Other (e.g., the amendment is unsigned or not signed in accordance with 37 CFR 1.4):

_____

For further explanation of the amendment format required by 37 CFR 1.121, see MPEP § 714.

TIME PERIODS FOR FILING A REPLY TO THIS NOTICE:

1. Applicant is given **no new time period** if the non-compliant amendment is an after-final amendment or an amendment filed after allowance. If applicant wishes to resubmit the non-compliant after-final amendment with corrections, the **entire corrected amendment** must be resubmitted.

2. Applicant is given **one month**, or thirty (30) days, whichever is longer, from the mail date of this notice to supply the correction, if the non-compliant amendment is one of the following: a preliminary amendment, a non-final amendment (including a submission for a request for continued examination (RCE) under 37 CFR 1.114), a supplemental amendment filed within a suspension period under 37 CFR 1.103(a) or (c), and an amendment filed in response to a *Quayle* action. If any of above boxes 1. to 4. are checked, the correction required is only the **corrected section** of the non-compliant amendment in compliance with 37 CFR 1.121.

   Extensions of time are available under 37 CFR 1.136(a) only if the non-compliant amendment is a non-final amendment or an amendment filed in response to a *Quayle* action.

   Failure to timely respond to this notice will result in:
   Abandonment of the application if the non-compliant amendment is a non-final amendment or an amendment filed in response to a *Quayle* action; or
   Non-entry of the amendment if the non-compliant amendment is a preliminary amendment or supplemental amendment.

/saleh najjar/ SPE AU 2155

Legal Instruments Examiner (LIE), if applicable — Telephone No.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Chang
Application Number: 09/992,413
Filing Date: November 18, 2001
Title: Method For Mobile And Pervasive Output

Confirmation No. 2155
Examiner: Nawaz, Asad M.
Art Unit: 2155

AMENDMENT

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Applicants respond as follows to the Patent and Trademark Office action dated June 29, 2007.

In the claims:

Claims 1-65. Cancelled.

66. A data output service method for outputting data content at an output device, comprising

establishing a wireless communication channel between a mobile, wireless information apparatus and a server over a network that includes a wireless communication channel;

providing a composite message from the information apparatus to the server over the wireless communication channel, the composite message including at least one of a job object or a data content object, the job object indicating at least one of authentication and payment information and the data content object including a reference or pointer to data content;

receiving output data at the information apparatus from the server corresponding to the data content; and

delivering the output data from the information apparatus to an output device for outputting the data content.

67. The method of claim 66 in which the network further includes one of an Internet, a local area network, a cellular telephone network and a wide area network.

68. The method of claim 66 in which the output device is an audio output device and the output data includes audio data.

69. The method of claim 66 in which the output device is a display device and the output data includes one or more of image data, audio data, and a video data.

70. The method of claim 66 in which the output device is a printing device and the output data includes printing data.

71. The method of claim 66 further comprising providing from the information apparatus and to the server one or more of an authentication

information, a quality of service information, a priority information and subscription service information.

72. The method of claim 66 in which delivering the output data from the information apparatus to an output device includes a wireless communication channel that is is one of a Bluetooth, IRDA, IEEE 802.11, and one that operates in the 2.4 GHz frequency range.

73. The method of claim 66 further comprising the information apparatus discovering the output device prior to delivering the output data.

74. The method of claim 73 in which discovering the output device includes discovering it from among plural available output devices that are available to the information apparatus for outputting the output content.

75. The method of claim 66 in which the output data is delivered from the information apparatus to the output device over a wired connection.

76. The method of claim 66 in which the composite message further includes an indication of at least one of a language, format, or data type corresponding to the data content.

77. The method of claim 66 in which the information apparatus and output device includes a Bluetooth communication unit and the information apparatus communicates with the output device via Bluetooth communication.

78. The method of claim 66 in which the output device further includes an output controller that is externally connected to the output device, and the method further comprising transmitting the output data from the information apparatus to the output controller, and the output controller delivering the output data to the output device.

79. The method of claim 78 in which the output controller is connected to the output device via a wired connection.

80. The method of claim 66 further comprising obtaining at the server data content from a content server employing at least partly the reference or pointer to data content received from the information apparatus.

81. A data output service method, comprising

establishing a wireless communication channel between a mobile, wireless information apparatus and a server over a wireless communication network;

providing a composite message from the information apparatus to the server, the composite message including at least a reference or pointer to data content and an indication of at least one of a language, format or data type acceptable for outputting the data content at an output device;

receiving output data at the information apparatus from the server corresponding to the data content and being in a form that is acceptable for rendering at the output device; and

delivering the output data from the information apparatus to the output device for outputting the data content.

82. The method of claim 81 in which the output device is an audio output device and the output data includes audio data.

83. The method of claim 81 in which the output device is a display device and the output data includes one or more of image data, audio data, and a video data.

84. The method of claim 81 in which the output data is delivered from the information apparatus to the output device over a data output wireless communication channel.

85. The method of claim 81 further comprising the information apparatus discovering the output device prior to delivering the output data.

86 The method of claim 85 in which discovering the output device includes discovering it from among plural available output devices that are available to the information apparatus for outputting the output content.

87. The method of claim 81 in which the output data is delivered from the information apparatus to the output device over a wired connection.

88. The method of claim 81 further comprising providing from the information apparatus and to the server one or more of an authentication information, an identification information, and a subscription service information.

89. The method of claim 81 further comprising sending payment information from the information apparatus to the server corresponding to payment for the data output service.

90. The method of claim 89 in which the payment information includes data output service subscriber information corresponding to a pre-arranged subscription to the data output service.

91. The method of claim 90 further comprising correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

92. The method of claim 81 further comprising obtaining authentication information from the information apparatus to authenticating permission for the information apparatus to access the data output service.

93. The method of claim 81 in which the output device and the information apparatus includes a Bluetooth communication unit and the information apparatus communicates with the output device via Bluetooth communication.

94. The method of claim 81 further comprising obtaining at the server data content from a content server employing the reference or pointer to data content.

95. The method of claim 94 in which the obtaining of the data content includes obtaining data content related at least in part to the indication included in the composite message.

96. The method of claim 81 further comprising generating at the server output data that is in accordance at least partly to the indication included in the composite message.

97. A data output service method, comprising

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establishing a cellular telephone communication channel between a mobile, wireless information apparatus and a server over a cellular telephone communication network;

providing a composite message from the information apparatus to the server, the composite message including at least a reference or pointer to data content and an indication of at least one of a language, format, instruction, or data type acceptable for outputting the data content at an output device;

receiving output data at the information apparatus from the server corresponding to the data content and being in a form that is related at least partly to the indication included in the composite message;; and

delivering the output data from the information apparatus to the output device for outputting the data content.

98. The method of claim 97 in which the output device is an audio output device and the output data includes audio data.

99. The method of claim 97 in which the output device is a display device and the output data includes one or more of image data, audio data, and a video data.

100. The method of claim 97 further comprising providing from the information apparatus and to the server one or more of an authentication information, an identification information, and a subscription service information.

101. The method of claim 97 further comprising sending payment information from the information apparatus to the server corresponding to payment for the data output service.

102. The method of claim 101 in which the payment information includes data output service subscriber information corresponding to a pre-arranged subscription to the data output service.

103. The method of claim 102 further comprising correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

104. The method of claim 97 further comprising obtaining authentication information from the information apparatus to authenticating permission for the information apparatus to access the data output service.

105. The method of claim 97 further comprising obtaining at the server data content from a content server employing at least partly the reference or pointer to data content.

106. A data output service system, comprising

a wireless communication channel on a wireless communication network between a mobile, wireless information apparatus and a server;

means for providing from the information apparatus to the server, at least a reference or pointer to data content and an indication of at least one of a language, format or data type acceptable for outputting the data content at an output device;

means for receiving output data at the information apparatus from the server corresponding to the data content and being in a form that is related at least partly to the indication provided from the information apparatus to the server; and

means for delivering the output data from the information apparatus to the output device for outputting the data content.

107. The method of claim 106 in which the output device is an audio output device and the output data includes audio data.

108. The method of claim 106 in which the output device is a display device and the output data includes one or more of image data, audio data, and a video data.

109. The method of claim 106 in which the output data is delivered from the information apparatus to the output device over a data output wireless communication channel.

110. The method of claim 106 further comprising the information apparatus discovering the output device prior to delivering the output data.

111. The method of claim 106 in which the output data is delivered from the information apparatus to the output device over a wired connection.

112. The method of claim 106 further comprising providing from the information apparatus and to the server one or more of an authentication information, an identification information and subscription service information.

113. The method of claim 106 further comprising sending payment information from the information apparatus to the server corresponding to payment for the data output service.

114. The method of claim 113 in which the payment information includes data output service subscriber information corresponding to a pre-arranged subscription to the data output service.

115. The method of claim 106 further comprising means for generating at the server an output data that compatible to the indication received from the information apparatus.

116. The method of claim 106 in which the output device further includes an output controller that is externally connected to the output device, and the method further comprising delivering the output data from the information apparatus to the output controller for outputting data content at the output device.

117. The method of claim 116 in which the information apparatus is connected to the output controller via a wireless communication.

118. The method of claim 116 in which the information apparatus is connected to the output controller via a wired connection.

119. A data output service method for outputting data content at an output device, comprising

establishing a wireless communication channel between a mobile, wireless information apparatus and a server over a network that includes a wireless communication channel;

providing a composite message from the information apparatus to the server, the composite message including at least one of a job object or a data content object, the job object indicating at least one of authentication and payment information and the data content object including a reference or pointer to a data content that includes audio data;

receiving at least an audio output data at the information apparatus from the server corresponding to the audio data content; and

delivering at least the audio output data from the information apparatus to an output device that includes audio output function for outputting the data content.

120. The method of claim 119 in which the network further includes one of an Internet, a local area network and a wide area network.

121. The method of claim 119 in which the output device is a display device and the output data further includes one or more of image data, audio data, and a video data.

122. The method of claim 119 further comprising providing from the information apparatus and to the server authentication information and subscription service information.

123. The method of claim 119 further includes establishing a wireless communication channel between the information apparatus and the output device.

124. The method of claim 123 in which the output device is a Bluetooth audio output device. .

125. The method of claim 123 in which establishing the wireless communication channel includes a security or authentication procedures.

126. The method of claim 119 further comprising the information apparatus discovering the output device prior to delivering the output data.

127. The method of claim 119 in which the output data is delivered from the information apparatus to the output device over a wired connection.

128. The method of claim 119 further comprising obtaining at the server data content from a content server employing at least partly the reference or pointer to the data content.

129. The method of claim 119 in which the output device further includes an output controller that is externally connected to the output device, and the method further comprising delivering the output data from the information apparatus to the output controller for outputting data content at the output device.

130. The method of claim 119 in which the output device is connected to the output controller via a wired connection.

Remarks

Claims 66- 130 are in the application. Claims 66, 81, 97, 106, and 119 are in independent form. Reconsideration is requested.

Claims 11, 13-15 and 32-58 stand rejected under 35 USC 102(e) for anticipation by Tan (US Pat. No. 6,760,745). Claims 12 and 16-22 stand rejected under 35 USC 103(a) for obviousness over Tan in view of Stewart et al (US Pat Publ. No. 2004/0057075). Applicant responds as follows.

Claims 1-65 have been cancelled and replaced with claims 66- 130. Claims 66, 81, 97, 106, and 119 are in independent form and are each direct to a data output service method or system for outputting data content at an output device. Applicant submits that 66-130 are patentably distinct over the cited references for the following reasons.

Claim 66 recites:

> A data output service method for outputting data content at an output device, comprising
>
> establishing a wireless communication channel between a mobile, wireless information apparatus and a server over a network that includes a wireless communication channel;
>
> providing a composite message from the information apparatus to the server and over the wireless communication channel, the composite message including at least one of a job object or a data content object, the job object indicating at least one of authentication and payment information and the data content object including a reference or pointer to data content;
>
> receiving output data at the information apparatus from the server corresponding to the data content; and
>
> delivering the output data from the information apparatus to an output device for outputting the data content.

Claim 66 recites "a mobile, wireless information apparatus" as a clarification of the "portable" device recited in original elected claim 17. Examples of such an apparatus are referred to at paragraph [0047] as "palmtop computer, handheld device, laptop computer, personal digital assistant (PDA), smart phone, screen phone, e-book, Internet pad, communication pad, Internet

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appliance, pager, digital camera, etc." As described at paragraph [0050], the wireless aspect of the apparatus is a species that is exemplified as follows:

> Information apparatus 100 may be coupled to network 108 through wired or wireless connections, or a combination of them. As an example, information apparatus 100 may subscribe to a wireless data network in which packet data is transmitted through, for example, radio links between information apparatus 100 and a plurality of base stations. A wireless communication connection may include a cellular telephone communication channel. As another example, information apparatus 100 may be connected to network 108 through wired lines such as, without limitation, telephone lines, Ethernet, WAN links (e.g., T1, T3, 56kb, X.25) or broadband connections (e.g., ISDN, Frame Relay and ATM), among others.

The job object and data content object of the composite message are described in the application beginning at, for example, paragraphs [0039] and [0042], respectively. The use of these objects in a composite message is described, for example, at paragraph [0108] of the application. The job object clarifies the structure of the payment and authentication information recited in original elected claims 12 and 22, respectively, and the data content object recites the subject matter recited in original elected claim 38.

Tan is directed to a method of operating a server to facilitate an interactive session between two or more computers. A document server dynamically-generates a document generated with an attached variable that contains information necessary to replicate the document on another server, thereby allowing the other server to generate a replicated version of the document to be sent to a second client computer as shown in Fig. 4, a customer service representative computer 425 to establish an interactive session between two or more client computers.

Stewart et al. is directed to a method for delivering a document over a network, including generating a postscript document from a client by a print driver at the client shown in Fig. 7A, 650 and uploading the postscript document to a storage unit via the network, verifying print driver information, and downloading the document from the storage unit to a facility for printing. As

described at paragraph [0044] of Stewart et al., the client 310 stores local applications 310a that can be used to create or download a document that the user can ultimately forward to the print side 300c for shipping and/or delivery to a specified location. Stewart et al. refers to an interface for entering user payment information.

Neither of the cited references teaches or suggests the data output service method of claim 66. Tan is directed to facilitating an interactive session between client computers by replicating documents on a pair of servers. Stewart et al. is directed to uploading a document from a client to a server and then forwarding the document from the server to a print site. Neither reference teaches or suggests a data output service method that includes establishing a wireless communication channel between a mobile, wireless information apparatus and a server over a network that includes a wireless communication channel, providing a composite message from the information apparatus to the server, the composite message including at least one of a job object or a data content object, and receiving output data at the information apparatus from the server corresponding to the data content.

More specifically, Tan is directed to facilitating an interactive session and not remotely directed to outputting data. Stewart et al. describes outputting data, but uploads the data from the client to a server from which the data is then sent by the server at the website co-location as shown in Fig 7A to a print site for output. Stewart et al. provides no teaching or suggestion of receiving output data at the information apparatus from the server and delivering the output data from the information apparatus to an output device for outputting the data content. Moreover, neither reference provides any teaching or suggestion of a job object indicating authentication information or a data content object including a reference or pointer to data content. Applicants submit, therefore, that claim 66 and its dependent claims are patentably distinct from the cited references.

Moreover, applicants submit that independent claims 81, 97, 106, and 119, and their dependent claims, are patentably distinct from the cited references. Claim 81 recites:

> providing a composite message from the information apparatus to the server, the composite message including at least a reference or pointer to data content and an indication of at least one of a language, format or data type acceptable for outputting the data content at an output device;
>
> receiving output data at the information apparatus from the server corresponding to the data content and being in a form that is acceptable for rendering at the output device;

Neither of the cited references teaches or suggests a reference or pointer to data content and an indication of at least one of a language, format or data type acceptable for outputting the data content at an output device and receiving output data at the information apparatus from the server corresponding to the data content and being in a form that is acceptable for rendering at the output device.

Tan is directed to facilitating an interactive session and not remotely directed to outputting data. Stewart et al. describes outputting data, but uploads the data from the client to a server from which the data is sent to a print site for output. Stewart et al. provides no teaching or suggestion of receiving output data at the information apparatus from the server delivering the output data from the information apparatus to an output device for outputting the data content. Moreover, neither reference provides any teaching or suggestion of a composite message that includes a reference or pointer to data content or an indication of at least one of a language, format or data type acceptable for outputting the data content at an output device. Neither reference provides any mentions of an indication of a language, format or data type as being acceptable for outputting the data content at an output device. Applicants submit, therefore, that claim 81 and its dependent claims are patentably distinct from the cited references.

Claim 97 recites subject matter analogous to claim 81, but further recites a cellular telephone communication channel between a mobile, wireless information apparatus and a server over a cellular telephone communication network. Claim 97 is patentably distinct from the cited references for the reasons set forth above in reference to claim 81, and is further patentably distinct because the cited references do not teach or suggest cellular telephone communication channel between a mobile, wireless information apparatus and a server over a cellular telephone communication network.

Claim 106 recites a system analogous to the method subject matter of claim 81. Claim 106 is patentably distinct from the cited references for the reasons set forth above in reference to claim 81.

Claim 119 recites subject matter analogous to claim 81, but further recites that the data content includes audio data content, as described in the application at paragraph [0058], for example. Claim 119 is patentably distinct from the cited references for the reasons set forth above in reference to claim 81, and is further patentably distinct because the cited references do not teach or suggest the outputting of data content that includes audio data.

Applicant believes the application is in condition for consideration and respectfully requests the same.

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Respectfully Submitted,



Mark M. Meininger
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PTO/SB/17 (10-07)
Approved for use through 06/30/2010. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2008

☑ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($)	525

Complete if Known	
Application Number	09992413
Filing Date	11/18/2001
First Named Inventor	Chang
Examiner Name	Nawaz, Asad M.
Art Unit	2155
Attorney Docket No.	1282-011/MMM

METHOD OF PAYMENT (check all that apply)

☐ Check ☑ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☐ Deposit Account Deposit Account Number: _____ Deposit Account Name: _____

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☐ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☐ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES Fee ($)	FILING FEES Small Entity Fee ($)	SEARCH FEES Fee ($)	SEARCH FEES Small Entity Fee ($)	EXAMINATION FEES Fee ($)	EXAMINATION FEES Small Entity Fee ($)	Fees Paid ($)
Utility	310	155	510	255	210	105	
Design	210	105	100	50	130	65	
Plant	210	105	310	155	160	80	
Reissue	310	155	510	255	620	310	
Provisional	210	105	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	210	105
Multiple dependent claims	370	185

Total Claims	Extra Claims	Fee ($)	Fee Paid ($)
65 - 20 or HP =	0	x _____	= 0

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee ($)	Fee Paid ($)
5 - 3 or HP =	0	x _____	= 0

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims Fee ($)	Multiple Dependent Claims Fee Paid ($)

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(c)), the application size fee due is $260 ($130 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
_____ - 100 =	_____ / 50 =	_____ (round up to a whole number)	x _____	= _____

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other (e.g., late filing surcharge): _____	

SUBMITTED BY

Signature	/Mark M. Meininger/	Registration No. (Attorney/Agent) 32,428	Telephone 503-419-0705
Name (Print/Type)	Mark M. Meininger		Date 12/31/2007

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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Electronic Patent Application Fee Transmittal

Application Number:	09992413
Filing Date:	18-Nov-2001
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Filer:	Mark Meininger
Attorney Docket Number:	1282-011/MMM

Filed as Small Entity

Utility Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with $0 paid	2253	1	525	525

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	525

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Electronic Acknowledgement Receipt

EFS ID:	2656609
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Customer Number:	21034
Filer:	Mark Meininger
Filer Authorized By:	
Attorney Docket Number:	1282-011/MMM
Receipt Date:	31-DEC-2007
Filing Date:	18-NOV-2001
Time Stamp:	15:56:05
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$525
RAM confirmation Number	624
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)

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1	Amendment - After Non-Final Rejection	09992413Amend1.pdf	613059 32bfdb4d3dbef9fea59c9c1c2f0716923456d1c	no	15
Warnings:					
Information:					
2	Fee Worksheet (PTO-06)	09992413Amend1FeeXmtal.pdf	248099 45dfbef424294cd39005d9159eae55c344d19037	no	1
Warnings:					
Information:					
3	Fee Worksheet (PTO-06)	fee-info.pdf	8133 e2159fdb522cec4b6660ca1553f836dc6fe1a3f	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	869291		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 09/992,413	Filing Date 11/18/2001	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	12/31/2007	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 65	Minus	** 65	= 0	X $25 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 5	Minus	***7	= 0	X $105 =	0	OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/DEBORAH POLLARD/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,413	11/18/2001	William Ho Chang	1282-011/MMM	5528

21034 7590 06/29/2007

IPSOLON LLP
111 SW COLUMBIA
SUITE 710
PORTLAND, OR 97201

EXAMINER	
NAWAZ, ASAD M	

ART UNIT	PAPER NUMBER
2155	

MAIL DATE	DELIVERY MODE
06/29/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	09/992,413	CHANG ET AL.
	Examiner	Art Unit
	Asad M. Nawaz	2155

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-22 and 32-58* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-22 and 32-58* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is responsive to the election made without traverse on 6/7/07. Group II consisting of claims 11-22 and 35-58 were elected. Accordingly, claims 11-22 and 35-58 are pending prosecution.

Election/Restrictions

2. Applicant's election without traverse of Group II in the reply filed on 6/7/07 is acknowledged.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 11, 13-15 and 32-58 are rejected under 35 U.S.C. 102(e) as being anticipated by Tan et al (USPN: 6760745) hereinafter Tan.

As to claim 11, Tan teaches data output service system for rendering at an output device output content managed from an information apparatus, comprising: means for delivering a document object and an output device object to a server application operated on a server that is distinct from the information apparatus and the

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Lexmark v. Flexiworld

output device, the document object relating to the output content and the output device object having one or more attributes corresponding to the output device (col 3, line s52-61);

means for generating with the server application output data related to the output device for rendering the output content (col 4, lines 3-10);

and means for delivering the output data to the output device for rendering the output content (col 4, lines 17-27).

As to claim 13, Tan teaches the system of claim 11 in which the means for delivering the document object and the output device object to the server application and the means for delivering the output data to the output device are included in an output controller associated with the output device (col 4, lines 3-27).

As to claim 14 Tan teaches the system of claim 13 in which the output controller is included in the selected output device (col 4, lines 3-27).

As to claim 15 Tan teaches the system of claim 13 in which the output device includes a display output control unit and the output controller is included in the display output control unit of the output device (col 4, lines 3-27).

Claims 32-58 present no further limitations above claims 11, 13-15 and 32-58 and are thus rejected under similar rationale.

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Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 12 and 16-22 rejected under 35 U.S.C. 103(a) as being unpatentable over Tan further in view of Stewart et al (USPGPUB 2004/0057075).

As to claim 12, Tan teaches the system of claim 11 however does not explicitly indicate means for obtaining payment information from the information apparatus corresponding to payment for the data output service provided at the output device.

Stewart et al teaches means for obtaining payment information from the information apparatus corresponding to payment for the data output service provided at the output device (0052).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Tan to make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

As to claim 16 Tan teaches the system of claim 11 however does not explicitly indicate in which the output device is a printer.

Stewart el al teaches the output device is a printer (0052).

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It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Tan to make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

As to claim 17 Tan teaches the system of claim 11 but does not explicitly teach the information apparatus includes a portable computing device.

Stewart teaches the information apparatus includes a portable computing device (0052).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Tan to make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

As to claim 18, Tan teaches the system of claim 12 but does not teach the payment information is provided automatically by the information apparatus.

Stewart et al teaches the payment information is provided automatically by the information apparatus (0052).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Tan to make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

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As to claim 19 Tan teaches the system of claim 12 but does not teach in which the payment information is provided through the information apparatus as entered by a user in response to a prompt to enter payment information.

Stewart et al teaches the payment information is provided through the information apparatus as entered by a user in response to a prompt to enter payment information (0052).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Tan to make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

As to claim 20 Tan teaches the system of claim 12 but does not teach the payment information includes data output service subscriber information corresponding to a pre-arranged subscription to the data output service.

Stewart et al teaches the payment information includes data output service subscriber information corresponding to a pre-arranged subscription to the data output service (0052).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Tan to make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

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As to claim 21, Tan teaches the system of claim 20 but does not teach correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

Stewart et al teaches correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information (0052).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Tan to make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

As to claim 22, Tan teaches the system of claim 11 but does not teach obtaining authentication information from the information apparatus to authenticating permission for the information apparatus to access the data output service.

Stewart teaches obtaining authentication information from the information apparatus to authenticating permission for the information apparatus to access the data output service (0052).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Stewart et al into those of Tan to make the system more user friendly. By providing a large pool of resources to the users and letting them decide whether the fee is fair, a user friendly system can be achieved.

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Lexmark v. Flexiworld

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asad M. Nawaz whose telephone number is (571) 272-3988. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Saleh Najjar can be reached on (571) 272-4006. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AMN

SALEH NAJJAR
SUPERVISORY PATENT EXAMINER

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Lexmark v. Flexiworld

Notice of References Cited	Application/Control No. 09/992,413	Applicant(s)/Patent Under Reexamination CHANG ET AL.	
	Examiner Asad M. Nawaz	Art Unit 2155	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,760,745	07-2004	Tan et al.	709/203
*	B	US-2004/0057075	03-2004	Stewart et al.	358/001.15
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	09992413	CHANG ET AL.
	Examiner	Art Unit
	Nawaz, Asad M	2155

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE							
Final	Original	04/02/2007	06/25/2007						
	1	÷	-						
	2	÷	-						
	3	÷	-						
	4	÷	-						
	5	÷	-						
	6	÷	-						
	7	÷	-						
	8	÷	-						
	9	÷	-						
	10	÷	-						
	11	÷	✓						
	12	÷	✓						
	13	÷	✓						
	14	÷	✓						
	15	÷	✓						
	16	÷	✓						
	17	÷	✓						
	18	÷	✓						
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	27	÷	-						
	28	÷	-						
	29	÷	-						
	30	÷	-						
	31	÷	-						
	32	÷	✓						
	33	÷	✓						
	34	÷	✓						
	35	÷	✓						
	36	÷	✓						

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	09992413	CHANG ET AL.
	Examiner	Art Unit
	Nawaz, Asad M	2155

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	04/02/2007	06/25/2007							
	37	÷	✓							
	38	÷	✓							
	39	÷	✓							
	40	÷	✓							
	41	÷	✓							
	42	÷	✓							
	43	÷	✓							
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	45	÷	✓							
	46	÷	✓							
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	63	÷	-							
	64	÷	-							
	65	÷	-							

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	09992413	CHANG ET AL.
	Examiner	Art Unit
	Nawaz, Asad M	2155

SEARCHED

Class	Subclass	Date	Examiner
709	203-230, 245-48	6/13/07	AMN
715	500, 516-517,969	6/13/07	AMN
710	8, 10	6/13/07	AMN

SEARCH NOTES

Search Notes	Date	Examiner
East Search (USPAT; USPGPUB; EPO: JPO: DERWENT; IBM_TDB)	6/13/07	AMN
Inventor Name Search for ODP	6/16/07	AMN

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

Bib Data Sheet

CONFIRMATION NO. 5528

SERIAL NUMBER	FILING DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/992,413	11/18/2001 RULE	455	2681	1282-011/MMM

APPLICANTS

William Ho Chang, Vancouver, WA;
Christina Ying Liu, Vancouver, WA;

** CONTINUING DATA **********

THIS APPLN CLAIMS BENEFIT OF 60/252,682 11/20/2000

** FOREIGN APPLICATIONS **********

** SMALL ENTITY **

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ yes ☑ no 35 USC 119 (a-d) conditions met ☐ yes ☑ no ☐ Met after Allowance Verified and Acknowledged Examiner's Signature Initials	WA	10	85	4

ADDRESS

021034

TITLE

Method for mobile and pervasive output

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
901	No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	709/203-230, 245-248.ccls.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 18:55
L2	2188	710/8,10.ccls.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 18:55
L3	772	345/1.1.ccls.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 18:55

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EAST Search History

L4	46600	709/203-230,245-248.ccls.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 18:55
L5	2607	715/500,516,517,969.ccls.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 18:55
L6	2958	2 or 3	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 18:55
L7	49234	6 or 4	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 18:55

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EAST Search History

L8	51620	7 or 5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 18:56
L9	4442246	(format$ or transcod$ or display$)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 18:57
L10	3774606	general or generic or automatic	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 18:58
L11	74794	10 near4 9	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 18:58

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EAST Search History

L12	1273	automatic near4 format$. ab.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 18:59
L13	126123	(device near3 specific)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 18:59
L14	1	12 same 13	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 18:59
L15	230	automatic near4 format$ and 13	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 19:00
L16	122	automatic near4 format$ and 13	USPAT	OR	ON	2007/06/24 19:00

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

EAST Search History

L17	0	automatic near4 format$ same 13	USPAT	OR	ON	2007/06/24 19:00
L18	5	automatic near4 format$ same 13	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/06/24 19:00

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Lexmark v. Flexiworld

PTO/SB/06 (12-04)
Approved for use through 7/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875 Effective December 8, 2004

Application or Docket Number: 07/922,413

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	150.00		N/A	300.00
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	$260		N/A	$500
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	$100		N/A	$200
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X$ 25 =		OR	X$50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X100 =			X200 =	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			+180=			+360=	
			TOTAL			TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X$ 25 =		OR	X$50 =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X100 =		OR	X200 =	
Application Size Fee (37 CFR 1.16(s))							OR		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					+180=		OR	+360=	
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 65	Minus	** 65	=	X$ 25 =		OR	X$50 =	
Independent (37 CFR 1.16(h))	* 17	Minus	*** 17	=	X100 =		OR	X200 =	
Application Size Fee (37 CFR 1.16(s))							OR		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					+180=		OR	+360=	
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

CLAIMS ONLY

Application Number: 09/998,413

Filing Date:

Applicant(s):

* May be used for additional claims or amendments

CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT		*					
	Indep	Depend	Indep	Depend	Indep	Depend		Indep	Depend	Indep	Depend	Indep	Depend
1							51						
2							52	1					
3							53						
4							54						
5							55						
6							56						
7							57						
8							58						
9							59	1					
10							60						
11	1						61						
12							62						
13							63						
14							64						
15							65						
16							66						
17							67						
18							68						
19							69						
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21							71						
22							72						
23	1						73						
24							74						
25							75						
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29							79						
30							80						
31							81						
32	1						82						
33							83						
34							84						
35							85						
36							86						
37							87						
38							88						
39							89						
40							90						
41	1						91						
42							92						
43							93						
44							94						
45							95						
46							96						
47							97						
48							98						
49							99						
50							100						
Total Indep							Total Indep						
Total Depend							Total Depend						
Total Claims							Total Claims						

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Chang
Application Number: 09/992,413
Filing Date: November 18, 2001
Title: Method For Mobile And Pervasive Output

Examiner: Nawaz, Asad M.
Art Unit: 2155

RESPONSE TO RESTRICTION REQUIREMENT

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Applicants respond as follows to the Patent and Trademark Office restriction requirement April 6, 2007.

The Examiner has required restriction to one of the following inventions under 35 USC 121:

I. claims 1-10

II. Claims 11-22 and 32-58

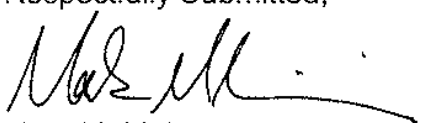
III. Claims 23-31 and 59-65.

Applicant elects without traverse claims 11-22 and 32-58 of Group II.

Applicant believes the application is in condition for consideration and respectfully requests the same.

IPSOLON LLP
111 SW COLUMBIA #710
PORTLAND, OREGON 97201
TEL. (503) 249-7066
FAX (503) 249-7068

Respectfully Submitted,



Mark M. Meininger
Registration No. 32,428

Electronic Patent Application Fee Transmittal

Application Number:	09992413
Filing Date:	18-Nov-2001
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Filer:	Mark Meininger
Attorney Docket Number:	1282-011/MMM

Filed as Small Entity

Utility Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 1 month with $0 paid	2251	1	60	60

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Lexmark v. Flexiworld

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	60

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Electronic Acknowledgement Receipt

EFS ID:	1849978
Application Number:	09992413
International Application Number:	
Confirmation Number:	5528
Title of Invention:	Method for mobile and pervasive output
First Named Inventor/Applicant Name:	William Ho Chang
Customer Number:	21034
Filer:	Mark Meininger
Filer Authorized By:	
Attorney Docket Number:	1282-011/MMM
Receipt Date:	07-JUN-2007
Filing Date:	18-NOV-2001
Time Stamp:	15:56:45
Application Type:	Utility

Payment information:

Submitted with Payment	yes
Payment was successfully received in RAM	$60
RAM confirmation Number	996
Deposit Account	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part /.zip	Pages (if appl.)

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

1	Response to Election / Restriction Filed	09992413RestrictResponse.pdf	29750	no	1
Warnings:					
Information:					
2	Fee Worksheet (PTO-06)	fee-info.pdf	8135	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	37885	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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Lexmark v. Flexiworld

4

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,413	11/18/2001	William Ho Chang	1282-011/MMM	5528

21034 7590 04/06/2007

IPSOLON LLP
111 SW COLUMBIA
SUITE 710
PORTLAND, OR 97201

EXAMINER	
NAWAZ, ASAD M	
ART UNIT	PAPER NUMBER
2155	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
31 DAYS	04/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Office Action Summary	Application No.	Applicant(s)	
	09/992,413	CHANG ET AL.	
	Examiner	Art Unit	
	Asad M. Nawaz	2155	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 November 2001*.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-65* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-65* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-10, drawn to a wireless data output method in which the document object is provided, classified in class 455, subclass 3.01.

II. Claims 11-22 and 32-58, drawn to a data output method in which the document object is delivered, classified in class 709, subclass 203.

III. Claims 23-31 and 59-65, drawn to a data output method in which the document object is provided, classified in class 709, subclass 217.

The inventions are distinct, each from the other because of the following reasons:

Inventions I, II and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct if they do not overlap in scope and are not obvious variants, and if it is shown that at least one subcombination is separately usable. In the instant case, subcombination I has separate utility such as being wireless. See MPEP § 806.05(d).

The examiner has required restriction between subcombinations usable together. Where applicant elects a subcombination and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a

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Lexmark v. Flexiworld

claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper.

A telephone call was made to applicant's representative on 3/30/07 to request an oral election to the above restriction requirement, but did not result in an election being made.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

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Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C.103(a) of the other invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asad M. Nawaz whose telephone number is (571) 272-3988. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Saleh Najjar can be reached on (571) 272-4006. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AMN

/SALEH NAJJAR/
SUPERVISORY PATENT EXAMINER

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	09992413	CHANG ET AL.
	Examiner	Art Unit
	Nawaz, Asad M	2155

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	04/02/2007								
	1	+								
	2	+								
	3	+								
	4	+								
	5	÷								
	6	+								
	7	÷								
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	31	+								
	32	+								
	33	+								
	34	+								
	35	+								
	36	+								

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	09992413	CHANG ET AL.
	Examiner	Art Unit
	Nawaz, Asad M	2155

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	04/02/2007								
	37	+								
	38	+								
	39	+								
	40	+								
	41	+								
	42	+								
	43	+								
	44	+								
	45	+								
	46	+								
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	64	+								
	65	+								

11-26-01

A

Express Mail Label No. EL817829204US
DATE OF DEPOSIT: November 18, 2001

Attorney's Ref. No. 1282-011/MMM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box PATENT APPLICATION
ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

Transmitted herewith for filing is the patent application of:
Inventor: Chang et al.

For: Method For Mobile And Pervasive Output

Enclosed are:

[X] Patent application with 60 pages of specification, 8 pages of claims, an abstract, and 10 sheets of drawings.
[X] Combined Declaration and Power of Attorney.
[X] Assignment and Assignment Cover Sheets

CLAIMS AS FILED						
For	Number Filed		Number Extra	Rate		Basic Fee $370.00
Total claims	65	-20	45	x $9.00	=	$405
Independent Claims	6	-3	3	x $42.00	=	$126
TOTAL FILING FEE						$901

[ ] The Commissioner is hereby authorized to charge any additional fees which may be required in connection with the filing of this application and recording any assignment filed herewith, or credit over-payment, to Account No._____. A copy of this sheet is enclosed.

[X] A check in the amount of $941 to cover [X] filing fee and [X] assignment recordal fee is enclosed.

Respectfully submitted,
IPSOLON LLP

Mark M. Meininger
Registration No. 32,428

IPSOLON LLP
805 SW Broadway #2740
Portland, Oregon 97205
Telephone: (503) 249-7066

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Lexmark v. Flexiworld

Method For Mobile And Pervasive Output

Technical Field of the Invention

[0001] Present invention relates to providing digital content to an output device and, in particular, to providing pervasive output in which an information apparatus can pervasively output digital content to an output device regardless of the processing power, display screen size and memory space of the information apparatus.

Background and Summary of the Invention

[0002] As described herein, information apparatuses refer generally to computing devices, which include both stationary computers and mobile computing devices (pervasive devices). Examples of such information apparatuses include, without limitation, desktop computers, laptop computers, networked computers, palmtop computers (hand-held computers), personal digital assistants (PDAs), Internet enabled mobile phones, smart phones, pagers, digital capturing devices (e.g., digital cameras and video cameras), Internet appliances, e-books, information pads, and digital or web pads. An output device may include any one or more of fax machines, printers, copiers, image and/or video display devices (e.g., televisions, monitors and projectors), and audio output devices.

[0003] For simplicity and convenience, hereafter, the following description may refer to an output device as a printer and an output process as printing. However, it should be understood that the term printer and printing used in the discussion of present invention may refer to a specific example used to simplify description or may be one exemplary embodiment. The reference to printer and printing used here is intended to be applied or extended to the larger scope and definition of output devices and should not be construed as restricting the scope and practice of present invention.

[0004] Fueled by ever-increasing bandwidth and processing power and ever-increasing numbers of wireless mobile devices and available software applications for pervasive devices, millions of users are or will be creating,

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downloading, and transmitting content and information using their pervasive computing devices. As a result, there is a need to allow users to easily output content and information from their pervasive computing devices to any output device. People need to output directly and conveniently from their pervasive information apparatus, without depending on synchronizing with a stationary computer (e.g., desktop personal computer) for printing, as an example.

[0005] To illustrate, an information worker at an airport receiving Email in his hand-held computer may want to walk up to a nearby printer or fax machine to have his e-mail printed. In addition, the mobile worker may also want to print a copy of his to-do list, appointment book, business card, and his flight schedule from his mobile device. As another example, a user reading a news article using his/her Internet-enabled pager or mobile phone may want to print out the complete article instead of reading it through the small screen on the pager or mobile device. In still another example, a user visiting an e-commerce site using his mobile phone may want to print out pictures of the product he/she is buying because the pictures (image and/or graphics) may not be displayed on the small screen of his/her mobile phone. In yet another example, a user who takes a picture with a digital camera may want to easily print it out to a nearby printer. In still another example, a user with a mobile device may want to simply walk up to a printer and conveniently print a file that is stored on the mobile device or that is stored on a network (e.g., Internet, corporate network) and accessible from the mobile device, such as a PowerPoint® display application document, word processing document, or a document in any other file format such as PDF, HTML, JPEG etc. In addition, a user should also be able to print a web page or a book or a report published on the Internet. Finally, a user may want to output a complete web page or any document or file to a larger display screen nearby, even though the small screen of his/her mobile device cannot completely display or open a document of such a size.

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[0006] Conventionally, an output device (e.g., a printer) is connected to an information apparatus via a wired connection such as a cable line. A wireless connection is also possible by using, for example, radio communication or infrared communication. Regardless of wired or wireless connection, a user must first install in the information apparatus an output device driver (e.g., printer driver in the case the output device is a printer) corresponding to a particular output device model and make. Using a device-dependent or specific driver, the information apparatus may process output content or digital document into a specific output device's input space (e.g., printer input space). The output device input space corresponds to the type of input that an output device (e.g., a printer) understands (herein referred to as output data or print data in the case the output device is a printer). For example, the printer input space or print data may include printer specific input format (e.g., one or more of an image format, graphics format, text format, audio format, video format, file format, and data format), encoding, language (e.g., page description language, markup language etc), instructions, protocols or data that can be understood or used by a particular printer make and model.

[0007] Output data may be proprietary or published or a combination of the two. An output device's input space or output data is therefore, in general, device dependent. Different output device models may have their own input spaces specified, designed or adopted by the output device manufacturer (e.g., the printer manufacturer) according to a specification for optimal operation. Consequently, different output devices usually require use of specific output device drivers (e.g., printer drivers) for accurate output (e.g., printing). For example, a printer driver may control, manage, communicate, and output print data to a printer. Sometimes, instead of using a device driver (e.g., printer driver), the device driving feature may be included or as part of an application software.

[0008] Installation of a device driver (e.g., printer driver) or application may be accomplished by, for example, manual installation using a CD or floppy

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disk supplied by the printer manufacturer. Or alternatively, a user may be able to download that particular driver or application from a network. For a home or office user, this installation process may take anywhere from several minutes to several hours depending on the type of driver and user's sophistication level with computing devices and networks. Even with plug-and-play driver installation, the user is still required to execute a multi-step process for each printer or output device.

[0009] This installation and configuration process adds a degree of complexity and work to end-users who may otherwise spend their time doing other productive or enjoyable work. Moreover, many unsophisticated users may be discouraged from adding new peripherals (e.g., printers, scanners, etc.) to their home computers or networks to avoid the inconvenience of installation and configuration. Therefore, there is a need to provide a manner in which a user can more conveniently or easily output digital content to an output device without the inconvenience of finding and installing new device drivers or printer drivers.

[0010] In addition, conventional output or printing methods may pose significantly higher challenges and difficulties for mobile device users than for home and office users. The requirement for pre-installation of a device-dependent driver diminishes the benefit and concept of mobile (pervasive) computing and output. For example, a mobile user may want to print or output e-mail, PowerPoint® presentation documents, web pages, or other documents in an airplane or at an airport, gas station, convenient store, kiosk, hotel, conference room, office, home, etc. It is highly unlikely that the user would find at any of these locations a printer of the same make and model as is at the user's base station. It is usually not a viable option to pre-install all of the possible hundreds, or even thousands, of printer drivers or device drivers available to the user's information apparatus.

[0011] As a consequence, the user would currently have to install and configure a printer driver each time at each such remote location before printing. Moreover, the user may not want to be bothered with looking for a

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driver or downloading it and installing it just to print out or display one page of email at the airport. This is certainly an undesirable and discouraging process to promote pervasive or mobile computing. Therefore, a more convenient or automated printing and output solution is needed so that a user can simply walk up to an output device (e.g., printer or display device) and easily output a digital document without having to install or pre-install a particular output device driver (e.g., printer driver).

[0012] Another challenge for mobile users is that many mobile information apparatuses have limited memory space, processing capacity and power. These limitations are more apparent for small and low-cost mobile devices including, for example, PDAs, mobile phones, screen phones, pagers, e-books, Internet Pads, Internet appliances etc. Limited memory space poses difficulties in installing and running large or complete printer or device drivers, not to mention multiple drivers for a variety of printers and output devices. Slow processing speed and limited power supply create difficulties driving an output device. For example, processing or converting a digital document into output data by a small mobile information apparatus may be so slow that it is not suitable for productive output. Heavy processing may also drain or consume power or battery resources. Therefore, a method is needed so that a small mobile device, with limited processing capabilities, can still reasonably output digital content to various output devices.

[0013] Finally, some small mobile devices with limited display screens, such as mobile phones, may in some cases be limited to display only a few lines of text. Browsing the Internet with such devices can be a disappointing experience when viewing, for example, complex web pages containing rich formats, graphics, and images. Furthermore, some small mobile devices may not have appropriate applications to display complex documents or languages such as PDF-format files, word processing documents and PowerPoint® presentation documents etc. Typically, if an application is available, displaying complex original documents on small mobile devices may require downsizing the document or page into, for example, a few lines

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of text. As an example, WAP protocol, I-Mode, and web clipping among others may downsize, reduce or truncate information on the original web page for display on mobile devices. Therefore, it is desirable to allow mobile users to output from their small information apparatuses to an output device the full richness of the original document content.

[0014] One implementation of the present invention provides an easy, friendly and convenient process for digital output. Unlike conventional output or printing, a user does not have to manually pre-install a device driver (e.g., printer driver) from a CD, floppy disk, or download the driver somewhere from a network. This is well-suited for providing output capability to small and lower-cost mobile devices with limited memory space, power supply and processing capability to still be able to output or print to an output device.

[0015] In addition, this allows small mobile devices with limited display, processing power, and memory to be able to output a digital document (e.g., PDF, HTML, PowerPoint etc) in its full original richness, without resorting to downsizing, truncating, reducing, clipping or otherwise altering the original document. A user can output the original content or document even when the small mobile device cannot display or fully display the original digital document or content.

[0016] Finally, one implementation provides a convenient method allowing users to output to an output device with or without connection to a static network. Through local communication and synchronization between information apparatus and output device, hardware and software installation for static or permanent network connectivity may not be necessary for the output device.

[0017] Additional objects and advantages of the present invention will be apparent from the detailed description of the preferred embodiment thereof, which proceeds with reference to the accompanying drawings.

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Brief Description of the Drawings

[0018] Fig. 1 is a block diagram of a pervasive output system that can implement the process and apparatus of the present invention.

[0019] Figs. 2A and 2B are block diagrams illustrating exemplary configurations of hardware components of wireless communication units.

[0020] Figs. 3A-3C illustrate various configurations and implementations of output controller with respect to an output device such as a printer.

[0021] Fig. 4 is a flow diagram of a pervasive output process of the present invention.

[0022] Fig. 5 is a flow diagram of an exemplary implementation of a discovery process optionally included in the output process of Fig. 4.

[0023] Fig. 6 is a flow diagram of an exemplary client application process included in the output process of Fig. 4.

[0024] Fig. 7 is a flow diagram of an exemplary server application process utilized in the output process of Fig. 4.

[0025] Fig. 8 is a flow diagram of an exemplary final output process for pervasive output.

[0026] Figs. 9A - 9F show a series of exemplary graphical user interfaces (GUIs) rendered at different times on a display screen of an information apparatus.

[0027] Fig. 10A is an exemplary block diagram of a conventional printing system or printer with a conventional printer controller.

[0028] Fig. 10B is an exemplary block diagram of a conventional output system or an output device such as a printing system or printer that does not include a conventional printer controller.

Detailed Description of Preferred Embodiments

[0029] Sets forth below are definitions of terms that are used in describing implementations of the present invention. These definitions are provided to facilitate understanding and illustration of implementations of the present

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invention and should in no way be construed as limiting the scope of the invention to a particular example, class, or category.

[0030] Objects

[0031] An object may refer to a software and data entity, which may reside in different hardware environments or platforms or applications. An object may encapsulate within itself both data and attributes describing the object, as well as instructions for operating that data. For simplicity of discussion, an object may also include, for example, the concept of software components that may have varying granularity and can consist of one class, a composite of classes, or an entire application.

[0032] It is important to note that the term object is not limited to software or data as its media. Any entity containing information, descriptions, attributes, data, instructions etc. in any computer-readable form or medium such as hardware, software, files based on or including voice, text, graphics, image, or video information, electronic signals in analog or digital form, etc., are all valid forms of object definition.

[0033] An object may also contain in one of its fields or attributes a reference or pointer to another object, or a reference or pointer to data and or content. (The terms reference and pointer may be used interchangeably herein.) A reference to an object or any entity or content may include one or more, or a combination of, pointers, identifiers, names, paths, addresses or any descriptions relating to a location where an object, data, or content can be found. Examples of reference may include universal resource identifier scheme (URI), uniform resource locator (URL), IP address, file names, directory pointers, software object and component pointers, and run-time address, among others.

[0034] By way of example, a document object described in the present invention may contain or encapsulate one or more digital documents and/or one or more pointers or references to digital documents. Therefore, moving or passing document objects in connection with the present invention may include moving or passing (1) actual digital content or (2)

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reference to the actual content or (3) both. It will be appreciated that the document object can be quite small and lightweight if it does not also contain the digital document. These are examples of valid implementations and may be used in the description of present invention. Different implementations in different situations can be easily discerned and recognized by persons of ordinary skill in the art.

[0035] An object can reside anywhere in a network and can be transmitted to different environments, platforms, or applications. Downloading or transferring an object over the network may involve protocols such as file transfer protocol (FTP) or hypertext transfer protocol (http), among others. Transferring an object may also involve using messages or other methods through an object or component model. Three major objects used and described in present invention are output device object (or printer object in the case the output device is a printer), job object, and document object.

[0036] Output Device Object (or Printer Object in the case the output device is a printer)

[0037] An output device object may contain one or more attributes that may identify and describe, for example, the capabilities and functionalities of a particular output device such as a printer. An output device object may be stored in the memory component of an output device. As described below in greater detail, an information apparatus requesting output service may communicate with an output device. During such local service negotiation, at least a partial output device object may be uploaded to the information apparatus from the output device. By obtaining the output device object (or printer object in the case of a printer), the information apparatus may learn about the capability, compatibility, identification, and service provided by the output device.

[0038] As an example, an output device object or printer object may contain one or more of the following fields and or attribute descriptions. Each of following fields may be optional, and furthermore, each of the following fields

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or attributes may or may not exist in a particular implementation (e.g., may be empty or NULL).

- Identification of an output device (e.g., brand, model, registration, IP address etc.)
- Services and feature sets provided by an output device (e.g., color or grayscale output, laser or inkjet, duplex, output quality, price per page, quality of service, etc.)
- The type of input languages, formats, and or output data (e.g., PostScript, PCL, XML, RTL, etc.) supported by an output device.
- Device specific or dependent profiles (e.g., output device profiles, printer profiles, color profiles, halftoning profiles, communication profiles etc.). Device profiles may include information such as color tables, resolution, halftoning, dpi (dots-per-inch), bit depth, page size, printing speed, etc. One or multiple profiles may exist.
- Payment information on a plurality of services provided by an output device.
- Information or security requirements and type of authentication an output device supports.
- Date and version of the output device object (e.g., printer object).
- Software components containing algorithms or instructions or data, which may be uploaded to run in an information apparatus, as described with reference to Fig. 1. For example, a graphical user interface (GUI) software component may be uploaded to an information apparatus. The software component may be incorporated into or launched in the information apparatus by a client application of present invention to capture a user's preferences (e.g., print quality, page layout, number of copies, number of card per page, etc.). The client application may capture these user preferences and create a job object, as described below.
- Pointer or reference to any one or more output device parameters (output device parameters include one or more of the above described

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output device object fields and or attribute descriptions). For example, a more up-to-date or original version of output device parameters may sometimes be stored in a network node. An output device or may include pointer or pointers to these output device parameters.

- Pointer or reference to another object or objects, including output device object, job object (described below) or document object.

[0039] Job Object

[0040] A job object may contain attributes and information that describe an output job. A user may provide some or all of these attributes, preferences and or information about the output job consciously by, for example, specifying his/her preference through a GUI or through defaults in his/her information apparatus. Alternatively or in combination, a job object may be obtained without active user intervention. In one instance, default parameters may be provided, obtained, negotiated or calculated without user knowledge.

[0041] Examples of attributes and information contained in a job object may include one or more of the following, among others. Each of following fields may be optional, and furthermore, each of the following fields or attributes may or may not exist in a particular implementation (e.g., may be empty or NULL):

- Preferences such as print quality, page layout, number of pages, number of cards per page, output size, color or grayscale, among others.
- Information on security, authentication, payment, subscription, identification among others.
- Information on priority or quality of service.
- Status information of the output job or process.
- Job instructions such as queuing, cancellation, execution, output priority among others.
- Version or date of the job object.
- Sets of default parameters or instructions. The defaults may be stored in an output device, in the information apparatus, or in any network nodes.

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- Pointer or reference to any one of the above mentioned information, instructions, preferences and defaults.
- Pointer or reference to another object or objects.

[0042] Document Object

[0043] A document object may contain attributes and fields that describe a digital document and or reference or references to digital document or documents. The term digital document as used herein may refer to any digital content or data content that an output device may output. A digital document may contain text, graphics, image, sound, voice, forms, and video, among other content types. Examples of a digital document may be any one or combination of file types: HTML, VHTML, PostScript, PCL, XML, PDF, MS Word, PowerPoint, JPEG, MPEG, GIF, PNG, WML, VWML, CHTML, HDML, ASCII, 2-byte international coded characters, etc. A digital document can be composed of any format, language, encoding, data or combination, and the digital document may be partially or totally proprietary or otherwise. A digital document may be used interchangeably with the term output content or data content in the descriptions of present invention.

[0044] A document object may contain one or more of the following attributes, fields, or descriptions. Each of the following fields may be optional, and furthermore, each of the following fields or attributes may or may not exist in a particular implementation (e.g., may be empty or NULL).

- The actual digital document or output content.
- A pointer or reference to a digital document or output content and or instructions of where a digital document can be found and or retrieved. A digital document may be located in a user's information apparatus, in an application, or anywhere in a network node (e.g., in a content or file server). Using a pointer or reference to a digital document may reduce the size of the document object. Therefore, this may be beneficial, for example, when passing or uploading a document object from information apparatus to server application through a narrow bandwidth communication link.

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- Date and version of the digital document.
- A history with the dates and descriptions of any changes, modifications, and updates made to the document since its creation.
- Descriptions and instructions for viewing, obtaining, opening, interpreting, encoding, decoding, compressing, decompressing, rendering, converting, describing, processing, and manipulating the digital document.
- Status and state of the digital document. For example, one of the fields may provide priority or instructions of when or where to use the reference to digital document or the actual digital document itself if they are both contained in a document object.
- Pointer or reference to another object or objects.

[0045] Fig. 1 is a block diagram of a pervasive output system 98 that can implement the process and apparatus of present invention. In one implementation, electronic system 98 includes an information apparatus 100, an application server 110 and a content server 114 (sometimes referred to as "network nodes") that are connected together through network 108. Electronic system 98 may also include an output device 106 that communicates with information apparatus 100 through a communication link 116.

[0046] Network 108 generally refers to any type of wire or wireless link between multiple computing devices. Examples of network 108 may include, but are not limited to, a local area network (LAN), a wide area network (WAN), or a combination of networks. In one embodiment of the present invention, network 108 may include the Internet. In another embodiment, network 108 may contain multiple networks, including local area networks or wide area networks such as the Internet.

[0047] Information apparatus 100 is a computing device with processing capability. In one embodiment, information apparatus 100 may be a mobile computing device such as palmtop computer, handheld device, laptop computer, personal digital assistant (PDA), smart phone, screen phone, e-

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book, Internet pad, communication pad, Internet appliance, pager, digital camera, etc. It is possible that information apparatus 100 may also include a static computing device such as a desktop computer, workstation, server, etc.

[0048] Information apparatus 100 may contain components (not shown) such as a processing unit, a memory unit, a storage unit and an input/output control unit. Information apparatus 100 may also contain an interface (not shown) for interactions with users. The interface may be implemented in software or hardware or a combination. Examples of such interfaces include, without limitation, one or more of a mouse, a keyboard, a touch-sensitive or non-touch-sensitive screen, push buttons, soft keys, a stylus, a speaker, a microphone, etc.

[0049] Information apparatus 100 typically contains at least one network communication unit that interfaces with other electronic devices such as other nodes in network 108 or output device 106. The network communication unit may be implemented with hardware (e.g., silicon chipsets, antenna), software (e.g., protocol stacks, applications) or a combination. Sometimes an information apparatus 100 may contain more than one communication unit in order to support different interfaces, protocols, and or communication standards with different devices and or network nodes. For example, information apparatus 100 illustrated in Fig. 1 may communicate with output device 106 through a Bluetooth standard interface while communicating with other network nodes (e.g., content server 114 or application server 110) through a cellular telephone modem interface.

[0050] Information apparatus 100 may be coupled to network 108 through wired or wireless connections, or a combination of them. As an example, information apparatus 100 may subscribe to a wireless data network in which packet data is transmitted through, for example, radio links between information apparatus 100 and a plurality of base stations. A wireless communication connection may include a cellular telephone communication

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channel. As another example, information apparatus 100 may be connected to network 108 through wired lines such as, without limitation, telephone lines, Ethernet, WAN links (e.g., T1, T3, 56kb, X.25) or broadband connections (e.g., ISDN, Frame Relay and ATM), among others.

[0051] In one embodiment of present invention, interface 116 between information apparatus 100 and output device 106 is a wireless interface. As an example, the wireless interface may be a short-range radio interface such as those implemented according to the Bluetooth or IEEE 802.11 standard. However, the interface may be realized by other means of wireless communication such as radio, infrared, ultrasonic or hydrophonic among others. The HomeRF Shared Wireless Access Protocol (SWAP) and one of many standards for cellular communication may constitute alternatives to the Bluetooth standard. Wired line connections such as serial or parallel interface, USB interface and fire wire (IEEE 1394) interface, among others, are also possible. Connection to a local network such as an Ethernet or a token Ring network, among others, may also be implemented in the present invention for local communication between information apparatus 100 and output device 106. Exemplary hardware components of communication units that may be used to implement wireless interface between the information apparatus 100 and output device 106 are described below with reference to Figs. 2A and 2B.

[0052] Information apparatus 100 may be a dedicated device (e.g., email terminal, web terminal, digital camera, e-book, web pads, internet appliances etc.) with functionalities that are pre-configured by manufacturers. Alternatively, information apparatus 100 may allow users to install additional hardware components and or application software to expand its functionality.

[0053] Information apparatus 100 may contain a plurality of applications to implement its feature sets and functionalities. As an example, a document browsing application 103 may be implemented to help a user view and perhaps edit, partially or entirely, digital documents written in certain format

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or language (e.g., Page description language, markup language, etc.). Digital documents may be stored locally in the information apparatus 100 or in a network node (e.g., in content server 114). An example of a document browsing application is an Internet browser such as Internet Explorer, Netscape Navigator, or a WAP browser. Such browsers may use one or more standard protocols (e.g., HTTP, WAP, web clipping, I-Mode, etc.) to retrieve and display digital content written in mark-up languages such as HTML, WML, XML, CHTML, HDML, among others. Other software applications may also constitute examples of the document browsing application of the present invention. For example, a document editing software such as Microsoft Word™ also allows users to view and edit digital documents that have various file extensions (e.g., doc, rtf, html, XML etc.) whether stored locally in the information apparatus or in a network node.

[0054] In some instances restrictions may be imposed on the format or size of digital content that may be transmitted to information apparatus 100, such as when information apparatus 100 has limited processing power, screen size, memory space, or a limited application, or when bandwidth is a valuable resource in the transmission link to information apparatus 100 (such as in some wireless data network). As a result, there are situations where a user may not be able to view on information apparatus 100 the full content of a digital document in its original form using a document browsing application. For example, some images, tables, graphics, fonts and formats in a digital document may be "clipped" out or completely or partially altered from the original content before or during the transmission process. Such restrictions may be, sometimes, imposed by a service providing the content, or by the application rendering the content, or by the user to avoid slow transmission etc.

[0055] To address the difficulties described above, information apparatus 100 includes a pervasive output client application 102 that provides pervasive output capability of the present invention. Client application 102 may include software and data that can be executed by the processing unit of

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information apparatus 100. Client application 102 may be implemented as a stand-alone software application or as a part or feature of another application software, or in the form of device driver, which may be invoked, shared and used by other application software. Pervasive output client application 102 may also have means to invoke other applications (e.g., a document browsing application, a communication manager, etc.) to provide certain feature sets, as described below. Client application 102 may be variously implemented in an information apparatus 100 and may run on different operating systems or platforms. As an example, client application 102 may include one or more of the following functionalities:

- Obtain output device object as a result of communication or negotiation with output device 106.
- Obtain document object (1) from user input or selection, or (2) from other applications (e.g., a document browsing application) residing in the information apparatus 100.
- Coordinate with a server application 112 residing in application server 110 to manage the process of communication and transmission of objects or data to and from application server 112.
- Coordinate with output device 106 that include an output controller 104 to manage the process of transmitting output data (or print data in the case of printers) received from the server application 112 for output.

[0056] The client application may also optionally comprise one or more of the following functionalities:

- Communicate directly or indirectly (such as through an operating system or component or object model or message, etc.) with other applications residing in the same information apparatus 100 to obtain objects, data, and or content needed, or relating to the pervasive output process of present invention.
- Directly or indirectly manage and utilize functionalities provided by hardware components residing in its host information apparatus such as the communication unit, storage unit, memory unit, etc.

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- Provide a graphical user interface (GUI) in its host information apparatus 100 to interact with user.
- Obtain job object. Job object may be obtained (1) by user input through a GUI, or (2) by using default values stored in a network node or in the output device, or (3) the combination of the above. Default values may be pre-set or may be obtained calculated or generated by the client application as result of communication or negotiation between client application 102, output device 106 and or server application 112.
- Launch or provide an interface, session or emulation for server application 112.
- Further process output data or print data received from server application 112 before sending the data to output device 106 for final output. The processing may include converting the output data into a form (e.g., format, language, or instruction) more acceptable to or compatible with the associated output device 106. The processing may also include at least in part one or more raster image processing operations such as rasterization, scaling, color management, color conversion, halftoning, compression, decompression, etc.
- Launch, invoke, integrate or involve a helper application to assist at least in part in the processing of the output data.

[0057] The above functionalities and process of pervasive output client application 102 are described in further detail in the pervasive output process with reference to Fig. 4.

[0058] Output device 106 is an electronic system capable of outputting digital content or data content regardless of whether the output medium is a substrate (e.g., paper), display, projection, or sound. A typical example of output device 106 may be a printer, which outputs digital documents containing text, graphics, image or any combination onto a substrate. Output device 106 may also be a display device capable of displaying still images or video, such as, without limitation, televisions, monitors, and projectors. Output device 106 can also be a device capable of outputting

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sound. Any device capable of playing or reading digital content in audio (e.g., music) or data (e.g., text or document) formats is also a possible output device 106. A printer (including a fax machine, copier, etc.) is frequently referred to herein as the exemplary output device 106. However, it should be recognized that the present invention applies also to output device 106 other than printers.

[0059] Outputting a data content or output content at an output device (e.g. printers, display devices, projection devices, sound output devices etc.) includes rendering the output content on a specific output medium (e.g., papers, display screens etc). For example, rendering an output content at a printer generates image on a substrate; rendering an output content at a display device generates image on a screen; and rendering an output content at an audio output device generates sound.

[0060] A conventional printing system includes three basic components: a raster image processor, a memory buffer, and a marking engine. The raster image processor converts digital content into a raster suitable for printing; the memory buffer holds the rasterized image ready for printing; and the marking engine transfers colorant to a substrate (e.g., paper).

[0061] Marking engine may use any of a variety of different technologies to transform a rasterized image to paper or other media or, in other words, to transfer colorant to a substrate. The different marking or printing technologies that may be used include both impact and non-impact printing. Examples of impact printing may include dot matrix, teletype, daisywheel, etc. Non-impact printing technologies may include inkjet, laser, electrostatic, thermal, dye sublimation, etc.

[0062] The marking engine and memory buffer of a printer form its printer engine, which may also include additional circuitry and components, such as firmware, software or chips or chipsets for decoding and signal conversion, etc. Input to a printer engine is usually a final rasterized print data that is generated by the raster image processor. Such input is usually device

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dependent and printer specific. The printer engine may take this device dependent input and generate output pages.

[0063] Fig. 10A illustrates an exemplary block diagram of one conventional printing system or printer 1000A that includes a printer controller 1010, a memory buffer 1004, and a marking engine 1006. The printer controller 1010 includes an interpreter 1001 and a raster image processor 1002.

[0064] The Raster image processor (RIP) may be located within an output device itself (as shown by raster image processor 1002 in Fig. 10A) or externally implemented as hardware, software, or a combination (not shown). As an example, RIP may be implemented in a software application or device driver in the information apparatus 100. A RIP may also reside within a printer controller 1010 (as shown by raster image processor 1002 in Fig. 10A), a print server or an output controller 104 of present invention. Examples of raster image processing operations may include image and graphics interpretation, rasterization, scaling, segmentation, color space transformation, image enhancement, color correction, halftoning, compression etc.

[0065] When a RIP 1002 is located inside an output device 106, the RIP 1002 is usually included in a printer controller 1010 (as shown in Fig. 10A). A printer controller 1010 may interpret, convert or rasterize input print data in the form of a page description language (e.g., PostScript, PCL), markup language (e.g., XML) or other special document format or language into a final format, language or instructions that printer engine 1008 can understand.

[0066] A variety of other page description languages, markup languages, image formats, graphic formats, and file formats may be used as input print data to a printer 1000A or output device 106. Examples of possible inputs other than PostScript and PCL may include without limitation, EMF, XML, HTML, among many others. Some printer manufacturers may also employ a combination of proprietary or non-proprietary page description languages, markup languages, file formats, graphics and image formats, color spaces,

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metafiles, encoding, decoding, compression or decompression etc. for the print data. The print data sent to a printer with printer controller 1010 is usually an intermediate description of a digital document that may require further interpretation, processing or conversion before the print data can be sent to a printer engine 1008 for output. A printer controller 1010 may interpret and process the input intermediate print data into a final format that can be understood by the printer engine 1008. Regardless of the type of print data, conventionally, a user may need a device-specific driver in his or her information apparatus 100 in order to output the proper language, format, or file that can be accepted by a specific printer or output device 106

[0067] Fig. 10B shows another exemplary conventional output system or an output device 1000B. An output system or output device may include one or more of a printing system or device, a display system or device, a projection system or device, or a sound system or device. In the case that the output system or device is a printer, the printer with reference to Fig. 10A does not have a printer controller 1010. A typical example of printer 1000B is a lower-cost inkjet printer. RIP operations in this example may be implemented in a software application or device driver in an information apparatus 100 that outputs to such a printer 1000B.Conventionally, a device-specific driver or application may need to reside in the information apparatus 100 to rasterize and convert the digital document from its original format into final print data (for example a compressed CMKY data with one or more bits per pixel) that can be understood by a particular printer engine 1008B.

[0068] Regardless of type or sophistication level, different output devices 106 conventionally need different printer drivers or output management applications in the information apparatus 100 to provide output capability. Some mobile devices may have limited memory and processing power to store or process multiple device drivers. It may also be infeasible to install or preinstall multiple device dependent or specific printer drivers in such mobile devices. In pervasive output operations of the present invention

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described below, various device specific drivers or applications may be available and may be executed completely or partially in a remote application server 110, thereby reducing the workload of information apparatus 100 and realizing device-independent pervasive output.

[0069] In one implementation, output device 106 includes at least a communication unit or adapter to interface with information apparatus 100, as described below in greater detail. Output device 106 may sometimes include more than one communication unit in order to support different interfaces, protocols, or communication standards with different devices. For example, output device 106 may communicate with a first information apparatus 100 through a Bluetooth interface while communicating with a second information apparatus 100 through a parallel interface, and so on. Exemplary hardware components of a wireless communication unit are described below with reference to Figs. 2A and 2B.

[0070] Output device 106 may also include an output controller 104 to help manage communication and negotiation processes with information apparatus 100. Output controller 104 may be dedicated hardware or software or combination of both for at least one output device 106. Output controller 104 may also be integrated, installed, or connected externally to one or more output devices 106. In such cases the output controller 104 may sometimes be referred to as print server or output server.

[0071] The difference between output controller 104 and printer controller 1010 should be noted. Printer controller 1010 and output controller 104 are both controllers and are both dedicated hardware and or software for at least one output device 106. Output controller 104 refers to a controller with feature sets, capabilities, and functionalities of the present invention. Printer controller 1010 may contain functions such as interpreting an input page description language, raster image processing, and queuing, among others. Output controller 104 may also contain partially or all the features of a printer controller 1010, plus the feature set, functionalities, capabilities, and processes of present invention.

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[0072] In one embodiment, output controller 104 does not include a communication unit, but rather utilizes or manages a communication unit residing in the associated output device 106. In another embodiment, output controller 104 may include or provide a communication unit to output device 106. For example, an output controller 104 with a wireless communication unit may be installed internally or connected externally to a legacy printer to provide it with wireless communication capability that was previously lacking.

[0073] Figs. 3A-3C show exemplary implementations of output controller 104 to illustrate that it may be implemented in a variety of ways. The output controller 104 may be connected externally to an output device 106 or integrated internally into the output device 106. Fig. 3A shows that output controller 104 may be implemented as a circuit board or a card that is installed inside an output device 106 and may include software, hardware, or both. Fig. 3C shows that output controller 104 may be implemented as an external box or station that is wired or wirelessly connected to an output device 106. Such an external box or station may contain its own user interface. One example of such an implementation is a print server connected to an output device 106. Fig. 3B shows another configuration in which the functionalities of output controller 104 may be integrated into an existing printer controller 1010 (referred to as "combined controller") which can be internally or externally (not shown) connected to output device 106. A combined controller 104B has functionalities of both printer controller 1010 (e.g., input interpretation and or raster image processing) and output controller 104 of the present invention. Under this configuration, the functionalities of output controller 104 and printer controller 1010 may share the same resources, such as processing unit, memory unit, etc.

[0074] Other possible implementations of output controller 104 may include, for example, a conventional personal computer (PC), a workstation, and an output server or print server. In these cases, the functionalities of output controller 104 may be implemented using application software installed in a

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computer (e.g., PC, server, or workstation), with the computer connected with a wired or wireless connection to an output device 106. Using a PC, server, workstation, or other computer to implement the feature sets of output controller 104 with application software is just another possible embodiment of the output controller 104 and in no way departs from the spirit, scope and process of the present invention.

[0075] Regardless of its manner of implementation, the output controller 104 will usually include hardware, software, or a combination. For example, an output controller 104 may include components using one or more or combinations of an application-specific integrated circuit (ASIC), a digital signal processor (DSP), a field programmable gate array (FPGA), firmware, system on a chip, and various communication chip sets. Output controller 104 may also contain embedded processors with software components or embedded application software to implement its feature sets, and functionalities.

[0076] Output controller 104 may contain an embedded operating system. With an operating system, some or all functionalities and feature sets of the output controller 104 may be provided by application software managed by the operating system. Additional application software may be installed or upgraded to newer versions in order to, for example, provide additional functionalities or bug fixes.

[0077] Output controller 104 typically includes a memory unit, or may share a memory unit with, for example, printer controller 1010. The memory unit, such as ROM, RAM, flash memory and disk drive among others, may provide persistent or volatile storage. The memory unit may store objects, codes, instructions or data (collectively referred to as software components) that implement the functionalities of the output controller 104. Part of the software components (e.g., the printer object) may be uploaded to information apparatus 100 during a data output operation.

[0078] Functionalities and components of output controller 104 for the purpose of providing pervasive output may include:

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- Input components and operations for receiving service requests from a plurality of information apparatuses 100.
- Storage components and operations for storing partial or the entire printer or output object in a memory component.
- Transmission components and operations for transmitting partial or the entire printer or output object to the information apparatus 100 requesting pervasive output service. The output controller 104 may transmit the output device object in one or multiple sessions.
- Receiving components and operations for receiving output data (e.g., print data) from information apparatus 100 and sending the data to output device 106 or output engine (or printer engine) 1008.

[0079] In addition to the above functionalities, output controller 104 may further optionally include one or more of the following:

- Response components and operations to respond to service request from an information apparatus 100 (e.g., in a discovery process, described below) by providing at least a partial output device object (e.g., printer object for printers).
- Broadcast components and operations to broadcast or advertise the services provided by a host output device 106 to an information apparatus 100 that may request such services.
- Payment components and operations for implementing payment processing and management functions by, for example, calculating and processing payments according to the services requested or rendered to a client (information apparatus 100).
- Components and operations for implementing job management functionalities such as queuing and spooling among others.
- User interface components and operations for providing a user interface (e.g., display screen, touch button, soft key, etc.) when it is implemented as an external box connected to an output device 106.
- Security components and operations for implementing security or authentication procedures. For example, the output controller 104 may

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store in its memory component (or shared memory component) an access control list, which specifies what device or user may obtain service from its host (or connected) output device 106. Therefore, an authorized information apparatus 100 may gain access after confirming with the control list.

- Processing components and operations to further process the output data. The processing of the output data may include converting the output data into a form (e.g., format, language, and or instruction) at least more acceptable to or compatible with the associated output device 106 or output engine or printer engine 1008. The processing may also include at least in part one or more raster image processing operations such as rasterization, scaling, color management, color conversion, halftoning, compression, decompression etc.

[0080] When output controller 104 is implemented as firmware, or an embedded application, the configuration and management of the functionalities of output controller 104 may be optionally accomplished by, for example, using controller management software in a host computer. A host computer may be a desktop personal computer (PC), workstation, or server. The host computer may be connected locally or through a network to the output device 106 or the controller 104. Communication between the host computer and the output controller 104 can be accomplished through wired or wireless communication. The management application software in the host computer can manage the settings, configurations, and feature sets of the output controller 104. Furthermore, host computer's configuration application may download and or installed application software, software components and or data to the output controller 104 for the purpose of upgrading, updating, and or modifying the features and capabilities of the output controller 104.

[0081] Output device 106 in one implementation includes or is connected to output controller 106 described above. Therefore, functionalities and feature sets provided by output controller 106 are automatically included in the

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functionalities of output device 106. The output device 106 may, however, implement or include other controllers and/or applications that provide at least partially the features and functionalities of the output controller 104.

[0082] Therefore, the output device 106 may include some or all of the following functionalities:

- Components and operations to receive multiple service requests or queries (e.g., a service request, a data query, an object query etc.) from a plurality of information apparatus 100 and properly respond to them by returning software components, which may contain data, codes, instructions and/or objects.
- Components and operations to receive, from information apparatus 100 device-specific output data containing the digital document intended for output.
- Components and operations to output final output data or print data on a substrate or in another medium such as display screen.

[0083] An output device may further comprise optionally one or more of the following functionalities:

- Components and operations for establishing and managing a communication link with an information apparatus 100 requesting service;
- Components and operations to store and/or further process input print data or output data.
- Components and operations for storing partial or the entire output device object (e.g. printer object) in a memory component.
- Components and operations to advertise or broadcast services provided or available to an information apparatus 100 that may request such services.
- Components and operations for implementing payment processing and management functions by, for example, calculating and processing payments according to the services requested by or rendered to a client (information apparatus 100).

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- Components and operations for implementing job management functionalities such as queuing and spooling among others.
- Components and operations for providing a user interface (e.g., display screen, touch button, soft key, power switch, etc.).
- Components and operations for implementing security or authentication procedures. For example, the output device 106 may store in its memory component (or a shared memory component) an access control list, which specifies what device or user may obtain service from it. Therefore, an authorized information apparatus 100 may gain access after confirming with the control list.
- Components and operations to process the output data. The processing of the output data may include converting the output data into a form (e.g., format, language, and or instruction) more acceptable or compatible to the associated printer controller 1010, output engine or printer engine 1008. The processing may also include at least partially one or more raster image processing operations.

[0084] Application server 110 is a node on network 108. An application server 110 may include computing capability, data storage capability, and mechanisms for servicing requests from a plurality of client computers (referred to as clients), including the information apparatus 100, needing computational or data storage resources. A server typically includes processing unit, memory unit, storage unit, input/output control unit, and a communication unit, among others. Application server 110 may also include an interface to interact with users. The interface may be implemented with, for example, display screen, touch-sensitive screen, keyboard, mouse, stylus, push button, microphones and speakers among others.

[0085] Application server 110 preferably includes at least an operating system for supporting a plurality of application software to implement the functionalities of the application server 110 and to provide services to its clients (e.g., information apparatus 100). To provide services to multiple clients at the same time, the application server 110 may run a multi-user

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operating system that enables multiple concurrent users to log on and run applications in separate, protected sessions.

[0086] Application server 110 typically includes a server application 112 that may include software and data to be executed in the processing unit of a server node. The server application 112 may include one or more of the following functionalities:

- Components and operations to receive data and/or objects (with at least a output device object and a document object) from client application 102.
- Components and operations to process the objects received to generate device-dependent output data acceptable to one or more output devices 106 selected by a user. The server application 112 may perform the processing function independently or in combination with other applications.
- Components and operations to transmit output data back to the client application 102.

[0087] The server application 112 may optionally include one or more of the following functionalities:

- Components and operations to obtain digital document (output content) from other network node if it is not included or completely included in the document object received from client application 102.
- Components and operations to obtain output device parameters if they are not included or completely included in the output device object received from client application 102.
- Components and operations to obtain job object or relating parameters if it is not included or completely include in the composite message received from client application 102. The server application 112 may obtain job object by querying user or by assuming default values. For example, if a user did not specify print or output range, the server application 112 may assume the default by printing or outputting all pages.
- Components and operations to manage and coordinate communication with an information apparatus 100 requesting output service.

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- Components and operations to identify, invoke and or incorporate appropriate applications (residing in the application server 112 or in other network nodes) to help interpret and or process the digital document obtained and generate output data. The processing of the digital document may include converting the digital document into an output data related at least in part to the output device object. The processing may also include at least in part one or more raster image processing operations such as rasterization, scaling, color management, color conversion, halftoning, compression, decompression, etc.
- Components and operations to interact with (e.g., store, update, verify, etc.) one or more databases that store profiles of information apparatuses 100 and/or users who have subscribed to output service provided by the server application 112.
- Components and operations to implement an independent computing architecture where the execution of the server application 112 may occur entirely in the application server 110. The GUI of the application 112, keystrokes and mouse clicks are transmitted over the network 108 to and from the client such as a user's information apparatus 100.

[0088] It should be noted that, in the example shown here, server application 112 is illustrated as the only application in application server 110. But in actuality, more than one application may exist in the application server 110 and the applications may provide various services to different clients. It is also possible that the functionalities and feature sets of the server application 112 may be implemented with multiple applications residing in the same server, multiple servers (e.g., in a server farm), or network nodes or combination.

[0089] Content server 114 may represent one of a plurality of server nodes on network 108 that may store digital documents 116. The digital documents stored in content server 114 may be viewed or edited by a user using an information apparatus 100. As an example, the content server 114 may be a web server that hosts a plurality of web pages written in mark up

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languages such as HTML, WML, XML, HDML, CHTML, among others. A user may view web pages using an Internet browsing application such as Internet Explorer or Netscape Navigator, a WAP browser, etc. As another example, the content server 114 may be a file server that allows multiple clients to store and share digital files with appropriate security or authentication procedures. These digital files or documents may contain one or more of image, text, graphics, sound and video. The files may be saved in various file formats (e.g., MS Word, Excel, PowerPoint, PDF, Postscript, JPEG, GIF, MPEG, etc.). A user may need to have appropriate application on his/her information apparatus 100 to access, view and edit these files.

[0090] It should be noted that in Fig. 1 content server 114 and application server 110 are shown as distinct server nodes. However, it is possible that application server 110 and content server 114 belong to the same domain, or the functionalities of these two servers may be implemented with different applications executed in a single network node or server.

[0091] Further description of the functionalities and feature sets of different devices and applications illustrated in Fig. 1 is provided below in reference to a pervasive output process shown in Fig. 4.

[0092] Figs. 2A and 2B are block diagrams illustrating two exemplary configurations of hardware components of wireless communication units. Referring to Fig. 2A, a radio adapter 200 may be implemented to enable data/voice transmission among devices (e.g., information apparatus 100 and output device 106) through radio links. A RF transceiver 214 coupled with antenna 216 is used to receive and transmit radio frequency signals. The RF transceiver 214 also converts radio signals into and from electronic signals. The RF transceiver 214 is connected to a RF link controller 210 by an interface 212. The interface 212 may perform functions such as analog-to–digital conversion, digital-to-analog conversion, modulation, demodulation, compression, decompression, encoding, decoding, and other data or format conversation functions.

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[0093] RF link controller 210 implements real-time lower layer (e.g., physical layer) protocol processing that enables the hosts (e.g., information apparatus 100, output controller 104, output device 106, etc.) to communicate over a radio link. Functions performed by the link controller 210 may include, without limitation, error detection/correction, power control, data packet processing, data encryption/decryption and other data processing functions.

[0094] A variety of radio links may be utilized. A group of competing technologies operating in the 2.4 GHz unlicensed frequency band is of particular interest. This group currently includes Bluetooth, Home radio frequency (Home RF) and implementations based on IEEE 802.11 standard. Each of these technologies has a different set of protocols and they all provide solutions for wireless local area networks (LANs). Interference among these technologies could limit deployment of these protocols simultaneously. It is anticipated that new local area wireless technologies may emerge or that the existing ones may converge. Nevertheless, all theses existing and future wireless technologies may be implemented in the present invention without limitation, and therefore, in no way depart from the scope of present invention.

[0095] Among the current available wireless technologies, Bluetooth may require relatively lower power consumption. Bluetooth has its own protocol stack and is designed for short range (10 meters), point-to-multipoint voice and data transfer. It is based on a frequency-hopping version of spread spectrum. Seventy-nine hop frequencies are utilized beginning at the lowest frequency of 2402 MHz and each of the 79 hop frequencies is 1 MHz above the next lower frequency. Bluetooth-enabled devices operate in piconets, in which several devices, using the same hopping pattern or sequence, are connected in a point-to-multipoint system (piconet). There is one device (master) in each piconet that determines how the bandwidth is allocated to other devices (slaves). As many as 10 piconets of 8 devices each can operate simultaneously.

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[0096] Referring to Fig. 2B, one or more infrared (IR) adapters 220 may be implemented to enable data transmission among devices through infrared transmission. The IR adapters 220 may be conveniently implemented in accordance with the Infrared Data Association (IrDA) standards and specifications. In general, the IrDA standard is used to provide wireless connectivity technologies for devices that would normally use cables for connection. The IrDA standard is a point-to-point (vs. point-to-multipoint as in Bluetooth), narrow angle, ad-hoc data transmission standard designed to operate over a distance of 0 to 1 meter and at speeds up to 4 Mbps.

[0097] Configuration of infrared adapters 220 may vary depending on the intended rate of data transfer. Fig. 2B illustrates one embodiment of infrared adapter 220. Transceiver 226 receives/emits IR signals and converts IR signals to/from electrical signals. A UART (universal asynchronous receiver/transmitter) 222 performs the function of serialization/deserialization, converting serial data stream to/from data bytes. The UART 222 is connected to the IR transceiver 226 by encoder/decoder (ENDEC) 224. This configuration is generally suitable for transferring data at relatively low rate, for example 115.2 kbps or below. Other components (e.g., packet framer, phase-locked loop) may be needed for higher data transfer rates.

[0098] Figs. 2A and 2B illustrate exemplary hardware configurations of wireless communication units. Such hardware components may be included in devices (e.g., information apparatus 100, output controller 104, output device 106, etc.) to support various wireless communications standards. Wired links, however, such as parallel interface, USB, Firewire interface, Ethernet and token ring networks may also be implemented in the present invention by using appropriate adapters and configurations.

[0099] Figs. 3A-3C illustrate various configurations and implementations of output controller 104.

[00100] In the configuration illustrated by Fig. 3A, output controller 104A may be installed, for example as one or more boards or cards containing both

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hardware and software, inside output device 106(A). The output device 106(A) may or may not have inside it a printer controller 1010 (Fig. 10). In the case that output device 106(A) includes a printer controller 1010 (not shown), the output controller 104 may co-exist with the printer controller 1010 and other components of the output device 106(A). One example of this implementation is to connect or cascade output controller 104A sequentially or serially with the printer controller 1010.

[00101] In another implementation shown by Fig. 3B, the functionalities of output controller 104 and printer controller 1010 (Fig. 10) may be combined into a single controller, sometimes referred to as combined controller 104(B). The combined controller 104(B) may be implemented, for example, as one or more boards or cards containing both hardware and software, inside output device 106(B). This implementation may help to reduce the cost of material when compared to implementing two separate controllers. As an example, the combined controller 104(B) may share common processors, memories, and storage units to run the applications and functionalities of the two types of controllers and, therefore, may have lower component cost. The combined controller can also be implemented as an external box or station (not showed) connected to the output device 106. This connection could be wired or wireless.

[00102] In the third implementation shown in Fig. 3C, the output controller 104C may be implemented in a separate box or server or station connected externally to output device 106C. T he communication link between output controller 104C and output device 106C may be a wired or wireless link. The output device 106C may or may not have inside it a printer controller 1010 (Fig. 10). If the output device 106C does not contain a printer controller 1010 inside, the externally connected output controller 104C may optionally contain the functionalities of printer controller 1010 and therefore, provide raster image processing capability as an additional feature.

[00103] The above are exemplary implementations and configurations of output controller 104. Other implementations are also possible. For

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example, partial functionalities of output controller 104 may be implemented in an external box or station while the remaining functionalities may reside inside an output device 106 as a separate board or integrated with a printer controller 1010. As another example, the functionalities of output controller 104 may be implemented into a plurality of external boxes or stations connected to the same output device 106. As a further example, the same output controller 104 may be connected to service a plurality of output devices 106. Variously implemented output controllers 104 should not depart from the spirit and scope of the present invention provided that they all support the functionalities and feature sets described herein.

[00104] Fig.4 is a flow diagram of a pervasive output process 401 of the present invention. Pervasive output process 401 allows an information apparatus 100 to output digital content or document in its original form to an output device 106 regardless of processing power, display screen size, or memory space of information apparatus 100. Pervasive output process 401 may include or utilize:

- A client application 102, in an information apparatus 100, obtaining objects; with at least one object including a document object and another object including an output device object (or printer object in the case of a printer);
- A client application 102 transmitting objects to a server application 112;
- A server application 112 obtaining and processing the document object and converting it into output data, reflecting at least in part a relationship to said output device object;
- A server application 112 transmitting output data to the information apparatus 100 including a client application 102;
- The information apparatus 100 including a client application 102 transmitting output data to an output device 106;
- An output device 106 generating output with the output data.

[00105] Pervasive output process 401 may be initiated by a user in step 400. Typically, a user initiates output process 401 by invoking a client application

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102 in his/her information apparatus 100. The client application 102 may be launched as an independent application or it may be launched from other applications 103 (such as from a document browsing, creating or editing application) or as part of or component of or a feature of another application 103 residing in the same information apparatus 100. When launched from another application 103, the client application 102 may obtain information, such as a partial or an entire document object, from that another application 103. This can be accomplished, for example, by one or combinations of messages or facilitated through an operating system or a particular object or component model etc. The client application maybe a device driver in this example.

[00106] During output process 401, a user may need to select one or more output devices 106 for output service. An optional discovery process step 404 may be implemented to help the user select an output device 106. During the discovery process step 404, a user's information apparatus 100 may (1) search for available output devices 106; (2) provide the user with a list of available output devices 106; and (3) provide means for the user to choose one or more output devices 106 to take the output job. An exemplary discovery process 404 is described below in greater detail with reference to Fig. 5.

[00107] The discovery process 404 may sometimes be unnecessary. For example, a user may skip the discovery process 404 if he or she already knows the output device (e.g., printer) 106 to which the output is to be directed. In this case, the user may simply connect the information apparatus 100 to that output device 106 by wired connections or directly point to that output device 106 in a close proximity such as in the case of infrared connectivity. As another example, a user may pre-select or set the output device or devices 106 that are used frequently as preferred defaults. As a result, the discovery process 404 may be partially or completely skipped if the default output device 106 or printer is found to be available.

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[00108] In stage 406, the client application 102 may interact with output device 106, the user, and or other applications residing in the same information apparatus 100, to obtain (1) a document object, (2) an output device object and (3) any other optional objects such as a job object. These objects may be obtained sequentially, concurrently, or in any order. It should be noted that some of the objects or partial objects might have been acquired in prior steps. For example, the client application 102 may have obtained partially or entirely document objects or related information when the client application 102 was launched from or by another application. As another example, a partial output device object may have been uploaded to the information apparatus 100 during the optional discovery process 404. The client application 102 may create a composite message including these objects (document object, output device object and other optional objects) and transmit the composite message to server application 112 for processing, as described below in greater detail with reference to Fig. 6.

[00109] The server application 112, after receiving such a composite message from the client application 102, may in step 408 processes the document object or objects contained in the composite message and convert it or them into output data. Additional helper applications may be needed to help in this processing task. The processing and generation of output data may reflect at least in part a relationship to the output device object and or job object contained in the composite message received from client application 102. The output data generated may be transmitted back to the information apparatus 100, requesting output service or process 401 via network 108. An exemplary implementation of a server application process is described below with reference to Fig. 7.

[00110] In step 410, information apparatus 100 transmits output data, with or without further processing, to the selected output device 106 through a local communication link 116. Preferably, the output data is in a format or language acceptable to or compatible with the output device 106 selected by the user. When receiving output data from information apparatus 100, an

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output device 106 may simply buffer the output data before sending it to output engine (or printer engine) 1008 for final output. In cases where an output device 106 includes or is connected to a printer controller 1010, output controller 104 or a combined controller, such controllers may further process the output data received from information apparatus 100 before sending the output data to printer engine 1008 for final output. Further processing, if it exists, may include at least partially conversion operations and or raster image processing operations on the output data. The output controller 104 may also provide queuing or spooling or other job management features. An exemplary implementation of such an output process is described below with reference to Fig. 8.

[00111] The steps included in pervasive output process 401 may proceed automatically when a user requests output service. Alternatively, a user may be provided with options to proceed, cancel, or input information at each and every step. For example, after the client application process step 406 is finished, the user may be asked whether or not he or she wishes to continue to communicate with a remote application server. As another example, a user may cancel the output service at any time by, for example, indicating a cancellation signal or command or by terminating the client application or by shutting down the information apparatus 100 etc.

[00112] A printer is used as a primary output device 106 in this example. It should be recognized, however, that pervasive output process 401 described above can be similarly applied to other output devices such as fax machines, digital copiers, display screens, monitors, televisions, projectors, voice output devices, among others.

[00113] Fig. 5 is a flow diagram of an exemplary implementation of a discovery process 520, which may be an optional step to help a user locate one or more output devices 106 for an output job. The discovery process 520 may, however, be skipped partially or entirely. Implementation of discovery process 520 may require compatible hardware and software components residing in both the information apparatus 100 and the output device 106.

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[00114] The discovery process 520 may include or utilize:

- A client application 102 in an information apparatus 100 communicating with available output devices 106 to obtain information such as partial or complete output device object or objects.
- A client application 102 that provides to the user information on each available and or compatible output device 106.
- User selection or determination by a client application 102 (automatically or not) of one or more devices 106 for output service from the available or compatible output devices 106.

[00115] Various protocols and or standards may be used during discovery process 520. Wireless communication protocols are preferred. Wired communication, on the other hand, may also be implemented. Examples of applicable protocols or standards may include, without limitation, Bluetooth, HAVi, Jini, Salutation, Service Location Protocol, and Universal Plug-and-play among others. Other proprietary protocols or combination may also be implemented in the discovery process 520. However, these different protocols, standards, or combination shall not depart from the spirit and scope of present invention.

[00116] In one implementation an application (referred here for simplicity of discussion as a "communication manager," not shown) residing in the information apparatus 100 helps communicate with output device 106, manage service requests and discovery process 520. The communication manager may be a part of or a feature of the client application 102. Alternatively or in combination, the communication manager may also be a separate application. When the communication manager is a separate application, the client application 102 may have the ability to communicate, manage or access functionalities of the communication manager.

[00117] The discovery process 520 may be initiated manually by a user or automatically by a communication manager when the user requests an output service with information apparatus 100.

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[00118] In the optional step 500, a user may specify searching or matching criteria. For example, a user may indicate to search for color printers and or printers that provide free service. The user may manually specify such criteria each time for the discovery process 520. Alternatively or in combination, a user may set default preferences that can be applied to a plurality of discovery processes 520. Sometimes, however, no searching criteria are required - the information apparatus 100 may simply search for all available output devices 106 that can provide output service.

[00119] In step 501, information apparatus 100 searches for available output devices 106. The searching process may be implemented by, for example, an information apparatus 100 multi-casting or broadcasting or advertising its service requests and waiting for available output devices 106 to respond. Alternatively or in combination, an information apparatus 100 may "listen to" service broadcasts from one or more output devices 106 and then identify the one or more output devices 106 that are needed or acceptable. It is also possible that multiple output devices 106 of the same network (e.g., LAN) register their services with a control point (not shown). A control point is a computing system (e.g., a server) that maintains records on all service devices within the same network. An information apparatus 100 may contact the control point and search or query for the needed services.

[00120] In step 502, if no available output device 106 is found, the communication manager may provide the user with alternatives 504. Such alternatives may include, for example, aborting the discovery process 520, trying discovery process 520 again, temporarily halting the discovery process 520, or being notified when available output device 106 is found. As an example, the discovery process 520 may not detect any available output device 106 in the current wired/wireless network. The specified searching criteria (if any) is then saved or registered in the communication manager. When the user enters a new network having available output devices 106, or when new compatible output devices 106 are added to the

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current network, or when an output device 106 becomes available for any reason, the communication manager may notify the user of such availability.

[00121] In step 506, if available output devices 106 are discovered, the communication manager may obtain some basic information, or part of or the entire output device object, from each discovered output device 106. Examples of such information may include, but not limited to, device identity, service charge, subscription, service feature, device capability, operating instructions, etc. Such information is preferably provided to the user through the user interface (e.g., display screen, speaker, etc.) of the information apparatus 100.

[00122] In step 508, the user may select one or more output devices 106 to take the output job. If the user is not satisfied with any of the available output device 106, the user may decline the service. In this case, the user may choose to try again in step 510 with some changes made to the searching criteria. Alternatively, the user may choose to terminate the service request.

[00123] In step 512, with one or more output devices 106 selected or determined, the communication link between information apparatus 100 and the selected output device or devices 106 may be "locked". Other output devices 106 that are not selected may be dropped. The output process 520 may then proceed to a client application process 601 referenced in step 406 of Fig. 4.

[00124] Fig. 6 is a flow diagram of an exemplary client application process 601 that may include or utilize:

- A client application 102 that obtains an output object or objects as a result of communication and or negotiation with an output device 106.
- A client application 102 that obtains a document object (1) from user input or selection, or (2) from other applications (e.g., document browsing application) residing in the same information apparatus 100.
- A client application 102 that coordinates with server application 112 to manage the process of communication and transmission of a composite

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message (including at least a printer object and a document object) to the server application 112 for further processing.

[00125] Step 600 indicates that client application 102 obtains a document object. To assemble or create a document object, the client application 102 may need to obtain output content (or a digital document) or pointers to the output content, or both. In cases where the output content is downloaded or partially downloaded to a user's information apparatus 100, the client application 102 may include both the output content and pointers to the output content in its document object. In cases where the output content is not downloaded to the information apparatus 100, the client application 102 may include only pointers to the output content in the document object.

[00126] There are various ways that a client application 102 may obtain a digital document or a pointer or reference to the digital document. In one embodiment, the client application 102 may provide a GUI with which a user can directly input the pointer or reference (e.g., URL, IP address, filename, path, etc.) of a digital document stored locally or in a network node. This manual process may be facilitated by, for example, providing a GUI with which users may select one or more pointers from a list of pointers or references of digital documents stored locally or in a remote network node. For instance, through a GUI provided by the client application 102, a user may see and select pointers of digital documents stored in a remote file server. In this case, the document object created by the client application 102 may contain only pointers or references to the output content.

[00127] In another embodiment, the client application 102 may obtain output content or pointer to output content from another application in the same information apparatus 100. As an example, a user may (1) launch the client application 102, and (2) invoke another application 103 (e.g., document editing and or browsing application) residing in the same information apparatus 100 to view or download the digital document. As another example, a user may (1) run another application 103 (e.g., document editing and or browsing application) residing in the same information apparatus 100

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to view or download the digital document; and (2) launch or invoke the client application 102. In these cases, the client application 102 may communicate with another application 103 (e.g., document browsing application) to obtain pointers to the digital document and or the digital document itself (if it has been downloaded locally for viewing) to be included in document object.

[00128] It should be noted that the document object may have been partially or entirely obtained by the client application 102 in previous steps such as in step 400 of Fig. 4 in which the client application 102 is initiated. As an example, a user may (1) view or download a digital document (stored locally or in a network node) by using a document browsing application on the information apparatus 100, and (2) request output service by launching the client application 102 (as in step 400). The client application 102 may then communicate with the document browsing application to obtain the document object (including digital document and or pointers to the digital document). In this case, step 600 may be partially or entirely skipped.

[00129] In some instance such as in document browsing applications, a user may be limited to viewing or downloading only part of, or a reduced version of, the original digital document stored in a network node. This may be due to small screen size, limited bandwidth, memory size, and lack of application support, among other issues. In these cases, the client application 102 may allow the user to choose to output the original digital document or the reduced sized document. In the case of the original document, the document object created by the client application 102 may, for example, contain only references or pointers to the original output content stored in a server or network node. In the case where user wants to output the reduced version document that has been downloaded locally, the client application 102 may include in the document object one or more of (1) the obtained reduced output content (2) the reference to the reduced content in the server or network node, and (3) pointer or pointers to the original output content.

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[00130] In another instance, for example, with a document browsing application, a user may see only the name or path to output content without being able to download or open it due to, for example, no compatible applications residing on the information apparatus 100, small display screen etc. According to the present invention, however, a user may still be able to output the original digital document by indicating to the client application 102 the pointer or reference of the output content. For example, the user may select or highlight the name or path of the output content through a GUI provided by the document browsing application. In this case, the document object created by the client application 102 may contain only pointers to the output content.

[00131] A document object may also contain instructions. Instructions in an object may provide description, operation, and status information of the content or data of the document object, etc. For example, instructions may provide information about the changes or differences between an output content included in a document object relative to the original output content (stored in a network node) that is pointed to by the reference field in the document object. The output content included in a document object may be an edited or altered version while the output content referred to by the pointers may be the original version.

[00132] It should be noted that some output content may be publicly available to all users (e.g., generic web pages) while other output content may be restricted to one or a group of users (e.g., secure documents stored in a corporate network). In the latter case, authentication information such as a password, user name, id number, biometric information, digital certificate or security key, among others, may need to be provided to the server application 112 for accessing and or fetching the digital document with reference to a pointer or reference. In one example, such authentication information may be included in document object, printer object, or job object. In another example, server application 112 may prompt the user to enter

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authentication information through a UGI in information apparatus 100 when necessary.

[00133] Step 602 indicates whether an output device object is obtained. In the case where an output device object is not obtained, then in step 604, with one or more output devices 106 selected, the client application 102 may communicate with the selected output device or devices 106 to upload output device objects or related information stored in memory or storage components of the output device or devices 106. It should be noted that a partial or entire output device object or related information might have been already obtained by the client application 102 during the prior optional discovery process (520 and step 402 in FIG 4). In this case, step 604 may be partially or entirely skipped.

[00134] To successfully obtain the output device object or objects from the selected output device or devices 106, several additional optional processes may be involved. As an example, authentication may be necessary when the selected output device 106 provides service to a restricted group of users. A simple authentication may be implemented by, for example, comparing the identity for the information apparatus 100 with an approved control list of identities or elements stored in the output device 106. Other more complex authentication and encryption schemes may also be used. Information such as user name, password, ID number, signatures, security keys (physical or digital), biometrics, fingerprints, voice, among others, may be used separately or in combination as authentication means. Such identification and or authentication information may be manually provided by the user or automatically detected by the selected output device or devices 106. With successful authentication, a user may gain access to all or part of the services provided by an output device 106. The output device object that the client application 102 obtains may vary according to the type or quality of service requested or determined. If authentication fails, it is possible that a user may be refused partially or completely all access to the

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service. In this case, the user may be provided with alternatives such as selecting another output device 106 or alternative services.

[00135] Another optional process is that a user may be asked to provide payment or deposit or escrow before, during or after output service. Examples of payment or deposit may include cash, credit card, bankcard, charge card, smart card, electronic cash, among others. The output controller 104 may provide payment calculation or transaction processing as optional feature sets.

[00136] It should be noted that a plurality of information apparatuses 100 may request to obtain output device object or objects from the same output device 106 at the same time or at least during overlapping periods. The output device 106 may have components or systems to manage multiple communication links and provide the output device object or objects concurrently or in an alternating manner to multiple information apparatuses 100. Alternatively, an output device 106 may provide components or systems to queue the requests from different information apparatuses 100 and serve them in a sequential fashion according to a scheme such as first come first serve, quality of service, etc. Multi-user communication and service management capability with or without queuing or spooling functions may be implemented by, for example, the output controller 104 as optional feature sets.

[00137] Step 606 indicates that the client application 102 may optionally obtain a job object. A job object may include a user's preferences and parameters relating to the output job or process. The client application 102 may obtain a job object by, for example, capturing a user's output preferences through a GUI. In one instance, the client application 102 may provide a universal GUI to a user regardless of what output device 106 is selected. Through such an interface, the user may specify some device-independent parameters such as page range, number of cards per page, number of copies, etc. Alternatively or in combination, the client application 102 may incorporate device-dependent features and preferences into the GUI provided to user.

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The device dependent portion of the GUI may be supported partially or entirely by some information contained in or provided by the output device object obtained from the selected output device 106. Examples of such device dependent features may include quality of service, service fee, print quality, color or grayscale, duplex or single sided, output page size, among others.

[00138] It is possible that some or all components, attributes or fields of a job object have default values. The client application 102 may have certain defaults such as those hard-coded in software or hardware or pre-configured by the user or a manufacturer. In addition, the client application 102 may access a file to obtain default values or by other means such as communicating with the output device 106, the server application 112 or other applications in the information apparatus 100 or in a network node. The client application 102 may also create or calculate certain default values based on the information it has or obtained during the output process. These default values may be related, at least in part, to the output device object and or the server application 112 involved in the output process. In some instances, a user may or may not have an opportunity to change or overwrite some or all defaults. The client application 102 may obtain and use some or all defaults with or without user intervention or knowledge.

[00139] In step 608, the client application 102 may create or assemble a composite message. A composite message may be any type of data transferred across network 108 that may include one or more transmissions. A composite message typically includes partially or entirely the objects (with some default values) obtained by the client application 102 in previous steps.

[00140] In step 610, the client application 102 transmits the composite message to server application 112. The client application 102 may communicate with the server application 112 using one or more or a combination of standard network protocols such as WAP, Web Clipping, I-Mode, TCP/IP, SPX/IPX, PPP, NetBEUI, Apple Talk, among others.

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Proprietary network protocols or a combination that includes them may also be used. The communication link between information apparatus 100 and application server 112 may be implemented with one or a combination of standard network connections and communication links such as telephone lines, LAN or WAN links (T1, T3, 56kb, X.25, etc.), broadband connections (ISDN, Frame Relay, ATM etc), wireless connection (radio link, inferred, microwave, etc.) as well as the Internet or corporate Intranets.

[00141] In addition to the composite message, the client application 102 and server application 112 may also exchange various types of messages back and forth to, for example, request service, confirm service availability, configure protocol stack, or confirm or acknowledge receipt of the previous message, among other messages. The server application 112 may also prompt the client application 102 to send or resend some components or objects of the composite message if such components or objects are incomplete, missing or corrupted. The server application 112, however, may also try to fill in default values (if available) for some or all of the information missing in the composite message. Encode/decode, compression/decompression and/or encryption techniques may be used to facilitate the transmission of the composite message.

[00142] There is a possibility that the application server 112 only provides services to users who have subscribed to such services. In this case, a user may be prompted to log in or sign up when he or she requests service from the server application 112.

[00143] The server application 112 may receive composite messages or service requests from a plurality of client applications 102 at the same time or at least during overlapping periods. It is therefore, beneficial that the server application 112 runs on a multi-user operating system that enables multiple concurrent users to run applications in separate, protected sessions.

[00144] It should be recognized that Fig. 6 illustrates only one example of the client application process 406 described with reference to Fig. 4. Other

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implementations are also possible. As an example, the client application 102 may obtain document objects, output device objects and optional job objects in any combination of order or sequence, or may obtain them concurrently. As another example, step 610 (transmitting composite message) may proceed before step 608 (creating composite message) is finished. In other words, during the process when client application 102 is obtaining objects from the user, output device 106, or other applications in the same information apparatus 100, the client application 102 may also communicate with the server application 112 concurrently or in alternating times to transmit partially or completely the objects it has obtained.

[00145] Fig. 7 is a flow diagram of an exemplary server application process 701. Typically, an application server 110 is a much more powerful computing device than a mobile information apparatus 100. The server 110 may contain a plurality of applications to interpret, process, or rasterize digital documents into output data. Therefore, in one implementation the core computation of an output process is executed in the application server 110. The server application process 701 may include or utilize:

- A server application 112 that receives a composite message (including an output device object and a document object) from client application102.
- A server application 112 that processes the objects received to generate device-dependent output data acceptable to one or more output devices 106 selected by a user. The server application 112 may perform the processing function independently or in combination with other applications.
- A server application 112 that transmits output data back to the information apparatus 100 requesting output service or services.

[00146] In step 700, server application 112 receives a composite message from client application 102. As mentioned earlier, the composite message may include one or more of a document object, an output device object and an optional job object.

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[00147] After receiving the composite message from client application 102, the server application 112 may process the document object and convert it into output data. The output data generated is preferred to be in a format or language acceptable or compatible to the output device or devices 106 selected by the user.

[00148] In some cases, the document object or output device object in a composite message may include only references, pointers and or instructions. Such a configuration may, for example, reduce the size of the composite message and therefore make it easier to transmit through a network. In another case, the document object or output device object in a composite message may include missing or incomplete information. Digital document (e.g., output content) or output device parameters may not be available or completely available in the document object or the output device object, respectively. In these cases, as shown in step 704, the server application 112 may need to find or fetch partially or entirely the output content or device parameters from network nodes or otherwise obtain the content or parameters according to the pointers, references or instructions provided by the objects. For example, an output device object received in a composite message may contain insufficient output device parameters – only the brand name and model number of a selected output device 106 may be provided. In this case, the server application 112 may either find or fetch the missing output device parameters according to pointers or references provided in the output device object, or the server application 112 may consult a translation service or application in order to obtain the complete output device parameters based on the partial or limited device information that is available. If no further information or data can be found or obtained, predefined defaults may be used to fill in missing information about the output device 106 or alternatively a warning or an error message may be provided to the user for either continuation or cancellation of the process.

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[00149] Step 704 (obtaining output content and or device parameters) may be entirely or partially skipped if the output content and output device parameters are already included in the document object and output device object, respectively.

[00150] In order to process a digital document into device dependent output data, step 706 shows that the server application 112 may need to involve one or more helper applications. A helper application is any application in the server 110 or other network node that participates, helps or assists in the output process of the present invention. Examples of helper applications may include, software components, software applications, device drivers, printer drivers, etc. The helper application or applications may perform one or more of the following tasks among others:

- Open, parse, or interpret a particular digital document format or language.
- Convert a digital document into an intermediate format, language or data.
- Process an input digital document into a raster format including, as an example, one or more raster image processing operations such rasterization, scaling, color correction, color matching, segmentation, halftoning, compression, decompression etc.
- Convert or encode rasterized data into a device specific output data.

[00151] The helper applications may participate in the output process in various ways. As an example, a server application 112 may involve one or more helper applications to decode, parse, interpret, and or process a digital document into an intermediate file, format, language or data. And then the server application 112 may involve one or more helper applications to further convert the intermediate result into output data. In another example, the server application 112 may involve two or more groups of helper applications. The first group of helper applications may decode, interpret, and process a digital document into intermediate file, format, language or data. The second group of helper applications may convert the intermediate results into output data. A group may consist of one or more applications.

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[00152] The server application 112 may identify, locate, invoke, launch, and or integrate the appropriate helper applications or its components based on the information (e.g., output device parameters) provided in an output device object. A translation service (e.g., database application, directory service) may provide information to the server application 112 as to where to find, obtain, or use the helper applications. The helper applications may reside locally in the application server 110 or remotely in another network node. If a helper application is located in another network node, the server application 112 may acquire or download the helper application to the application server 110. Alternatively, the server application 112, considering application availability or load balancing, may direct the digital document to be processed in another server node where the helper application or applications are run.

[00153] In some cases, however, the server application 112 may have the ability to process and generate the correct output data without involving additional helper applications and step 706 may be skipped. As an example, the server application 112 may already contain software components and feature sets capable of supporting and generating, different print data or output data formats or language such as PostScript or PCL or XML etc. Therefore, if the output device object indicates that the output device 106 is a PostScript printer or any other that it supports, the server application 112 may not need to invoke, or download or incorporate a helper application or a helper application component such as a PostScript driver. The server application 112 may just proceed and convert the digital document into a PostScript file as print data. PostScript is used here as an example, other formats, languages, data used for other types of print data or output data follows the same fashion.

[00154] When fetching output content or device parameters or software components or drivers from other network nodes, the server application 112 may need authentication information in order to gain access. Such authentication information may be already stored in the server application

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112 (e.g., in a user profile), in the received objects (e.g., job object, output device object or document object), or the user may input authentication information as needed.

[00155] While processing digital content in step 708, the server application 112 may also distribute or send a presentation or GUI to a client device (e.g., information apparatus 100) to inform the user of the processing status (shown in step 709). The presentation or GUI in the client device may also capture user's preferences and inputs such as login information, security information among other preferences or inputs. This client/server implementation described here may provide an efficient computing environment. For example, logic for the server application 112 may run in the application server 110 and its distributed user interface may run in the client device (e.g., information apparatus 100). Therefore, only data relating to keystrokes, mouse clicks and screen updates may, as an example, travels through the network. This client/server implementation may reduce bandwidth requirements. Such a GUI may be implemented by, for example, instructing the client application 102 to launch on the display screen of the client information apparatus 100 a plurality of windows emulating the user interface of the server application 112. The presentation of the server application interface may be displayed efficiently through these windows in the client application 102.

[00156] If the server application 112 receives no job object or an incomplete job object in a composite message, the server application 112 may assume default values for the job object or optionally, as shown in step 709, it may also launch a GUI in the information apparatus 100 as described above to obtain partially or entirely the job object fields (job preference) from the user. Information provided in the job object may be used in the process of generating output data (step 708).

[00157] It is noted that the output data (or print data in the case of a printer) generated by the server application 112 may or may not be the final output data or the final print data that can feed directly into an output engine or a

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printer engine 1008. The output data sent to output device 106 through information apparatus 100 may in some cases need further processing by an application in the information apparatus 100 or by the output controller 104 or printer controller 1010 or combination before finally being sent to output engine or printer engine 1008. All these different combinations of processes and tasks or load distributions are possible implementations that shall fall within the scope and spirit of the present invention.

[00158] In step 710, the server application 112 transmits output data to the information apparatus 100 through network 108. Encryption techniques may be applied to the output data to ensure security. Compression/ decompression, encode/decode may also be implemented to facilitate the transmission of output data over network 108.

[00159] Fig. 8 is a flow diagram of an exemplary final output process 801 for pervasive output, which may include or utilize:

- A server application 112 transmits output data to information apparatus 100.
- An information apparatus 100 transmits output data, with or without further processing, to the output device 106 selected by the user.
- An output device 106 generates final output based on the input output data with or without further processing.

[00160] After receiving output data from server application 112, the information apparatus 100 may then transmit the output data to the output device 106 selected by the user in step 806. In some cases, the client application 102 may further process the output data (as shown in step 804). This further processing in the information apparatus 100 may include one or more operations such as encoding, decoding, compression, decompression, rasterization, scaling, color correction, halftoning, watermarking, adding templates, name, time stamps, etc., as shown in step 804, before sending the output data to the output device 106 through communication link 116 in step 806. The client application 102 may involve other applications 103 for part or all of the processing in step 804.

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[00161] During the time when server application 112 processes a composite message, the communication link 116 between information apparatus 100 and output device 106 selected by the user may be constantly maintained or it may be temporarily dropped and then resumed for transmitting output data. Encryption techniques may be applied to the output data to ensure security. Compression/decompression, encode/decode may also be implemented to facilitate the transmission of output data over communication link 116.

[00162] After receiving output data from information apparatus 100, an output device 106 may simply buffer the output data, as shown in step 810, before sending the data to output engine (or printer engine in the case of a printer) 1008 for final output. In cases where an output device 106 includes a printer controller 1010, output controller 104 or combined controller, such controller may, jointly or individually, further process the output data (shown in step 814) before sending the data to output engine or printer engine 1008 for final output.

[00163] It is possible that a plurality of information apparatuses 100 may transmit output data to an output device 106 at the same time or at least during overlapping periods. It may then become necessary to implement queuing or spooling functionality in the output device 106. Preferably, the output device 106 stores output data it receives in a queue until the output data can be processed. Such queuing and spooling capability may be implemented partially or entirely by the output controller 104 as an optional feature set. A user may be notified when the output device 106 is ready to process a particular output job or the status of the output job in the queue. Once the output device 106 completes the output service, the user may terminate the output process by indicating such an intention through an interface on information apparatus 100 or by moving the information apparatus 100 out of the communication range of the output device 106.

[00164] Figs. 9A -9F show a series of graphical user interfaces (GUIs) rendered at different times on a display screen 901 of an information

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apparatus 100 to illustrate one implementation of the output process 401 described with reference to Fig. 4. The illustrated example of user interface can be implemented in an information apparatus 100 with or without an operating system. The user interface is illustrated here only as an example, other user interfaces may also be implemented and in no way restrict the scope and claims of the present invention.

[00165] Referring to Fig. 9A, screen 901 may be a part of an information apparatus 100 such as, without limitation, palmtop, PDA, mobile phone, pager, Internet appliance, web pads, e-book etc. In this particular example, as shown in screen 901, a user is reading a news article published on the Internet using a document browsing application in information apparatus 100. Part of the article (e.g., photo 900) cannot be fully displayed and so is indicated by a link or tag. The inability to fully display photo 900 may arise from a variety of reasons including limitations in display capacity, memory, processing power, or lack of support by a service provider, application, communication protocols, or software protocols, among other reasons.

[00166] As shown in FIG 9A, a document browsing application in the information apparatus 100 may have a plurality of functions and feature sets available to the user through the GUI. A printing function control 902 may be one of these features. The output or printing functionality may be provided by accessing a client application 102 with or without an operating system. In this illustrated example, the user may invoke the output function by selecting the print function control or icon 902. The user can make the selection by using, for example, any of a keyboard, keypad, mouse, stylus, soft keys, push buttons, software command, touch sensitive screen, voice-activated command, among others. Other display methods or functionalities or feature sets such as a drop down list, a pull down menu, among others, are also possible.

[00167] When the user selects Print function control 902, the client application 102 may be invoked or launched. The output process 401 described with reference to Fig. 4 may then proceed. The client application 102 may

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obtain a document object (e.g., the news article and or the pointer of the new article) from the document browsing application. As described earlier, the user may be able to choose to output the reduced digital document (e.g., without photo 900) as displayed in the information apparatus 100 or to output the full digital document in its original form (e.g., with photo 900). We assume for this example that the user has preset the default to always output the full digital document in its original form.

[00168] Since the user does not have a pre-selected or default output device 106, a discovery process 520 may automatically proceed in this example. A communication manager may coordinate the discovery process 520. As described earlier, the communication manager may be part of the client application 102 or may be a separate application that can communicate with the client application 102.

[00169] Assuming in this example that he or she did not specify any searching criteria for the discovery process 520, the user may be presented with all the printers 106, if any, that are available to take the print job. In the case where no available printers are found (not shown here), the user may also be notified and provided with alternatives as described earlier in the discovery process 520.

[00170] Assume in this example that three printers 106 are found. Their identities and service charges are listed on the GUI illustrated in Fig. 9B. The user may select a "more information" control or icon 904 to get more detailed information on each available output device 106. The user may select a printer 106 from the list, for example, by moving a cursor to highlight the name of the selected printer 106 and then selecting a "select" control or icon 906. The user may also withdraw the service request from any of the three printers by selecting a "cancel" control or icon 907.

[00171] Assume in this example that the user has selected the PH inkjet 260 printer. The next GUI, as illustrated in Fig. 9C, provides the user with a confirmation. Information included in the confirmation may include (1) address (pointers) of the digital document intended for output, (2) printer

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selected, (3) service fee that will be charged. Various payment types and methods may be used. The user may also choose to provide payment, deposit or escrow in various forms. However, for simplicity of illustration, only two are shown in this particular example. If payment by credit card is selected, the user may be prompted to provide credit card information. In one example, the user may then provide such information through a GUI (not shown) on the information apparatus 100, which then transmits the information to the selected output device 106. In another example, the user may provide credit card information directly to the selected output device 106 through an interface provide by the output device106. If the user has selected the cash payment option, cash may be physically deposited into a cash collector installed or connected to the selected output device 106. Or the user may transfer cash in electronic form from the information apparatus 100 to the output device 106. The user may or may not need to manually input payment information such as a credit card number. A user profile and or a variety of payment information may have already been saved in the user's information apparatus 100. The client application 102 may automatically fetch necessary payment information and process the transaction with the output device 106 or with a remote transaction server. If the output service is free, no payment information will need to be collected. If the output service is a subscription, then membership, login, authorization, or security information may be collected instead or in addition.

[00172] After the user confirms all the information and provides payment or deposit as requested, the user may be prompted to describe the job object as illustrated in Fig. 9D. Some of the selections for the job object input illustrated here may be device-dependent while others may be device-independent. The user can make selections by using, for example, radio buttons among other controls. Some default values, such as items 908 and 909, may have been preset by the user or automatically calculated by the client application 102 after negotiation with the output device 106. The user may also change all or some default values. After describing the job object,

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the user may select the "Next" control or icon 910 to move to the next step. It should be noted that only some exemplary or commonly used selections are displayed in the exemplary GUI of Fig. 9D. The user may make further selections by, for example, selecting the "more option" control or icon 911 or by simply scrolling down the display.

[00173] After the user submits the job object, the client application 102 sends a composite message 430 to an application server 110. The composite message 430 may include a document object, a printer object, and a job object. The application server 110 may contain server application 112. In this example, the server application 112 may need to fetch the output content (in its original format) based on the pointers provided in the document object. The server application 112 may obtain or invoke helper applications to process the output content (e.g., the news article) into print data that can be accepted by the printer 106 selected by the user (e.g., PH Inkjet 260). The server application 112 and or the helper application may perform one or more raster image processing operations on the output content. During this server application process 701, the sever application 112 may optionally launch a GUI in a window 912 as shown in Fig. 9E to provide the user with estimated processing time and or status. The user may choose to hide this window by selecting the "hide" control or icon 914. The user may also choose to abort the process by selecting the "cancel" control or icon 913.

[00174] After it has finished processing the output content and has generated the necessary print data, the server application 112 transmits the print data to the selected output device 106 through the user's information apparatus 100. Transmission may be wired or wireless. The client application 102 in the information apparatus 100 may or may not further process the print data before passing it to the output device 106. The output device 106, after receiving the print data, may queue the print job in its memory or storage component until it is ready to process this particular print job. As shown in Fig. 9F, the user may be notified when the original document is being

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printed or has been printed out. The user may also be notified of the service fee that has been, for example, charged to a credit card or deducted from a cash deposit. The user may be provided with a "more option" control or icon 916. For example, the user may choose this printer as a preferred default printer so that for the next output or print operation a discovery process 520 may be skipped or shortened if this printer 106 is found to be available.

[00175] Figs. 9A-9F provides only one example of output process 401 described with reference to Fig. 4. While the above descriptions contain many specificities, these should not be construed as limitations on the scope of the invention, but rather as exemplary embodiment thereof. Other user interfaces and embodiments may also be implemented. The process may also be implemented with more or fewer steps. As an example, security verification and authentication may be added to the steps illustrated in Figs. 9A-9F. As another example, the step illustrated by Fig. 9B may be skipped as the user may have pre-selected or preferred a default printer. These and other possible variations do not however depart from the scope and spirit of present invention.

[00176] Having described and illustrated the principles of our invention with reference to an illustrated embodiment, it will be recognized that the illustrated embodiment can be modified in arrangement and detail without departing from such principles. In view of the many possible embodiments to which the principles of our invention may be applied, it should be recognized that the detailed embodiments are illustrative only and should not be taken as limiting the scope of our invention. Rather, I claim as my invention all such embodiments as may come within the scope and spirit of the following claims and equivalents thereto.

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We Claim:

1. A data output service method for rendering at an output device output content managed from an information apparatus, comprising:

obtaining by wireless communication from the information apparatus at least part of a document object relating to the output content;

obtaining at least part of an output device object with one or more attributes relating to the output device;

providing the document object and the output device object to a server application operated on a server that is distinct from the information apparatus and the output device, and generating with the server application output data relating to the output device; and

providing the output data to the output device for rendering the output content as the data output service.

2. The method of claim 1 further comprising obtaining payment information from the information apparatus corresponding to payment for the data output service provided at the output device.

3. The method of claim 1 in which the providing of the output data includes transmitting the output data to the information apparatus and delivering at the information apparatus the output data to the output device.

4. The method of claim 2 in which the payment information is provided automatically by the information apparatus.

5. The method of claim 2 in which the payment information is provided through the information apparatus as entered by a user in response to a prompt to enter payment information.

6. The method of claim 2 in which the payment information includes data output service subscriber information corresponding to a pre-arranged subscription to the data output service.

7. The method of claim 6 further comprising correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

8. The method of claim 1 further comprising obtaining authentication

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information from the information apparatus to authenticating permission for the information apparatus to access the data output service.

9. The method of claim 1 in which the information apparatus includes a portable computing device.

10. The method of claim 1 in which the output device includes a printer.

11. A data output service system for rendering at an output device output content managed from an information apparatus, comprising:

means for delivering a document object and an output device object to a server application operated on a server that is distinct from the information apparatus and the output device, the document object relating to the output content and the output device object having one or more attributes corresponding to the output device;

means for generating with the server application output data related to the output device for rendering the output content; and

means for delivering the output data to the output device for rendering the output content.

12. The system of claim 11 further comprising means for obtaining payment information from the information apparatus corresponding to payment for the data output service provided at the output device.

13. The system of claim 11 in which the means for delivering the document object and the output device object to the server application and the means for delivering the output data to the output device are included in an output controller associated with the output device.

14. The system of claim 13 in which the output controller is included in the selected output device.

15. The system of claim 13 in which the output device includes a display output control unit and the output controller is included in the display output control unit of the output device.

16. The system of claim 11 in which the output device is a printer.

17. The system of claim 11 in which the information apparatus includes a portable computing device.

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18. The system of claim 12 in which the payment information is provided automatically by the information apparatus.

19. The system of claim 12 in which the payment information is provided through the information apparatus as entered by a user in response to a prompt to enter payment information.

20. The system of claim 12 in which the payment information includes data output service subscriber information corresponding to a pre-arranged subscription to the data output service.

21. The system of claim 20 further comprising correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

22. The system of claim 11 further comprising obtaining authentication information from the information apparatus to authenticating permission for the information apparatus to access the data output service.

23. A method for receiving data output service for rendering at an output device output content managed from an information apparatus, comprising:

establishing a communication channel between the information apparatus and a selected output device;

providing at the information apparatus at least part of a document object and at least an indication of the selected output device to a server that is distinct from the information apparatus and the output device, the document object relating to the output content;

receiving at the information apparatus an output data associated with the rendering of the output content at the selected output device; and

sending the output data to the output device for rendering the output content as the data output service.

24. The method of claim 23 further comprising sending payment information from the information apparatus corresponding to payment for the data output service provided at the output device.

25. The method of claim 24 in which the payment information is provided automatically by the information apparatus.

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26. The method of claim 24 in which the payment information is provided through the information apparatus as entered by a user in response to a prompt to enter payment information.

27. The method of claim 24 in which the payment information includes data output service subscriber information corresponding to a pre-arranged subscription to the data output service.

28. The method of claim 27 further comprising correlating the data output service subscriber information with a subscriber database that stores subscriber profiles with subscription payment information.

29. The method of claim 23 further comprising sending authentication information from the information apparatus to authenticating permission for the information apparatus to access the data output service.

30. The method of claim 23 in which the information apparatus includes a portable computing device.

31. The method of claim 23 in which the output device includes a computer printer.

32. A method for generating a device dependent output data acceptable for rendering at a selected output device, the device dependent output data corresponding to output content accessible at least partly by an information apparatus, the method comprising:

delivering at least part of a document object and at least part of an output device object to a device that is distinct from the information apparatus and the output device, the document object being associated with the output content and the output device object having one or more attributes corresponding to the selected output device; and

generating at the device the output data acceptable to the selected output device.

33. The method of claim 32 further comprising establishing a communication channel between the information apparatus and the selected output device; and

receiving at the information apparatus over the communication channel one or more attributes corresponding to the selected output device.

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34. The method of claim 32 in which the device that is distinct from the information apparatus and the selected output device includes one of a server, a computing device in a network, or another computing device.

35. The method of claim 32 in which the generating of the output data includes at least partially one or more of a conversion operation and a raster image processing operation.

36. The method of claim 32 further comprising discovering the selected output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

37. The method of claim 32 in which the document object includes the output content.

38. The method of claim 32 in which the document object includes a pointer or reference to the output content.

39. The method of claim 32 in which an application in the device, distinct from the information apparatus and the selected output device, obtains the output content based on a pointer or reference to the output content included in the document object.

40. The method of claim 32 further comprising delivering the output data to the selected output device for rendering of the output content.

41. A method for generating device dependent output data acceptable for rendering at each of one or more selected output devices, the device dependent output data for each selected output device corresponding to an output content accessible at least partly by an information apparatus, the method comprising:

delivering at least partially a document object and one or more output device objects to one or more devices that are distinct from the information apparatus and the one or more selected output devices, the document object being associated with the output content, and the one or more output device objects having one or more attributes corresponding to each of the one or more selected output devices; and

generating at the one or more devices the device dependent output data associated with each of the corresponding one or more selected output device.

42. The method of claim 41 further comprising establishing a communication

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channel between the information apparatus and one or more output devices.

43. The method of claim 42 further comprising:

receiving at the information apparatus over the communication channel one or more attributes corresponding to the one or more output devices; and

selecting at the information apparatus one or more output devices for rendering the output content based at least in part on the one or more attributes.

44. The method of claim 41 in which each of the one or more devices distinct from the information apparatus and the one or more selected output devices include one of a server, a computing device in a network, and another computing device.

45. The method of claim 41 in which the generating of the output data for each selected output device includes one of invoking, launching, calling, utilizing, and involving one or more applications.

46. The method of claim 41 in which the generating of the output data for each selected output device includes at least partially one or more of a conversion operation and an raster image processing operation.

47. The method of claim 41 further comprising discovering the selected output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

48. The method of claim 41 in which the document object includes the output content.

49. The method of claim 41 in which the document object includes a pointer or reference to the output content.

50. The method of claim 49 in which the one or more devices obtain the document object based on the pointer or reference to the output content included in the document object.

51. The method of claim 41 further comprising delivering the device dependent output data to each selected output device for rendering of the output content.

52. A data output method for rendering at a selected output device output content from an information apparatus, comprising:

establishing a communication channel between the information apparatus

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and the selected output device;

receiving at the information apparatus output data from a device that is distinct from the information apparatus and the selected output device; the output data being related to the output content and associated with the selected output device; and

delivering the device specific output data from the information apparatus to the selected output device for rendering of the output content.

53. The method of claim 52 further comprising obtaining an output device object and a document object at the information apparatus, the document object being associated with the output content, and the output device object having one or more attributes corresponding to the selected output device; and

sending the document object and the output device object to the device distinct from the information apparatus and the selected output device for generating the output data.

54. The method of claim 53 in which the obtaining of the output device object includes obtaining information from a user input, from a communication with the selected output device, and from a default parameter or preference.

55. The method of claim 52 further comprising discovering the selected output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

56. The method of claim 52 further comprising selecting an output device compatible for receiving the output data.

57. The method of claim 52 in which the received output data is device dependent with respect to the selected output device.

58. The method of claim 52 further comprising conforming at the information apparatus the output data into a form more suitable for rendering at the selected output device.

59. A data output method for rendering at an output device output content from an information apparatus, comprising:

receiving at the information apparatus output data from a device that is distinct from the information apparatus and the selected output device, the output

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data related to the output content and associated with an output device;

selecting an output device compatible for receiving the output data for rendering the output content;

establishing a communication channel between the information apparatus and the selected output device; and

delivering the output data to the selected output device for outputting the output content.

60. The method of claim 59 further comprising discovering the selected output device as one of one or more output devices that are discovered by the information apparatus as being available for rendering the output content.

61. The method of claim 59 in which the received output data is device dependent with respect to the selected output device.

62. The method of claim 59 in which the device is distinct from the information apparatus and the selected output device includes one of a server, a computing device in a network, and another computing device.

63. The method of claim 59 further comprising conforming at the information apparatus the output data into a form more suitable for rendering at the selected output device.

64. The method of claim 59 further comprising obtaining an output device object and a document object at the information apparatus, the document object being associated with the output content and the output device object having one or more attributes corresponding to the selected output device; and

sending the document object and output device object to the device distinct from the information apparatus and the selected output device for generating the output data.

65. The method of claim 64 in which the obtaining of the output device object include obtaining one or more information from a user input, from a communication with the selected output device, and from a default parameter or preference.

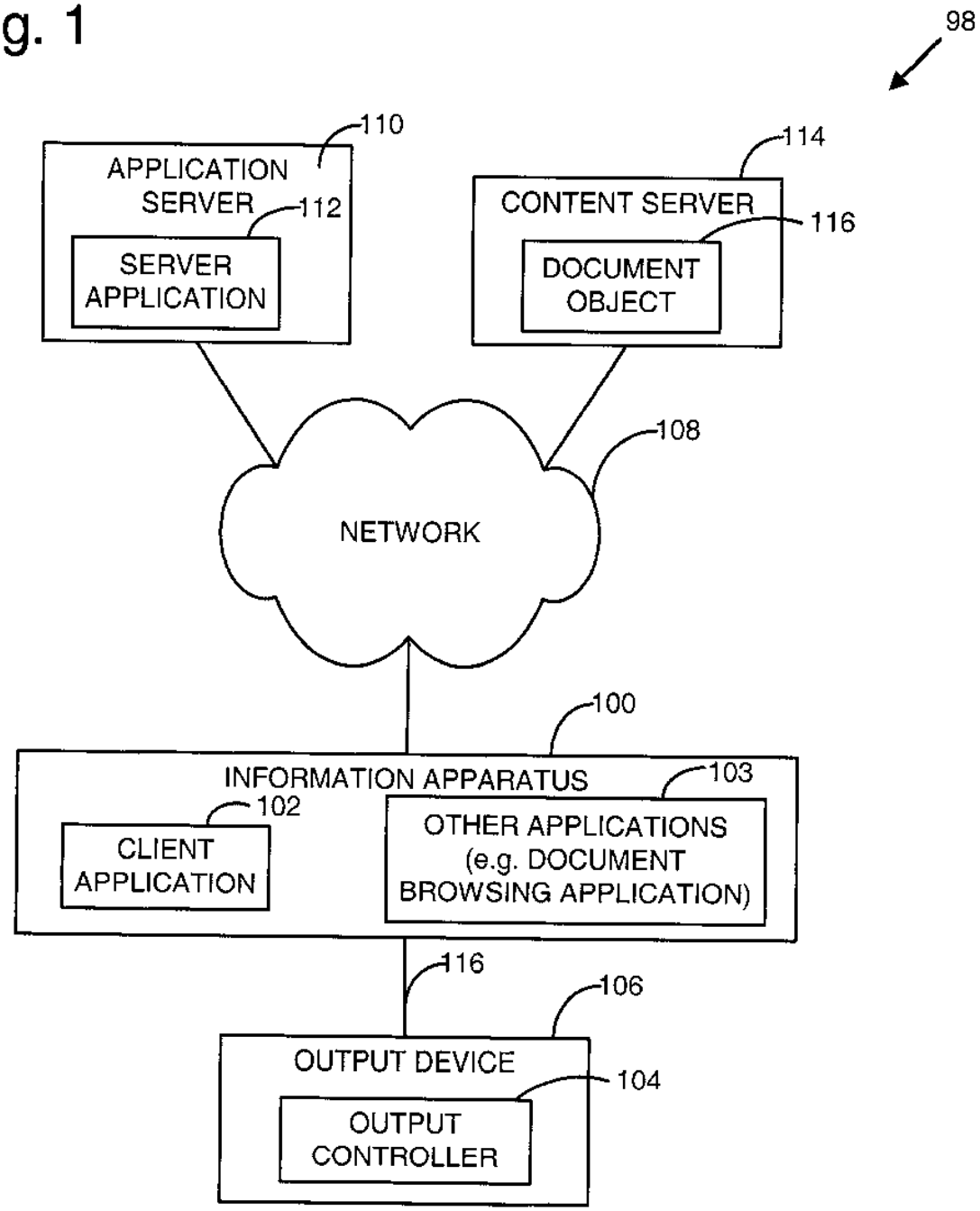
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Abstract of the Disclosure

Pervasive output capability is provided so that an information apparatus can pervasively output digital content to an output device regardless of the processing power, display screen size and memory space of the information apparatus. This allows small mobile devices with limited display, processing power, and memory to be able to output a digital document (e.g., PDF, HTML, PowerPoint etc) in its full original richness, without resorting to downsizing, truncating, reducing, clipping or otherwise altering the original document. A data output service method for rendering at an output device output content managed from an information apparatus may include obtaining by wireless communication from the information apparatus at least part of a document object relating to the output content, obtaining at least part of an output device object with one or more attributes relating to the output device, and providing the document object and the output device object to a server application operated on a server that is distinct from the information apparatus and the output device, and generating with the server application output data relating to the output device. The output data may then be provided to the output device for rendering the output content as the data output service.

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Fig. 1



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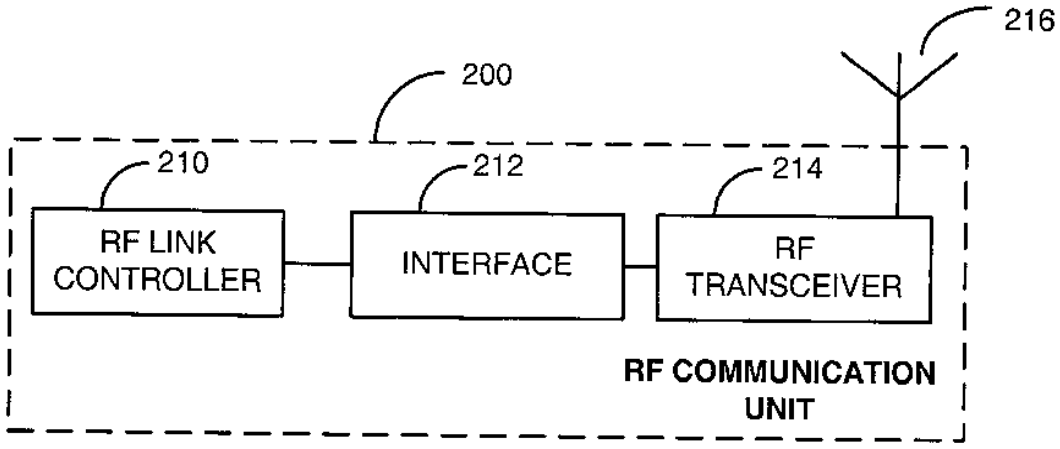


Fig. 2A

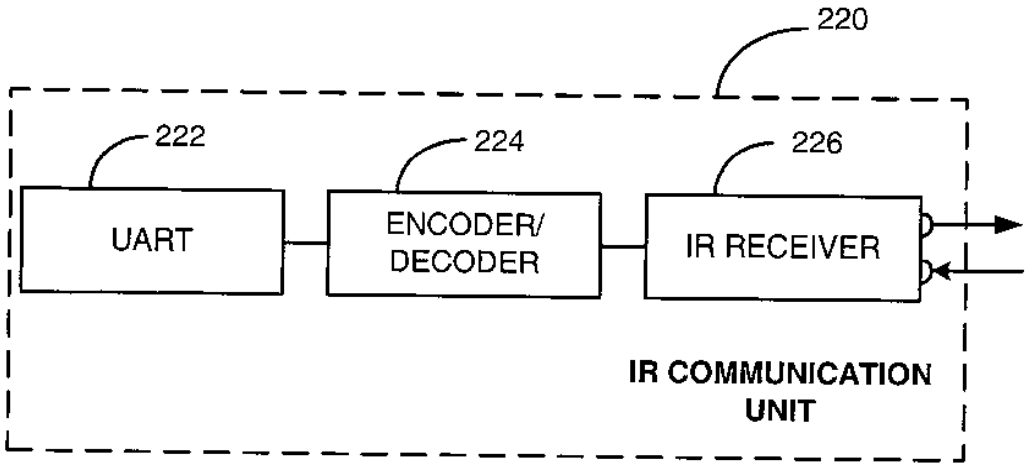


Fig. 2B

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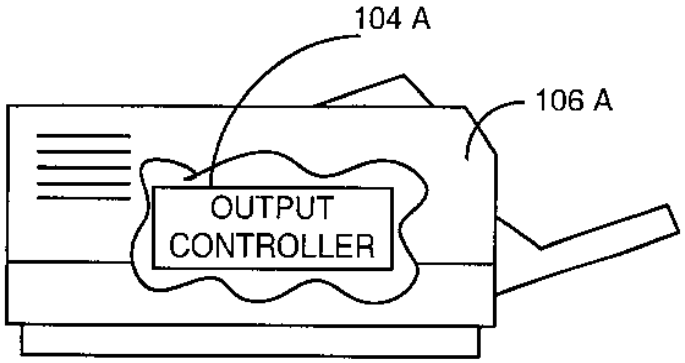


Fig. 3A

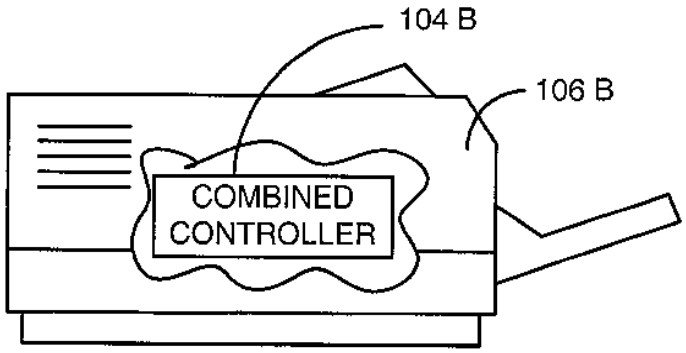


Fig. 3B

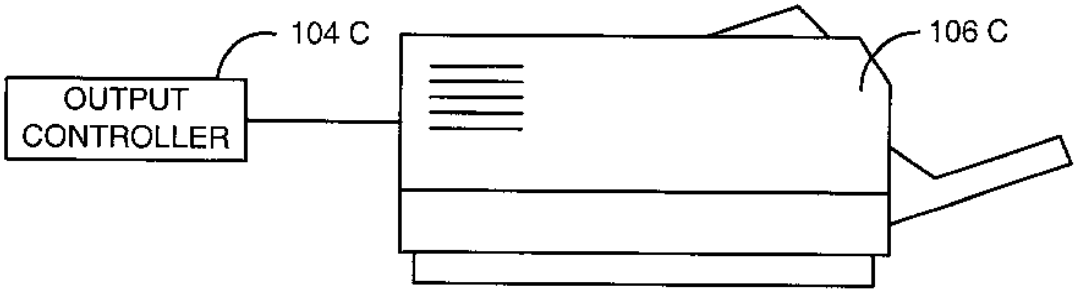
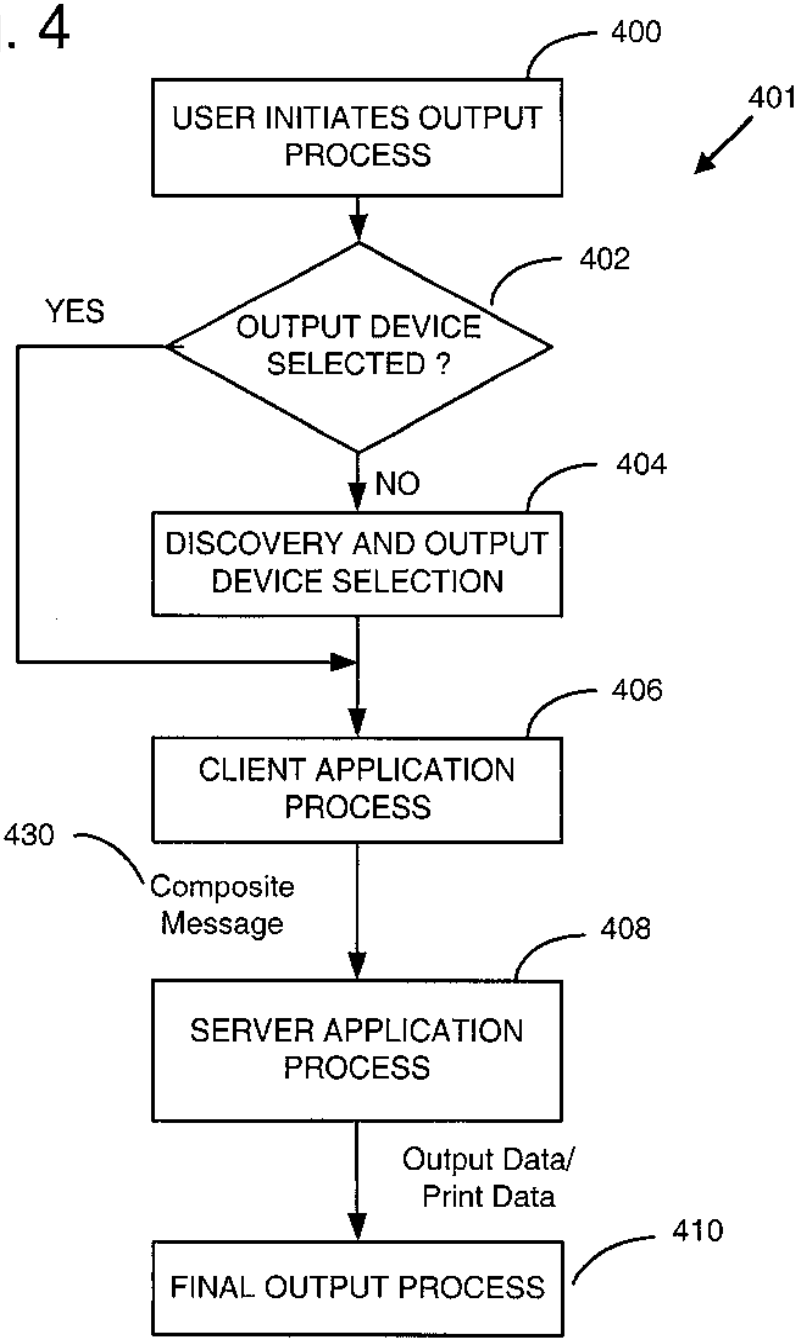


Fig. 3C

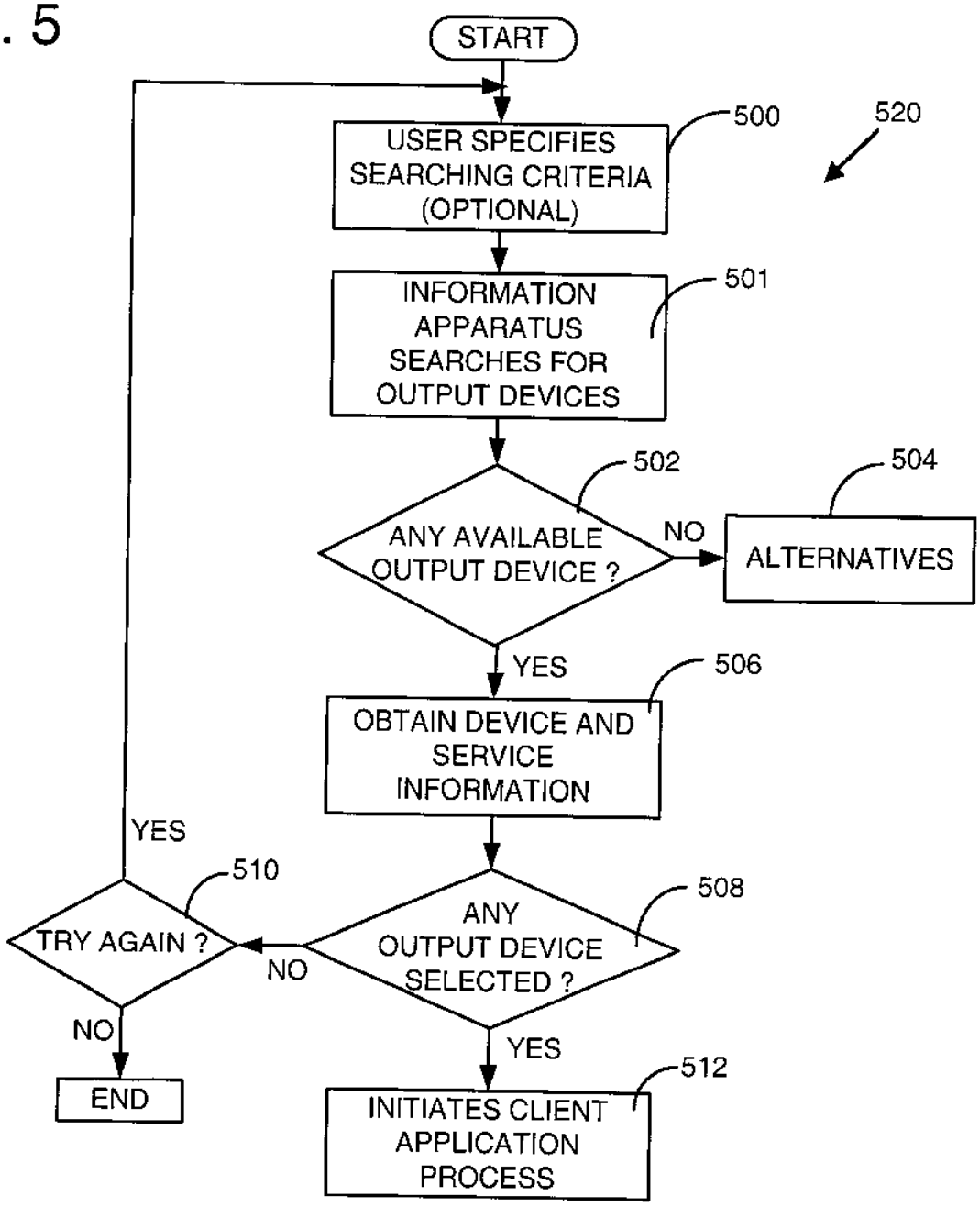
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Fig. 4



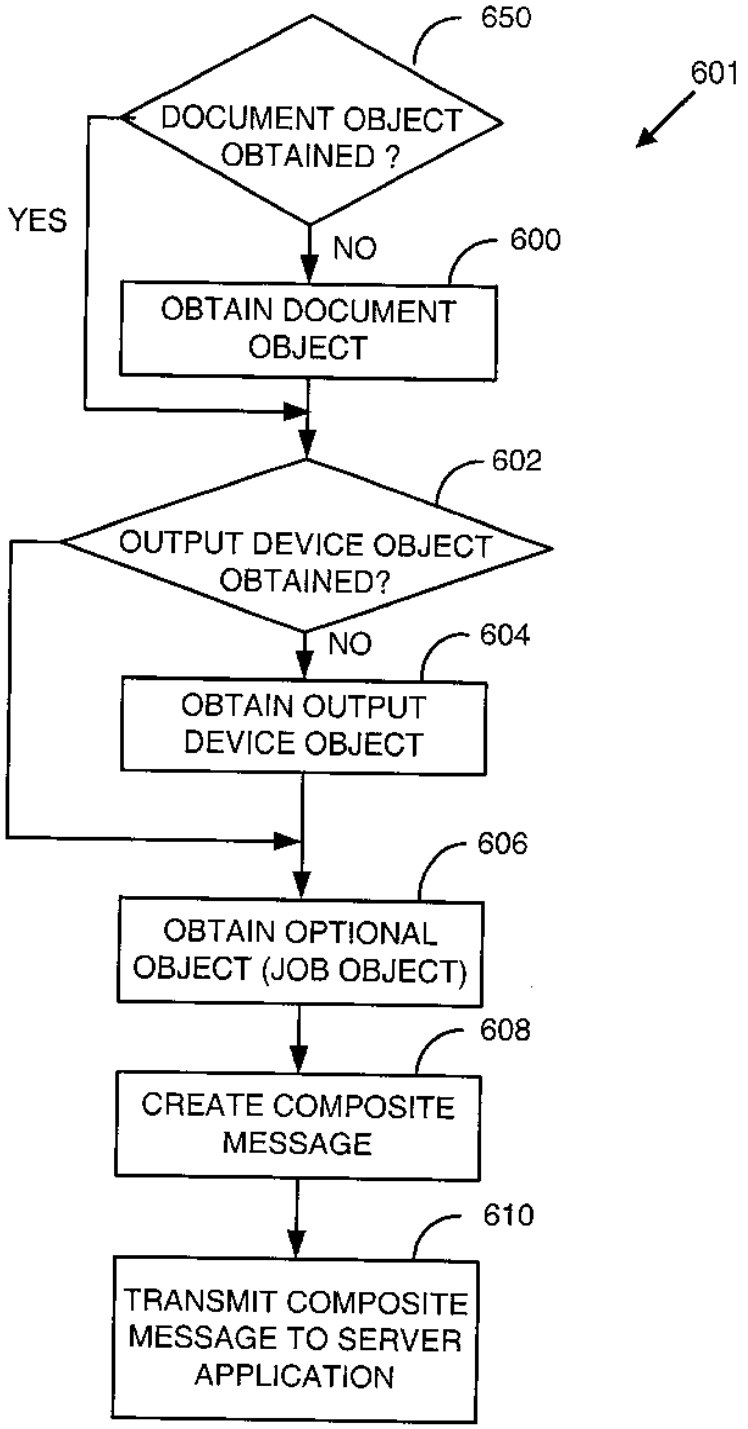
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Fig. 5



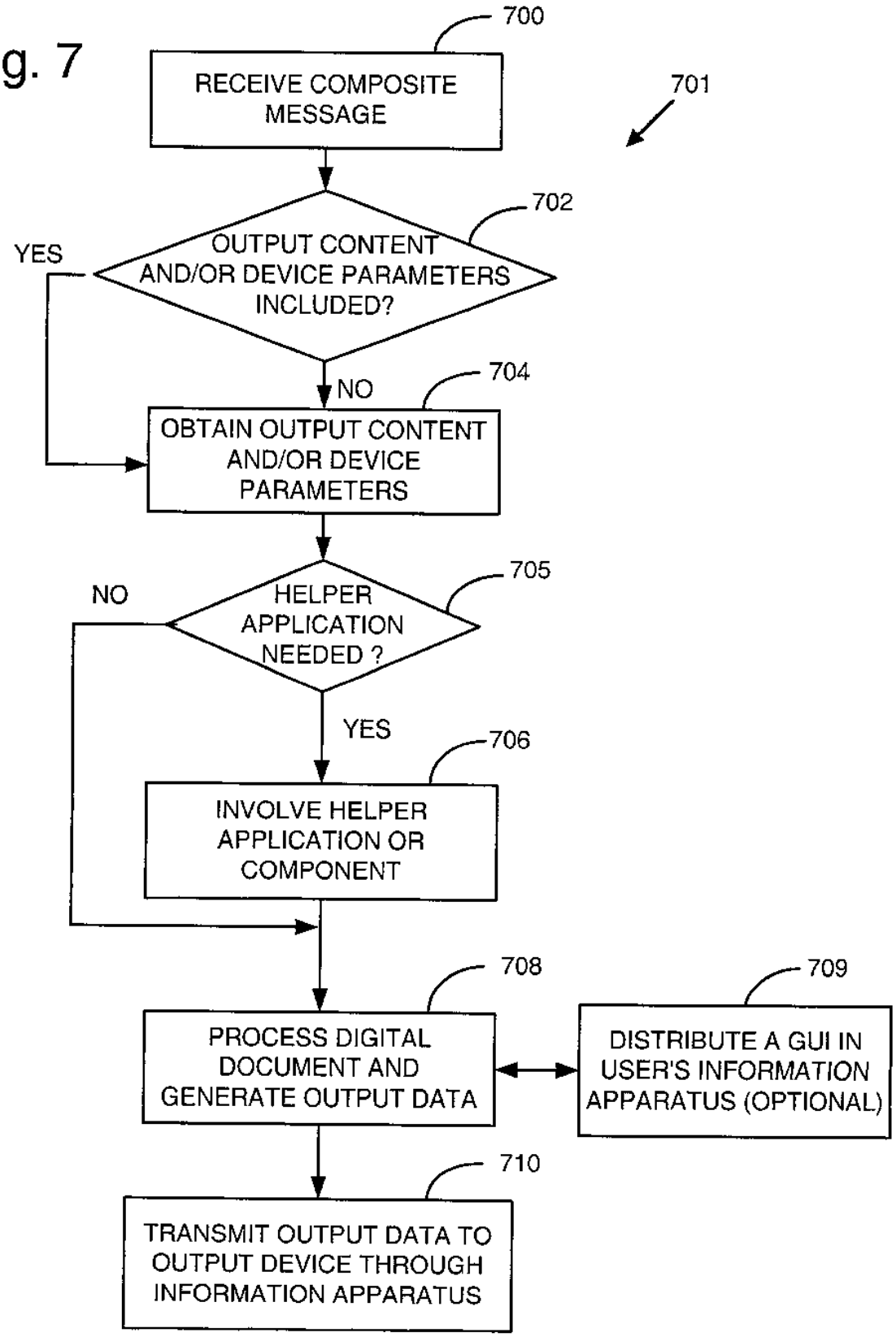
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Fig. 6



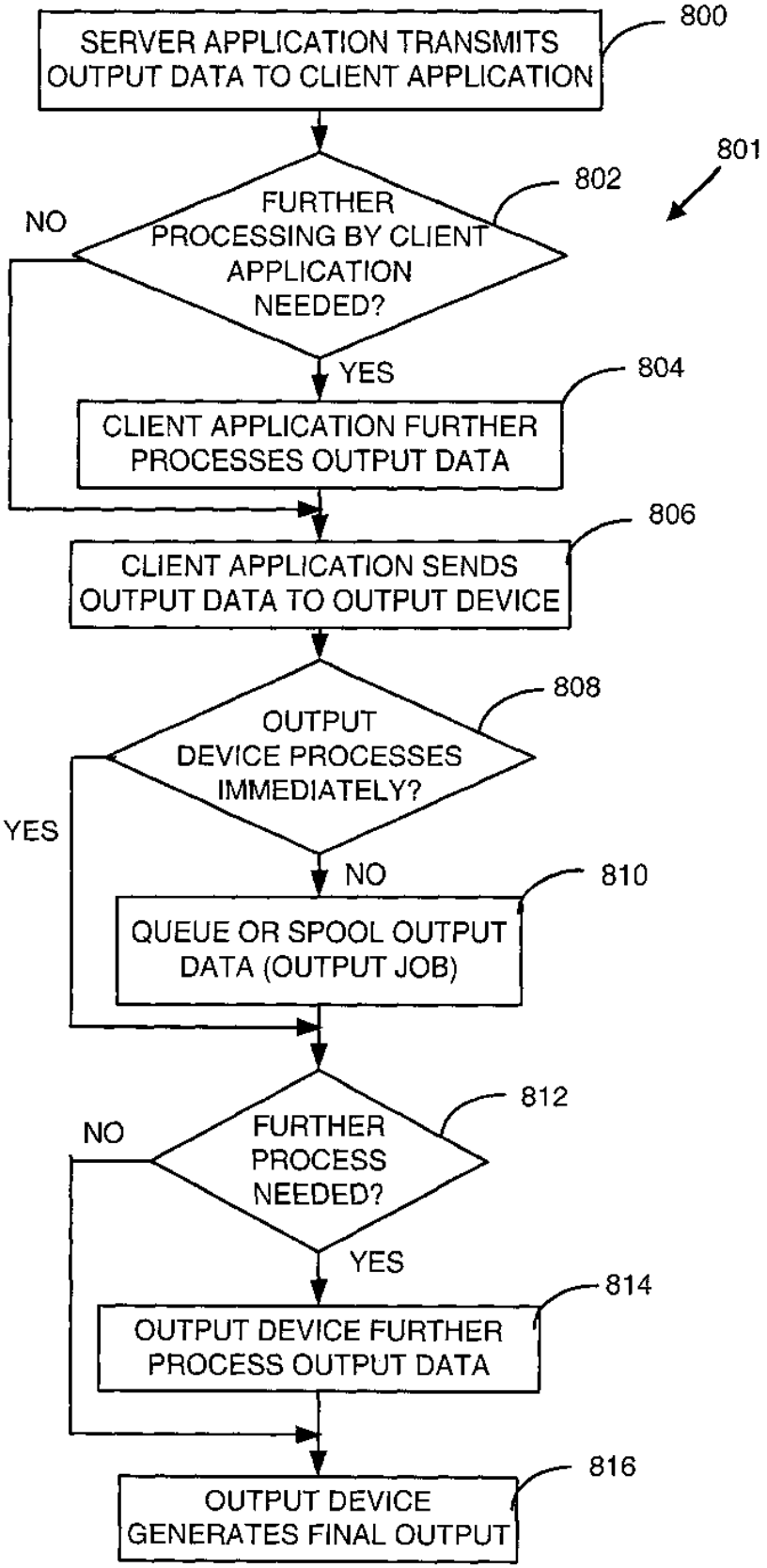
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Fig. 7



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Fig. 8



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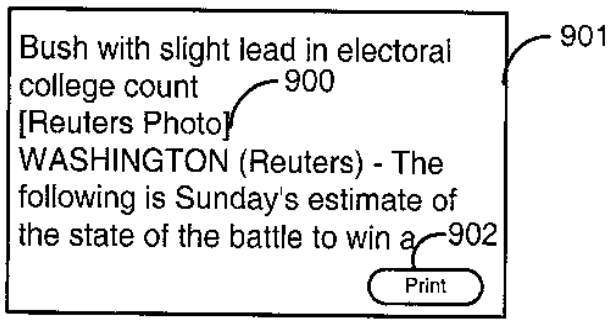


Fig. 9 A

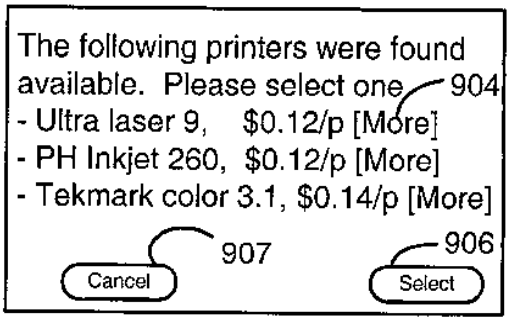


Fig. 9 B

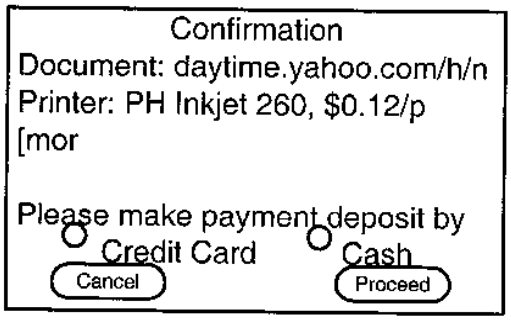


Fig. 9 C

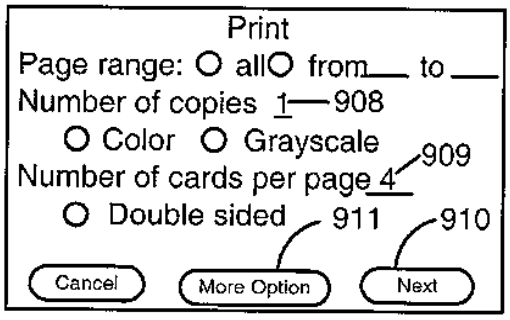


Fig. 9 D

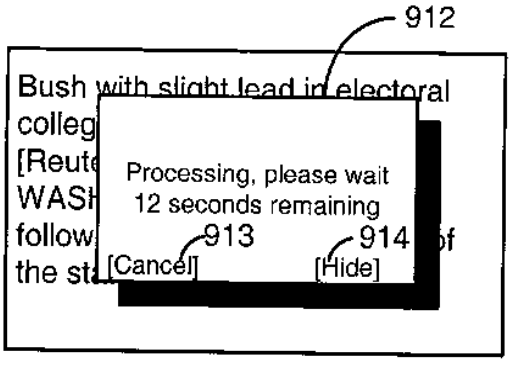


Fig. 9 E

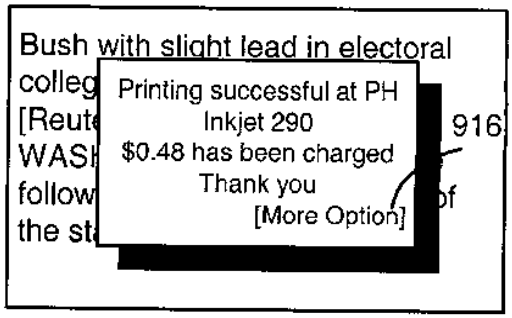


Fig. 9 F

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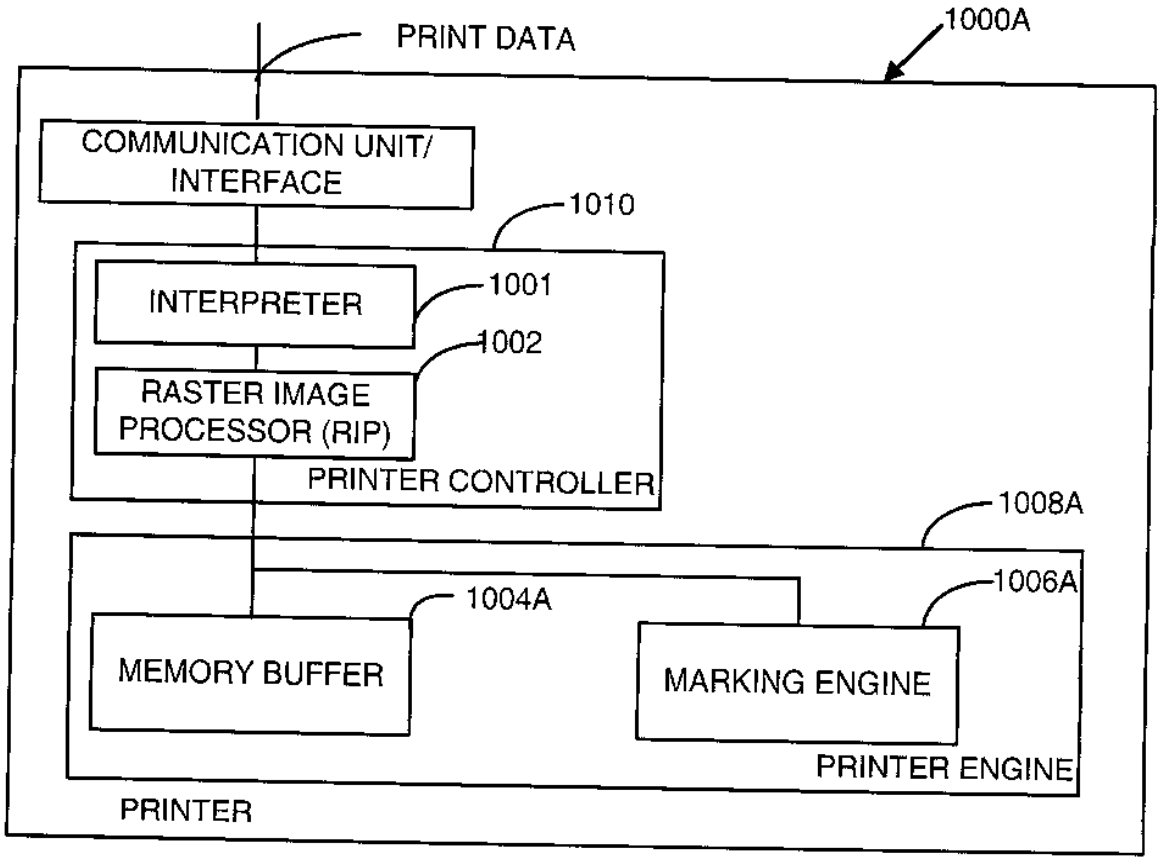


Fig. 10 A

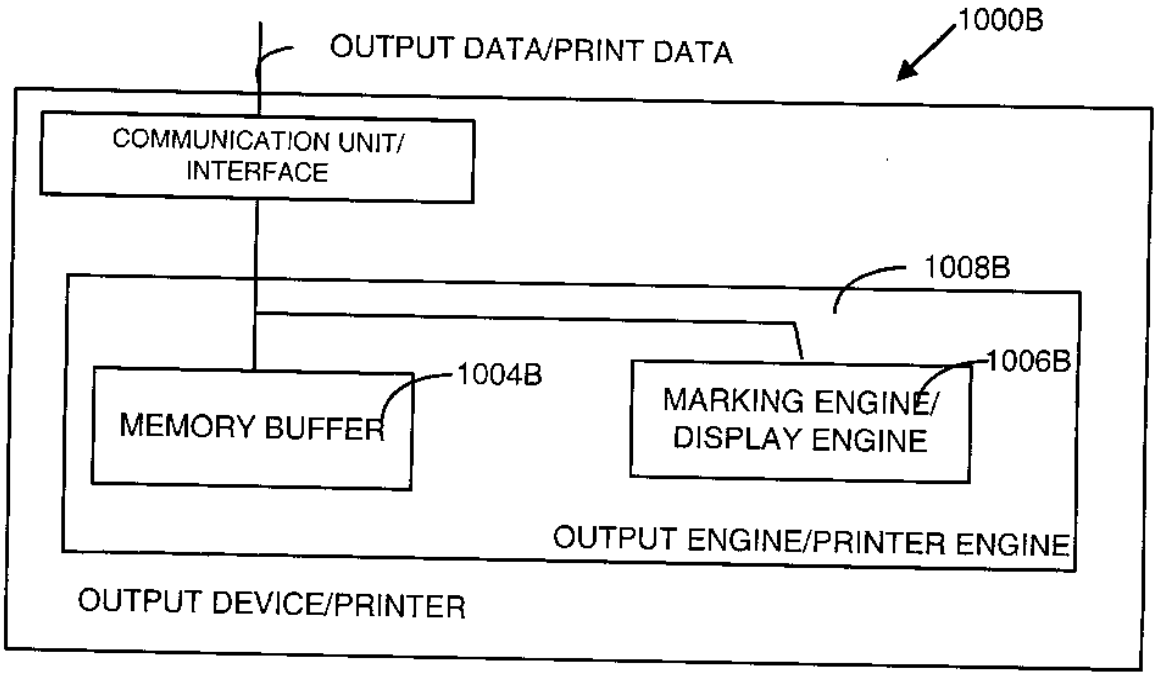


Fig. 10 B

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Atty Docket No. 1282-011

COMBINED DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled Method For Mobile And Pervasive Output, the specification of which

[X] is attached hereto.
[ ] was filed on _____ as Application No. _____.
[ ] was described and claimed in PCT International Application No. _____, filed on _____, and as amended under PCT Article 19 on _____ (if applicable).
[ ] and was amended on _____ (if applicable).
[ ] with amendments through _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56. If this is a continuation-in-part application filed under the conditions specified in 35 U.S.C. § 120 which discloses and claims subject matter in addition to that disclosed in the prior copending application, I further acknowledge the duty to disclose material information as defined in 37 CFR § 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or of any PCT International application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT International application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)	[] Yes	[] No

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

60/252,682	November 20, 2000
(Application No.)	(Filing Date)

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or § 365(c) of any PCT International application(s) designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT International filing date of this application:

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(Application No.) (Filing Date) (Status: patented, pending, abandoned)

The undersigned hereby authorizes the U.S. attorney or agent named herein to accept and follow instructions from _____ as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application, to file a corresponding international application, and to transact all business in the Patent and Trademark Office connected therewith:

Name	Reg. No.
John R. Dawson	39,504
Douglas D. Hancock	35,889
Patrick W. Hughey	31,169
Mark M. Meininger	32,428

Address all correspondence to USPTO CUSTOMER NUMBER 021034

*21034
*

Address all telephone calls to Mark M. Meininger at telephone number (503) 249-7066.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of first joint inventor: William Ho Chang

Inventor's signature William Chang 11/18/01
Date

Residence: Vancouver, Washington
Citizenship: U.S.A.
Post Office address: 16900 SE. 26th Drive #94, Vancouver WA 98683

Full name of second joint inventor: Christina Ying Liu

Inventor's signature _____ 11/18/01
Date

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Citizenship: Peoples Republic of China
Post Office address: 16900 SE. 26th Drive #94, Vancouver WA 98683

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

11/28/2001 RHARIS1 00000007 09992413

01 FC:201	370.00	OP
02 FC:202	126.00	OP
03 FC:203	405.00	OP

PTO-1556
(5/87)

*U.S. GPO: 2000-468-887/39595

Lexmark, Exhibit 1003
Lexmark v. Flexiworld

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2001

Application or Docket Number: 09992413

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	65	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	65 minus 20=	* 45
INDEPENDENT CLAIMS	7 minus 3 =	* 4
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	370.00	OR	BASIC FEE	740.00
X$ 9=	405	OR	X$18=	
X42=	126	OR	X84=	
+140=		OR	+280=	
TOTAL	90	OR	TOTAL	

CLAIMS AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
***If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

FORM PTO-875 (Rev. 6/01) — Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

☆U.S.GPO 2001-482-124/59197

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CLAIMS ONLY

SERIAL NO.	FILING DATE
09992413	
APPLICANT(S)	

CLAIMS

	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
1	1					
2		1				
3		1				
4		1				
5		1				
6		1				
7		1				
8		1				
9		1				
10		1				
11	1					
12		1				
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33		1				
34		1				
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36		1				
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39		1				
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41	1					
42		1				
43		1				
44		1				
45		1				
46		1				
47		1				
48		1				
49		1				
50		1				
TOTAL IND.	7	⇩		⇩		⇩
TOTAL DEP.	58	⇦		⇦		⇦
TOTAL CLAIMS	65					

	*		*		*	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
51		1				
52	1					
53		1				
54		1				
55		1				
56		1				
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99						
100						
TOTAL IND.		⇩		⇩		⇩
TOTAL DEP.		⇦		⇦		⇦
TOTAL CLAIMS						

* MAY BE USED FOR ADDITIONAL CLAIMS OR AMENDMENTS

FORM PTO-2022 (1-98)

U.S.DEPARTMENT OF COMMERCE
Patent and Trademark Office

*U.S. Government Printing Office: 1998 - 433-214/70303

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