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Case No. 10406/49

PATENT APPLICATION TRANSMITTAL LETTER

To the Commissioner for Patents:

Transmitted herewith for filing is the patent application of: John K. Overton and Stephen W. Bailey for : METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK. Enclosed are:

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- ☒ 15 sheet(s) of drawings, and 52 pages of application (including title page).
- ☐ Declaration.
- ☐ Power of Attorney.
- ☐ Verified statement to establish small entity status under 37 CFR §§ 1.9 and 1.27.
- ☐ Assignment transmittal letter and Assignment of the invention to : _____.
- ☐ _____.

Claims as Filed	Col. 1	Col. 2	Small Entity			Other Than Small Entity	
For	No. Filed	No. Extra	Rate	Fee	or	Rate	Fee
Basic Fee				$ 355	or		$ 710
Total Claims	-20		x$9=	$	or	x$18=	$
Indep. Claims	-3		x$40=	$	or	x$80=	$
Multiple Dependent Claims Present			+$135=	$	or	+$270=	$
*If the difference in col. 1 is less than zero, enter "0" in col. 2.			Total	$	or	Total	$

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June 1, 2001
Date

Kent E. Genin
BRINKS HOFER GILSON & LIONE
Registration No. 37,834

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Our Case No. 10406/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
APPLICATION FOR UNITED STATES LETTERS PATENT

INVENTORS:	JOHN K. OVERTON STEPHEN W. BAILEY
TITLE:	METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK
ATTORNEY:	KENT E. GENIN BRINKS HOFER GILSON & LIONE P.O. BOX 10395 CHICAGO, ILLINOIS 60610 (312) 321-4200

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METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK

RELATED APPLICATIONS

This application claims the benefit of provisional patent application serial no. 60/209,070 filed June 2, 2000 and provisional application serial no. 60/277,408 filed March 19, 2001, the entirety of each of these applications is incorporated herein by reference. This application also claims priority to the following U.S. patent applications: application serial no. 09/661,222 entitled NETWORK DISTRIBUTED TRACKING WIRE TRANSFER PROTOCOL, filed on September 13, 2000; application serial no. 09/503, 441 entitled AUTOMATED SYSTEM FOR IMAGE ARCHIVING, filed February 14, 2000; application serial no. 09/367,461 entitled AUTOMATED SYSTEM FOR IMAGE ARCHIVING, filed August 13, 1999; and application serial no. 09/111,896 entitled SYSTEM AND METHOD FOR ESTABLISHING AND RETRIEVING DATA BASED ON GLOBAL INDICES, filed on July 8, 1998. The entirety of each of these applications is also incorporated herein by reference.

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FIELD OF THE INVENTION

This invention relates generally to the storage and retrieval of information, and in particular, to a system and method for managing global search and retrieval of information across a network.

BACKGROUND

Data records can reside in many different places. In existing retrieval systems and methods, a client seeking information sends a request to a server. Typically, only files that are registered with that server are returned. Disadvantageously, the search is also usually restricted to a local, identified system. The search is thus conducted only where the server knows in advance to look.

Another disadvantage of known retrieval systems is the difficulty in accessing data in different forms. Current retrieval systems are typically

designed to search for data in limited forms. One example is where a client requests files based on a subject, like a person's name. Search results for this type of search may only retrieve text files of peoples' names. Another problem in current retrieval systems is that the client may receive text and image files in the search results, but cannot seamlessly access the image files. Yet another problem in current retrieval systems is that video and sound files related to the request may not even be found in the search results. For example, a doctor might be able to retrieve medical records on a specific patient, but cannot view MRI or X-Ray results associated with that record.

A distributed database is one where data is stored and retrieved among multiple machines connected by a network. Typically, each machine in which some portion of the data in a distributed database may reside is called an application server. One commonly asked question in an application server environment is: Where is data associated with a particular entity in a distributed database? The data location is a key question when a distributed database has highly dynamic, and even spontaneous, data distribution properties.

In networked environments where there are a large number of data repositories and any particular entity does not have data in all of the data repositories, a mechanism is needed that would permit queries to be directed only at data repositories with relevant information. It would also be beneficial to permit membership in the set of data repositories itself to be highly dynamic. Such a system would support on-the-fly addition and removal of data repositories from the topology of a distributed database seamlessly and without the need to reprogram the database.

Another challenge faced in networked environments is scaling system capabilities in a manner sufficient to handle variable demand for resources. A system and method for scaling resources to accommodate demands for those resources is also desirable.

BRIEF SUMMARY

In view of the above, the invention provides a system and method for managing data, using a transfer protocol, in a network environment. According to one aspect of the invention, a system for managing location information and providing location information to data location queries comprises a transfer protocol configured to manipulate an identifier, and at least one location associated with the identifier, wherein the identifier uniquely specifies an entity and wherein each data location specifies a location of data in a network pertaining to the entity. The system also includes a location server containing location information corresponding to at least one entity that is formatted according to the transfer protocol, where the location of data relates to an application server in the network. The system further includes programming logic stored on the location server that is responsive to a location query identifying a desired entity to return a location message. The location message includes one or more locations associated with the desired entity.

According to another aspect of the invention, a method of handling location queries in a network having a plurality of location servers containing location information correlating each of a plurality of unique identifiers with at least one location is disclosed. The method includes receiving a location query from a client requesting the location of data relevant to an entity identified in the query. The queried location server sends a location response message to the client if the queried location server contains information relevant to the entity identified in the query. The location server sends a redirect message to the client if it does not contain location information relevant to the entity identified in the query, where the redirect message comprising a list of location servers containing information relevant to the entity identified in the query.

In another aspect of the invention, a method of scaling at least one of location server capacity and transaction rate capability in a system for storing and retrieving location information over a network using a transfer protocol is disclosed. The method includes providing a transfer protocol configured to

transport and manipulate an identifier and a location, the location specifying the location of data in the network corresponding to the identifier, and providing a first location server storing location information formatted according to the transfer protocol. Upon receipt of an identifier and location from a first client, where the location represents a location of an application server in the network containing data stored by the first client related to an entity represented by the identifier, the location is stored in a location store at the first location server. A portion of the identifiers and respective location associations in the first location server are transferred to a second location server when a performance criterion of the first location server reaches a predetermined performance limit.

According to another aspect of the invention a database is disclosed. The database includes a computer readable medium containing a plurality of index designations, where each index designation represents of one of a plurality of identifiers, and where each identifier uniquely identifies an entity. The database also contains a plurality of locations, where each of the locations is associated with at least one of the plurality of index designations and represents a location of information relevant to an identifier represented by an index designation. A location store having a table containing the plurality of index designations and associated locations is stored in the computer readable medium, as well as an indexing function operative to map each of the plurality of identifiers to a respective one of the plurality of index designations.

These and other features and advantages of the invention will become apparent upon a review of the following detailed description of the presently preferred embodiments of the invention, when viewed in conjunction with the appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a system block diagram according to a preferred embodiment.

FIG. 2 is a block diagram of a location suitable for use in the system of FIG. 1.

FIG. 3 is a block diagram of an alternative embodiment of the location of FIG. 2.

FIG. 4 is a block diagram of an NDTP server suitable for use in the system of FIG. 1.

FIG. 5 is a block diagram of an NDTP server topology according to a preferred embodiment.

FIG. 6 is a block diagram of an alternative NDTP server topology.

FIG. 7 is an example of multiple outstanding protocol requests.

FIG. 8 is a layout of one presently preferred string format.

FIG. 9 is a layout of one presently preferred NDTP_GET message.

FIG. 10 is a layout of one presently preferred NDTP_GET RSP message.

FIG. 11 is a layout of one presently preferred NDTP_PUT message.

FIG. 12 is a layout of one presently preferred NDTP_PUT_RSP message.

FIG. 13 is a layout of one presently preferred NDTP_DEL message.

FIG. 14 is a layout of one presently preferred NDTP_DEL_RSP message.

FIG. 15 is a layout of one presently preferred NDTP_UPD message.

FIG. 16 is a layout of one presently preferred NDTP_UPD_RSP message.

FIG. 17 is a layout of one presently preferred NDTP_RDR_RSP message, where FIG. 17(a) shows a server table layout, and FIG. 17(b) shows a redirect function layout.

FIG. 18 is a system diagram showing an NDTP server constellation configuration and exemplary data flow paths.

FIG. 19 is a system diagram showing a client-centric NDTP server constellation approach for redirection.

FIG. 20 is a system diagram showing a server-centric NDTP server constellation approach for redirection.

FIG. 21 is a system block diagram showing a multi-server implementation environment of the transfer protocol of the invention.

FIG. 22 is a block diagram of a splitting process in an NDTP server cluster.

FIG. 23 illustrates an embodiment of a content management/object management system configuration incorporating an NDTP server network.

FIG. 24 illustrates an embodiment of a vehicle tracking system incorporating an NDTP server.

FIG. 25 illustrates an embodiment of a mobility management application incorporating an NDTP server.

FIG. 26 illustrates an embodiment of a location store format for the NDTP server of FIG. 25.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENTS

The following terms are used to describe the operation of the presently preferred distributed database system. A network distributed tracking protocol (NDTP) is a transfer protocol having the capability to manipulate location information used to efficiently track the location of information associated with an individual entity in the distributed database system. An "entity identifier" or an "identifier" is a unique encoding, which may be a string in one embodiment, with which zero or more data location specifiers are associated in an NDTP server. A "data location" or "location" is an encoding, for example a string, that is a member of a set of associations with an identifier in an NDTP server. An "NDTP client" or a "client" is a network-attached component that initiates add, delete, lookup and update of identifier/location mappings, or associations, from an NDTP server with NDTP request messages. An "NDTP server" or a "server" is a network-attached component that maintains a set of identifier/location mappings that are modified or returned in response to NDTP request messages from clients. The term "Network Byte Order" is the ordering of bytes that compose an integer of larger than a single byte as defined in the Internet Protocol (IP) suite. Preferably, Network Byte Order specifies a big-endian, or most significant byte first, representation of

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multibyte integers. In this specification a byte is preferably composed of eight bits.

FIG. 1 shows one basic topology of a preferred network 10 implementing a preferred embodiment of the distributed database system. The distributed database system 10 includes at least one NDTP server 12, at least one client 14, and, in one embodiment, an application server 16. An application server 16 is deployed for given purposes, such as a distributed database, instant messaging, phone routing, distributed content management, geo-location services and etc. As will be explained in greater detail below, the distributed database system preferably allows clients 14 to efficiently locate information through queries to the NDTP servers 12. Using the NDTP protocol, the NDTP servers maintain location information in the form of a list of location associations with an entity. The location may be address information for the application server(s) containing information relevant to the identifier or address information for the application server(s) through which data relevant to the identifier may be accessed. In one embodiment, when a client queries the NDTP server for information pertaining to an entity, the NDTP server preferably returns a list of all locations for the specified entity. The client then can directly access the various locations, relieving the NDTP server of any further involvement in the transaction and allowing the NDTP server to handle more queries.

Alternatively, the location may also be one or more pieces of data identifying the physical location of the entity identified by the identifier. In embodiments where the location on the NDTP server is a physical location of the entity identified by the identifier (e.g. a geo-location service), no application servers 16 may be necessary because the location information on the NDTP server(s) may be the endpoint of the client query.

When the locations returned by an NDTP server to a client are of address information of one or more application servers, these application servers 16 may be any type of mechanism accessible by a client system. As shown in FIG. 2, a location, such as an application server 16 containing a location-enabled service or router table, may include an NDTP application 18

for receiving and reporting NDTP references. The application server 16 running the location-enabled service or router table preferably supports the client-server interactions. Any of a number of existing location-enabled services, such as Universal Resource Identifier (URI) - Universal Resource Locator (URL) mappings in distributed content management, or router table formats may be operated on the application server 16.

FIG. 3 illustrates an embodiment where the location is a data repository 24 composed of an application server 22 and an NDTP application 20 associated with a persistent storage mechanism 26 such as a disk drive, for managing client-server interaction. In an alternative embodiment, the location in FIG. 2 may consist of a routing table on the application server 16. In this alternative embodiment, the NDTP application 18 performs location interactions and the routing table routes services to appropriate destinations. Similarly, the client 14 may be any mechanism capable of communicating with the NDTP server. For example, a client 14 may consist of a PC-based computer, computer network, personal digital assistant (PDA), telephone, car messaging center, and so on.

The NDTP server 12 illustrated in FIG. 1 is preferably a network server configured to answer the question: Where is data associated with a particular entity in a distributed database system? This is in contrast to the question of what is the data associated with a particular entity in the distributed database system that must be answered by a typical distributed database mechanism. The NDTP server is built upon a location store data structure. Large databases store large amounts of data, but the NDTP server is only concerned with the location of that data, rather than the end-point referent data itself.

Referring to FIG. 4, the NDTP server 12 includes a network front end 34, RAM storage 36, and non-volatile storage 38. The non-volatile storage 38 may be a disk drive that is in communication with, or integral with, the NDTP server hardware. The network front end 34 includes a memory manager that is preferably logic operative to divide a large contiguous memory area into small, fixed sized chunks, for example 128 octets. These fixed sized chunks

are used to build both strings, with linked lists of chunks used to represent strings that do not fit within a single chunk, and mapping lists, with linked lists of chunks to represent mapping lists that have more elements than fit in a single chunk. The network front end also includes a transaction protocol, such as transaction control protocol/Internet protocol (TCP/IP). The NDTP server 12 preferably maintains the state of its mappings in the non-volatile storage 38. An indexed location store is maintained in RAM 36 that contains a table of index designations, where the identifiers are mapped to one or more locations in the location store. The indexed location store may be indexed by a table implemented through an efficient function, such as hash function, b-tree function or t-tree function. Additionally, an NDTP server map identifying any other NDTP server locations for the specific network and the set of associations contained in each respective NDTP server is maintained in RAM, persistent storage, or preferably both RAM and persistent storage.

In one embodiment, a NDTP server 12 will read the state of its mapping sets from disk storage to service requests from clients, and once it starts servicing requests, the only action it will perform to disk storage is to record each NDTP update transaction as it is processed. In other embodiments, the state of the NDTP server mapping sets may be maintained in RAM. In yet other embodiments, the server mapping sets are maintained in RAM and persistent storage. The records written to the NDTP server log file refer to associations in the NDTP server location store using a pointer that defines a reference to an existing location. In one embodiment, the record looks like:

```
typedef struct ss_log_map  {
   ss_i_t op;        /*  opcode, LOG_MAP  */
   ss_i_t rec;       /*  rec pointer (previously
                     allocated chunk  */
   ss_i_t to;        /*  to pointer (string)  */
}  ss_log_map_t;
```

The ss_i_t type is the natural unsigned integer for the platform on which the NDTP server is being run. For example, it is a 32-bit integer on Intel (IA32) platforms, and a 64-bit integer on UltraSPARC platforms.

If the NDTP_PUT results in extending the linked list of mapping pointers with a new memory chunk, the record is somewhat different:

```
typedef struct ss_log_new_map  {
   ss_i_t op;        /*  opcode, LOG_NEW_MAP  */
   ss_i_t from;      /*  from pointer (in string or
                         rec)  */
   ss_i_t rec;       /*  rec pointer (new rec)  */
   ss_i_t to;        /*  to pointer (string)  */
}  ss_log_new_map_t;
```

The log record for an NDTP_DEL update is similar to the one for an NDTP_PUT;

```
typedef struct ss_log_unmap  {
   ss_i_t op;
   ss_i_t from;      /*  from pointer (key cstr)  */
   ss_i_t to;        /*  to pointer (data cstr)  */
}  ss_log_unmap_t;
```

Each time a new location is created in the NDTP server location store, a new string log file entry is written into the log file:

```
typedef struct ss_log_string {
  ss_i_t op;          /* opcode, LOG_STRING */
  ss_i_t len;
  ss_i_t chunks[];
  ss_log_str_t s;
} ss_log_string_t;
```

where the ss_log_str type is similar to the ndtp_str_t, except that the len field is an ss_i_t instead of a uint32_t:

```
 typedef struct ss_log_str_t {
    ss_i_t len;
```

```
    uint8_t data[];
} ndtp_str_t;
```

The transactional nature of NDTP protocol means that the response to an update request is not returned until request has completed, including being committed to nonvolatile storage. The NDTP server 12 combines the log file writes of multiple NDTP update transactions by adding each log file record to a log file write buffer 46 until either the buffer becomes full, or the network front end requests that one or all log file write buffers 46 be flushed to disk. The NDTP server 12 preferably maintains more than one log file buffer so that its performance at high transaction rates becomes insensitive to the high latency of individual file write operations. To prevent unbounded log file growth, the NDTP server will periodically write its entire current state to a new log file, close the old log file, and then begin the update logging process in the new log file.

Implementing the NDTP protocol specified below, if there are a large number of data repositories and other types of application servers in a network and any particular entity does not have data in all of them, the NDTP server permits queries to be directed only at pertinent data repositories and application servers. The NDTP server also preferably permits membership in the set of repositories and application servers itself to be highly dynamic and even spontaneous. The NDTP server supports on-the-fly addition and removal of data repositories and application servers from its deployed topology.

The NDTP server 12 may be implemented on any of a number of standard computer platforms including, for example, PC-based platforms having 64 Megabytes of RAM, and a PENTIUM-type processor operating at 450 MHz on a 100 Mbit Ethernet connection. Additionally, as illustrated in FIGS. 5 and 6, the NDTP server may be a network of NDTP servers configured in any number of ways. For example, FIG. 5 illustrates a flat NDTP server topology using clustering, or a distributed topology using replication, where each of the NDTP servers 12 in the cluster may contain a

different portion of a pool of associated identifier and location information. In another alternative embodiment, a hierarchical NDTP server topology, such as the NDTP server tree 52 shown in FIG. 6, may be utilized. In the NDTP server tree 52 topology, each node 54 may be an individual NDTP server 12, a cluster 50 of NDTP servers, an NDTP server tree or any combination of these arrangements.

Network Distributed Tracking Protocol (NDTP)

The Network Distributed Tracking Protocol (NDTP) efficiently tracks the location of data associated with an individual entity in a distributed database. NDTP is a transactional protocol, which means that each operation within NDTP consists of a request message from an NDTP client to an NDTP server, followed by an appropriate response message from the NDTP server to the NDTP client.

The NDTP server treats the identifier as an unstructured stream of octets, which is assumed to be unique to a particular entity. The precise structure of the NDTP identifier and the mechanism for ensuring its uniqueness are a function of the application in which the NDTP server is used. In a customer oriented application, the NDTP identifier might be a unique customer identifier, for example, a Social Security Number, in either printable or binary integer form, as is appropriate to the application. NDTP also defines a location to specify an association with a particular identifier. Multiple connections of locations with identifiers may be used concurrently.

As with identifiers, the NDTP server treats locations as unstructured streams of octets. The structure of a location is a function of the application in which the NDTP server is used. For example, a location might be an Internet machine name, and a TCP/IP port number for a relational database server, or an HTTP Universal Resource Locator (URL), or some concatenation of multiple components.

The NDTP server efficiently maintains and dispenses one to many relationships between identifiers and locations. In other words, an identifier may be associated with any number of locations. In embodiments where the

location information relates to locations of application servers containing data or routing information for finding data, the NDTP server is updated to indicate an association between the identifier and the application server's location when data for a particular identifier is added to an application server. When a query is performed for an identifier, the NDTP server supplies the set of application servers in which data may be found for that identifier.

General NDTP Mechanics

The protocol of the invention is designed to provide maximum transaction throughput from both the NDTP server and associated clients. The design goal is realized through two design principles:

1. NDTP messages should preferably be as short as possible to maximize the rate of NDTP transactions for a given network communication bandwidth.
2. NDTP messages should preferably be structured for efficient processing on existing machine architectures.

Design Optimizations.

In keeping with other network protocol standards including TCP/IP, multioctet integer quantities in NDTP are preferably encoded using the big endian integer interpretation convention, as set forth above. In one embodiment, NDTP fields are preferably represented in binary format and aligned on 32-bit boundaries.

To overcome network latency, NDTP is designed to support asynchronous operation, where many requests may be sent to an NDTP server before a response from any of them is received.

Each NDTP message is preceded by a fixed size, 12-octet header, using the preferred data structure:

```
typedef struct ndtp_hdr {
    uint8_t op;             /* opcode */
    uint8_t pad[3];
    uint32_t id;            /* transaction identifier */
    uint32_t size;          /* total request size
```

```
                                        following the header */
    } ndtp_hdr_t;
```

where:

op:

NDTP message numerical operation code.

NDTP_GET:	get request
NDTP_GET_RSP:	get response
NDTP_PUT:	put request
NDTP_PUT_RSP:	put response
NDTP_DEL:	delete request
NDTP_DEL_RSP:	delete response
NDTP_RDR_RSP:	request redirection
NDTP_UPD:	update
NDTP_UPD_RSP:	update response

id:

Client supplied operation request used to distinguish responses from multiple outstanding NDTP asynchronous requests. Each "_RSP" message echoes the id field of the associated request.

size:

Size, in octets of the remainder of the NDTP message. The size field should preferably be a multiple of 4 octets.

Variably sized portions of NDTP messages are preferably defined with a size field rather than some other delimiter mechanism to facilitate efficient reading of NDTP messages.

The variably sized portions of NDTP messages are composed of zero or more NDTP strings:

```
typedef struct ndtp_str {
   uint32_t len;
   uint8_t data[];
} ndtp_str_t;
```

Note that the C struct definitions in this document are schematic, and not necessarily fully compliant structures in the C programming language. Specifically, arrays denoted in this document with "[ ]" imply a dimension which is only known dynamically and this indefinite array size specifier is not allowed in C struct definitions. Note also the following:

len:

the number of significant octets of data following the len field in the data area.

data:

len octets of data, followed by up to 3 octets of padding, to ensure that the total length of the NDTP string structure is a multiple of 4 octets. The padding octets are not included in the len field.

Because variable sized portion NDTP messages are composed of zero or more NDTP strings and NDTP records preferably occupy an even multiple of 4 octets, this ensures that the "size" field of NDTP message headers will preferably be a multiple of 4 octets.

Protocol Structure

An example of multiple outstanding NDTP requests and the use of request identifiers is shown in FIG. 7. NDTP preferably has a simple, stateless request/response structure. Each request message 60 sent by a client 14 has a corresponding response message 62 returned by the server 12. To maximize server throughput and use of available network bandwidth, NDTP is asynchronous in nature. Many requests 60 from a single client 14 may be outstanding simultaneously, and responses 62 may or may not be returned from the server 12 in the order in which the requests 60 were issued. Each NDTP request 60 contains an NDTP request identifier 64 that is returned in the NDTP response 62 for the associated request 60. An NDTP client 14 uses a unique NDTP request identifier 64 for each NDTP request 60 that is outstanding at the same time to an NDTP server 12 if it wishes to correlate responses with requests.

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There are four basic operations preferably supported by the NDTP: add a location association, delete a location association, get location associations, and update a location association or associations. The response to adding a location association is a simple acknowledgement. If the location is already associated with the identifier, adding the association has no effect, but the request 10 is still acknowledged appropriately. In other words, the NDTP add operation is idempotent. The response to deleting a location association is a simple acknowledgement. If the location is not currently associated with the identifier, deleting the association has no effect, but the request 60 is still acknowledged appropriately. In other words, the NDTP delete operation is idempotent. The response to getting one or more locations is a list of one or more locations presently associated with an identifier. If no location associations currently exist, a list of length zero is returned. The response to updating a location association for an identifier is a simple acknowledgement. As the NDTP update operation is functionally a combination of the NDTP add and delete operations, the NDTP update operation is also idempotent.

Message Formats

NDTP messages 60, 62 preferably have a regular structure that consists of a message operation code, followed by a request identifier 64, followed by a length (in bytes) 66 followed by zero or more strings 68 as shown in FIG. 8. As those skilled in the art will appreciate, NDTP message formats are preferably independent of the network transport layer used to carry them. NDTP preferably defines mappings of these messages 60, 62 onto TCP and UDP transport layers (described in detail below), but other mappings could also be defined and it is likely that these NDTP message formats would not require change. For example, the notation ROUND4(x) means x, rounded up to the next multiple of 4.

Integer Format

Multibyte integers in NDTP messages are represented in network byte order; using the big-endian convention. In other words, the most significant

byte of a multibyte integer is sent first, followed by the remainder of the bytes, in decreasing significance order.

String Format

Strings in NDTP are represented as counted strings, with a 32-bit length field 66, followed by the string data 68, followed by up to 3 bytes of padding 70 to make the total length of the string representation equal to ROUND4(length). This layout is shown diagrammatically in FIG. 8.

NDTP_GET Format

The `NDTP_GET` message has a message operation code 72 of 2, and a single NDTP string 74 which is the identifier string for which to get associated locations. This layout is shown diagrammatically in FIG. 9.

NDTP_GET_RSP Format

The `NDTP_GET_RSP` message has a message operation code 76 of 3, and zero or more strings 78 that are the locations currently associated with the requested identifier. This layout is shown diagrammatically in FIG. 10.

NDTP_PUT Format

The `NDTP_PUT` message has a message operation code 80 of 4, and two NDTP strings 82, 84. The first string 82 is the identifier for which to add a location association, and the second string 84 is the location to add. This layout is shown diagrammatically in FIG. 11.

NDTP_PUT_RSP Format

The `NDTP_PUT_RSP` message has a message operation code 86 of 5, and zero NDTP strings. This layout is shown diagrammatically in FIG. 12.

NDTP_DEL Format

The `NDTP_DEL` message has a message operation code 88 of 6, and two NDTP strings 90, 92. The first string 90 is the identifier from which to delete a location association, and the second string 92 is the location to delete. This layout is shown diagrammatically in FIG. 13.

NDTP_DEL_RSP Format

The NDTP_DEL_RSP message has a message operation code 94 of 7, and zero NDTP strings. This layout is shown diagrammatically in FIG. 14.

NDTP_UPD Format

The NDTP_UPD message 93 has an operation code 95 of 9 and three NDTP strings. The first string 96 is the identifier from which to update the location association. The second string 97 is the location to delete. The third string 98 is the location to add. This layout is shown diagrammatically in FIG. 15.

NDTP_UPD_RSP Format

The NDTP_UPD_RSP message 99 has an operation code 100 of 10 and zero NDTP strings. This layout is shown diagrammatically in FIG. 16.

A general description of the usage and operation of these protocol messages is provided below.

NDTP_GET Transaction

The NDTP_GET message contains a single NDTP string which is the identifier for which associated data locations are requested.

```
typedef struct ndtp_get {
  ndtp_hdr_t hdr;
  ndtp_str_t key;
} ndtp_get_t;
```

The NDTP_GET_RSP message contains zero or more NDTP strings which are the locations associated with the NDTP identifier:

```
typedef struct ndtp_get_rsp {
  ndtp_hdr_t hdr;
  uint32_t rsps;
  ndtp_str_t values[];
} ndtp_get_rsp_t;
```

NDTP_PUT Transaction

The NDTP_PUT messages contains two NDTP strings which are (1) the NDTP identifier and (2) the NDTP location which is to be associated with the NDTP identifier.

```
typedef struct ndtp_put {
  ndtp_hdr_t hdr;
  ndtp_str_t key;
  ndtp_str_t data;
} ndtp_put_t;
```

The NDTP_PUT_RSP message has no NDTP strings, and simply indicates that the requested identifier/location association was added:

```
typedef struct ndtp_put_rsp {
  ndtp_hdr_t hdr;
} ndtp_put_rsp_t;
```

The requested identifier/location association is added in addition to any other associations already maintained by the NDTP server. If the requested identifier/location association is already in effect, the NDTP_PUT still succeeds and results in an NDTP_PUT_RSP message.

NDTP_DELETE Transaction

The NDTP_DEL message contains two NDTP strings which are (1) the NDTP identifier and (2) the NDTP location which is to be unassociated with the NDTP identifier:

```
typedef struct ndtp_del {
  ndtp_hdr_t hdr;
  ndtp_str_t key;
  ndtp_str_t data;
} ndtp_del_t;
```

The NDTP_DEL_RSP message has no NDTP strings, and simply indicates that the requested identifier/location association was deleted.

```
typedef struct ndtp_del_rsp {
  ndtp_hdr_t hdr;
} ndtp_del_rsp_t;
```

If the requested identifier/location association is not in effect, the NDTP_DEL still succeeds and results in an NDTP_DEL_RSP message.

NDTP_RDR_RSP Message

NDTP supports a distributed server implementation where the NDTP client selects the appropriate server from a table of servers based upon a distribution function computed from the identifier. This distribution function is preferably a standard hash function, for example the *hashpjw* function presented by Aho, Sethi and Ullman in their text *Compilers, Principles, Techniques and Tools*. Alternatively, when interest so dictates, NDTP allows applications to provide a customized function as an alternative to a standard hash function.

The NDTP client can determine the size of the NDTP server table, which may have changed, and then update its local copy of the NDTP server table and attempt the NDTP transaction again, this time directed at the correct NDTP server. An NDTP redirection mechanism (described in detail below) preferably permits a client to store permanently only a single NDTP server address, and learn the complete NDTP server table size and contents from the NDTP_RDR_RSP message from the first NDTP request the client performs for which the identifier does not reside on a well-known server.

NDTP_UDP Transaction

The NDTP_UPD message is functionally a combination of the NDTP_PUT and NDTP_DEL messages described above. The NDTP_UPD_RSP message is also functionally the same as the NDTP_UPD_RSP and NDTP_DEL_RSP messages, where there is simply an indication that an identifier/location association update was made.

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Network Front End

The NDTP server network front end preferably maximizes NDTP transaction throughput including concurrent NDTP requests from a single client as well NDTP requests from multiple concurrent clients.

Network Communication Mechanism

NDTP defines a transaction oriented protocol, which can be carried over any of a variety of lower level network transport protocols. TCP and UDP are currently supported, however any of a number of other protocols are also supportable.

TCP/IP: TCP/IP provides a ubiquitously implemented transport which works effectively on both local area and wide area networks. An NDTP client using TCP/IP preferably connects with the NDTP server at an established TCP port number, and then simply writes NDTP request messages through the TCP/IP connection to the server, which then writes NDTP response messages back to the client through the same TCP/IP connection in the reverse direction.

UDP/IP: For isolated NDTP transactions, depending upon the application and network infrastructure in use, it is beneficial to have the NDTP server employ UDP/IP, which is a widely available connectionless datagram protocol.

However, UDP/IP does not support reliable data transfer, or any congestion control mechanism. This means that NDTP clients using UDP/IP must implement reliability and congestion control maintaining transaction timeouts and performing exponential retry backoff timers, precisely analogous to the congestion control mechanism implemented by Ethernet, and other well known UDP protocols. Those skilled in the art will note that the NDTP protocol is stateless from the standpoint of the NDTP server, which means that there is no congestion control or reliability burden on the server; it is all implemented in a distributed manner by the NDTP UDP/IP clients.

Still Higher Performance (ST): Both TCP/IP and to a lesser degree UDP/IP suffer from high host CPU overhead. Like the relatively long latency of

TCP/IP, this host CPU consumption is considered just the "cost of doing business" where TCP/IP provides ubiquitous connectivity. If an NDTP server were running in a more constrained environment, where ubiquitous connectivity was not required, its absolute performance could be improved substantially by using a different protocol that is optimized to reduce CPU overhead and latency, such as the Scheduled Transfer (St) protocol.

NDTP Query Processing

In one embodiment, the NDTP server network front end preferably services NDTP query requests in a FIFO style by reading the `NDTP_GET` message, performing the lookup for the identifier in the NDTP server location store, and writing the `NDTP_GET_RSP` message. Each NDTP query is independent of any other NDTP transactions (other queries or updates), so multiple NDTP queries may be processed simultaneously on multiprocessor machines. The NDTP server permits this by not performing multiprocessor locking in the NDTP query processing path.

NDTP Update Processing

To maintain high performance on NDTP updates, the NDTP server network front end preferably supports multiple concurrent asynchronous update transactions. Each update is preferably performed automatically to avoid creating an inconsistent state in the location store. All NDTP updates are serialized through the location store mutator critical code sections.

When an NDTP update is processed, a call is made to the location store mutation function, which returns immediately indicating either that the mutation is complete, or that the completion will be signaled asynchronously through a callback mechanism. For updates which are not immediately completed, the network front end maintains a queue of NDTP updates for which it is awaiting completion. When completed, the network front end writes the NDTP update response messages for all completed updates back to the clients.

Multiple Connection Handling

The NDTP server network front end may be conditionally compiled to use either of two standard synchronous I/O multiplexing mechanisms, select or poll, or to use threads to prevent blocking the server waiting for events on individual connections. The threaded version of the NDTP server network front end preferably creates two threads for each NDTP connection, one for reading and one for writing.

TCP Mapping

NDTP is preferably carried on TCP in a standard manner. An NDTP/TCP client opens a connection with a server on a well-known port. The well-known TCP and UDP port numbers can be selected arbitrarily by the initial NDTP implementer. Port numbers that do not conflict with existing protocols should preferably be chosen. The client sends NDTP requests 60 to the server 12 on the TCP connection, and receives responses 62 back on the same connection. While it is permissible for a single client 14 to open multiple NDTP/TCP connections to the same server 12, this practice is discouraged to preserve relatively limited connection resources on the NDTP server 12. The asynchronous nature of NDTP should make it unnecessary for a client 14 to open multiple NDTP/TCP connections to a single server 12.

If protocol errors are detected on an NDTP/TCP connection, the NDTP/TCP connection should be closed immediately. If further NDTP/TCP communication is required after an error has occurred, a new NDTP/TCP connection should be opened. Some examples of detectable protocol errors include: Illegal NDTP message operation code; Nonzero String Area Length in `NDTP_PUT_RSP` or `NDTP_GET_RSP`; Inconsistent String Area Length and String Length(s) in `NDTP_GET`, `NDTP_GET_RSP`, `NDTP_PUT`, `NDTP_DEL` or `NDTP_UPD`; and Unexpected NDTP request identifier by client.

Due to the reliable nature of TCP, NDTP/TCP servers 16 and clients 12 need not maintain any additional form of operation timeout. The only transport errors that can occur will result in gross connection level errors. A client 12 should assume that any NDTP requests 10 for which it has not

received responses 14 have not been completed. Incomplete operations may be retried. However, whether unacknowledged NDTP requests 10 have actually been completed is implementation dependent.

UDP Mapping

Unreliable Datagram Protocol (UDP) provides connectionless, unacknowledged datagram transmission. The minimal protocol overhead associated with UDP can deliver extremely high performance if used properly.

NDTP/UDP clients 14 send UDP datagrams with NDTP request messages 60 to a well-known UDP port (see above). NDTP/UDP servers 12 return NDTP response messages 62 to the client 14 selected local UDP port indicated in the NDTP/UDP datagram containing the requests 60. NDTP/UDP does not require any form of connection or other association to be established in advance. An NDTP interchange begins simply with the client request message 60.

For efficiency, the mapping of NDTP onto UDP permits multiple NDTP messages to be sent in a single UDP datagram. UDP datagrams encode the length of their payload, so when a UDP datagram is received, the exact payload length is available. The recipient of an NDTP/UDP datagram will read NDTP messages from the beginning of the UDP datagram payload until the payload is exhausted. Thus, a sender of an NDTP/UDP datagram is free to pack as many NDTP messages as will fit in a UDP datagram.

NDTP/UDP client 14 implementations that use the NDTP request identifier 64 for antialiasing should ignore (i.e., skip) NDTP messages within a NDTP/UDP datagram with invalid NDTP request identifier 64 values. Client 14 or server 12 NDTP/UDP implementations detecting any other protocol error should also preferably discard the remainder of the current NDTP/UDP datagram without processing any further NDTP requests from that datagram. Some examples of such detectable errors include: Illegal NDTP message operation code, Nonzero String Area Length in `NDTP_PUT_RSP` or `NDTP_GET_RSP`, Inconsistent String Area Length and String Length(s) in

NDTP_GET, NDTP_GET_RSP, NDTP_PUT or NDTP_DEL, and Inconsistent NDTP message length and UDP datagram length.

Because NDTP/UDP messages are limited to the length of a single UDP datagram payload, NDTP/UDP cannot be used to transfer long NDTP messages. For example, it would be difficult to send an NDTP_GET message with NDTP/UDP for a 64K byte identifier.

Those skilled in the art will appreciate that network congestion is a highly dynamic property that is a function of network traffic from all sources through a network link and will vary over time over any given network path. An NDTP/UDP client 14 implementation can recover from network congestion by switching to NDTP/TCP after several failed retries using NDTP/UDP. Failure due to network congestion may be indistinguishable from failure due to UDP packet size limitations, but since the recovery strategy is the same in both cases, there is no need to distinguish these cases.

NDTP Redirection

NDTP handles NDTP server scaling with the NDTP's redirection mechanism, which is managed through an NDTP server 12, or set of such servers. This redirection mechanism allows arbitrary distribution of the data set across completely independent machines. The set of machines managing the NDTP server data set may be referred to as an NDTP server cluster 50, as shown in FIG. 5. The NDTP redirection mechanism exploits this by permitting the distribution of identifiers to location mappings across members of an NDTP server cluster. An advantage of distributing an NDTP server data set across independent machines is that both capacity and transaction rate scale can be increased. In one embodiment, each additional machine in an NDTP server cluster 50 linearly increases capacity, by adding main and secondary storage, and transaction rate, by adding processing power and network bandwidth (assuming a properly scalable network infrastructure is employed).

Each NDTP server 12 maintains a copy of the NDTP server map. An NDTP server will check each request it receives and verify that it is intended

for itself. If it is not, it will respond to the client 14 with an NDTP Redirection Response message (NDTP_RDR_RSP), instead of responding with the normal operation completion message.

A client may misdirect a NDTP request because the NDTP server cluster may have been reconfigured since the client last obtained a copy of the NDTP server map. Thus, the NDTP_RDR_RSP message includes a complete copy of the current NDTP server map with which the client may determine the correct NDTP server for the given NDTP request.

In essence, the NDTP server maintains authoritative copies of the NDTP server map, whereas NDTP clients may have out-of-date copies of the NDTP server map. This property permits efficient reconfiguration of the NDTP server cluster. With the redirect message, an NDTP client can determine the size of the NDTP server table, which may have changed, and then update its local copy of the NDTP server table, and attempt the NDTP transaction again, this time directed at the correct NDTP server.

The NDTP redirection mechanism permits a client permanently to store only a single NDTP server address, and learn the complete NDTP server table size and contents from the NDTP_RDR_RSP from the first NDTP request the client performs which the identifier does not reside on the well known server. The NDTP backbone topology can change dynamically in a similar way to application server topology. Preferably, any time the cluster is reconfigured, only the NDTP servers are updated, rather than the (potentially) unbounded number of clients in the network.

The NDTP client can start out with an NDTP server map containing a single, well known, NDTP server entry. If the well-known NDTP server is not the NDTP server which is managing the portion of the NDTP server data set containing the identifier in the client request, an NDTP_RDR_RSP will be returned, and the client can update its local copy of the NDTP server map. Once a client has received a new NDTP server map, it will use it for the lifetime of the client application, or until it receives a new NDTP server map. The client may also put the most current NDTP server map into a persistent

store, so that new invocations of the client application, or other clients of the same network, can begin operation without even a single NDTP_RDR_RSP.

If the client's saved NDTP server map becomes out-of-date, the server will return an updated NDTP server map the first time a client sends a NDTP request to an incorrect NDTP server. If a client NDTP request times out for some reason, this might mean that a machine in the current NDTP server map has been removed from the NDTP server cluster. In this case, to get the current NDTP server map the client may either (1) return to its base-line NDTP server map, containing the single well known NDTP server, or (2) direct the request to any other NDTP server in its current NDTP server map. Whether received directly, or by a map update via NDTP_RDR_RSP, the client will obtain the desired location specifiers with at most two NDTP transactions.

The ability to scale NDTP service beyond a single server requires a mechanism to distribute portions of the identifier/location association set across multiple NDTP servers. The presently preferred embodiment for accomplishing this is to define a well-known function of the identifier and use this function to select from a set of NDTP servers. NDTP clients will preferably apply this well-known function to the identifier for each NDTP request, and send the NDTP request to the indicated NDTP server. This technique will effectively partition the set of all identifier/location associations across the NDTP servers. Each NDTP server will only maintain the portion of the total association set which corresponds to its particular identifiers. This NDTP server redirection mechanism permits construction of NDTP server clusters. It is reasonable to expect that the identifier index function will be defined when an NDTP server instantiation is implemented, but the actual list of NDTP servers will change from application to application and within a single application throughout the lifetime of the system.

In one embodiment, each of the clients and NDTP servers are programmed with a well-known function and the redirection message, as shown in FIG. 17(a) carries of table of NDTP server URLs. The NDTP_RDR_RSP message 101 has a message operation code of 8, and a description of the system that the client should send its message to. In one

embodiment, the system is described by a list of strings, where each string is an NDTP URL (e.g. ndtp://server.name.com:24500).

If there is more than one list in the outer list, then the client is to select the appropriate inner list to send a message to by applying the following well-known function to the identifier and using the function result as an index into the NDTP server table. In one preferred embodiment, the well-known function applied is the *hashpjw* function presented by Aho, Sethi and Ullman in their text *Compilers, Principles, Techniques and Tools*:

```
uint32_t
hash (uint8_t *s, uint32_t slen, uint32_t size)
{
  uint32_t g;
  uint32_t i;
  unit32_t h = 0;
  uint8_t c;

  for (i = 0; i < slen; i++) {
    c = s[i];
    h = (h << 4) + c;
    g = (h & 0xf0000000);
    if (g) {
      h ^= g >> 24;
      h ^= g;
    }
  }
  return h % size;
}
```

In the above code sequence, the parameter *size* is the size of the hash table (the number of elements in the NDTP server URL table in the `NDTP_RDR_RSP` message), and is preferably a prime number. Those skilled in the art will appreciate that the same NDTP server may appear multiple times in the NDTP server URL table. For example, if the server URL table has 2039 elements, by putting one NDTP server URL in the first 1019 table elements, and a second NDTP server URL in the second 1020 table elements, the responsibility for the index will be split roughly in half.

A second variant of the `NDTP_RDR_RSP` function mechanism specifies that a general function description will be sent to the NDTP client in the `NDTP_RDR_RSP` message. The NDTP client will apply this function to the identifier and the output of the function will be the NDTP server URL to which

to send NDTP requests for the particular identifier. The advantage of this technique over the well-known function approach is that it allows application-specific partitions of the identifier space. This can permit useful administrative control. For example, if General Electric manages all identifiers beginning with the prefix "GE", a general function can be used to make this selection appropriately. The disadvantage of using a general function is it may be less efficient to compute than a well-known function.

There are a variety of possible mechanisms for sending function descriptions. NDTP is expected to be applied in environments that make extensive use of the Java programming platform. Therefore the `NDTP_RDR_RSP` mechanism preferably uses a feature of the Java programming language called "serialized representation" to communicate generalized function in the `NDTP_RDR_RSP` message. A serialized form of a Java object is a stream of bytes that represents the precise state of the object, including its executable methods. For example, the Java Remote Method Invocation (RMI) mechanism uses serialized objects to send executable code to a remote platform for execution. The `NDTP_RDR_RSP` message contains the serialized form of an object implementing this Java interface:

```
interface NDTPRedirect Function {
     String selectServer(byte[] identifier);
}
```

The format of the `NDTP_RDR_RSP` message 103 with a Java Serialized form of the NDTP redirection function is specifically identified in FIG. 17(b).

After the NDTP client has received a new server list, the client will direct further NDTP requests based on this updated NDTP server list until the NDTP server configuration changes again. An NDTP client may even save the current NDTP server list in non-volatile storage so that it can immediately select the correct NDTP server even after application or system restarts. Another possible alternative is for a client to remember only a single, well-known NDTP server, and update its NDTP server list every time the client restarts. These alternatives may be implemented as desired to accommodate design goals for a particular system.

Server Constellations

The NDTP server organization also allows NDTP servers to be combined in various ways to build server constellations that offer arbitrary server performance scalability and administrative control of the location of positions of the identifier/data location relation mappings. FIG. 18 illustrates a basic transaction flow according to a preferred embodiment where a client 112 communicates NDTP protocol messages with an NDTP server constellation 110 (which may be one or more NDTP servers) and separately transacts with an application server 114. The basic communication flow in FIG. 18 may represent a client 112 adding, deleting, or updating an identifier/location association(s), and in turn adding, deleting, or updating corresponding data. The communication flow may represent a client 112 requesting an identifier/location association(s) from the NDTP server, which may be a server constellation construed in either of two forms (see FIGS. 19 and 20), and then querying directly based on the identifier/location association(s) received from the NDTP server. NDTP server constellations preferably have two basic organizational paradigms: Client-Centric and Server-Centric.

Client-Centric Approach

Referring to FIG. 19, a single client (not shown) asks a server 120a in the server constellation 110 for operations that the client desires executed (represented by arrow 1 in FIG. 19). As discussed above, if the client does not receive the data requested, it will receive a redirection response message (NDTP_RDR_RSP) from the contacted server 120a (arrow 2). The client then uses the information it receives to ask another server 120b for the operations the client wants to initiate (arrow 3). A successful response from the second server 120b is then sent to the client (arrow 4).

Server-Centric Approach

Figure 20 shows the server constellation 110 characterizing "server-centric" functionality. In this figure, an NDTP server 130a (server0) receives a

request 132a from a client (not shown). The server 130a (server0) passes the request to a second server 130b (server1), which is an appropriate server for the process, and the second server 130b returns a response 134a to the first server 130a (server0). If the second server 130a (server1) was not appropriate, it could pass the request to another server (not shown), and so on. Each NDTP server 130a,b will combine the results of NDTP requests 132a,b it has performed of other NDTP servers 130a,b with whatever responses 134a,b it generates locally for the original NDTP request 132a, and the combined response 134b will be with the appropriate response for the original NDTP request 132a.

An important aspect of this topology is that it pushes processing emphasis toward servers 130a,b rather than toward clients. Since location/identifier processing can be centralized, administration of the indices can be administered more conveniently in certain cases.

Hybrid Constellations

The simplest NDTP server constellation is a single server, and the protocol is designed to permit massive scale with a single or simple server constellation. Highly configurable installations are possible using "client-centric" or "server-centric" techniques. NDTP server constellations 110 composed of more than one NDTP server may use any combination of the two approaches for performance optimization and administrative properties. Client-centric and server centric approaches can be used to build NDTP server clusters, NDTP server trees, NDTP server trees of NDTP server clusters, or any other useful configuration.

Topology: Hierarchical and Clustered

Hierarchical and clustered topologies may be created using a server-centric or client-centric approach. One illustration of a cluster topology 50 is shown in FIG. 5. A mixed topology containing hierarchical and clustered elements is shown in FIGS. 6 and 21. The primarily hierarchical topology of the embodiment of FIG. 21 can allow for a single administrative entity 102 to

manage the NDTP sever cluster. An NDTP server hierarchy 100, such as illustrated in FIG. 21, permits identifier/location association data to be owned and physically controlled by many different entities.

Splitting & Coalescing Data Sets

The NDTP redirection mechanism discussed above offers flexibility in NDTP server cluster configuration with preferably little impact on clients. However, the NDTP server cluster itself must execute several steps to reconfigure the NDTP server data load. Methods for adding or removing an NDTP server from a running NDTP server cluster include splitting some portion of the data set from a running NDTP server cluster into one or more NDTP servers to be added to the cluster; coalescing some portion of the data set to a remaining NDTP server cluster; and propagating updated NDTP server maps efficiently to all NDTP servers in an NDTP server cluster. Preferably, these methods minimize interruption of service. Large batch-style updates are preferably avoided using the splitting and coalescing algorithm discussed below to handle large scale reconfiguration.

When reconfiguring NDTP server clusters, splitting and coalescing problems for an NDTP server are handled by checkpointing the current data set state and loading it into another instance of an NDTP server. In the case where a data set will be split, a set of identifiers is transferred to another NDTP server. In the case where a data set is coalesced, several NDTP server states are loaded on a single NDTP server cumulatively.

Consider an example of splitting, as shown in FIG. 22, in which a given NDTP server cluster 140 having at least two NDTP servers 12 needs to reconfigure the distribution of identifier/location data among NDTP servers. If the identifier space needs to be split, whether for local policy reasons initiated by an administrator, or based on automatically monitored performance criteria such as transaction rate, storage capacity and etc., the splitting process begins by identifying the set of the data on Server 1, that will be transferred to Server 2. Referring to FIG. 22, Server 1 initially contains a total set of data consisting of Set A 142 and Set B 144. Assuming Server 1 has identified Set

B as the data that needs to be split out to Server2, Server 1 first checkpoints the data in Set B. Server 1 continues to operate normally with respect to Set A and will update (perform any of the NDTP add, delete, or update functions) without interruption. Server 1 also creates new set of data, Set C 146, which accumulates all operations directed to Set B 144 since the checkpoint of Set B 146 took place. Server 1 then copies Set B 144 to Set B' 148 on Server 2. After the copying of Set B 144 to Set B' 148 is complete, Server 1 freezes operations on Set C 146 and copies it to Set C' 150 on Server 2. Operation on Set B' 148 and Set C' 150 is then resumed on Server 2 and Sets B and C 144, 146 are deleted from Server 1.

Preferably, the only interruption to the NDTP server activity in Server 1 or Server 2 is limited to the Set C and the time it takes to complete the copy step of Set C 146 to Set C' 150 while Server 1 freezes operations to Set C. Operations on the remaining data are preferably unaffected throughout the splitting process. NDTP lookup operations do not affect the checkpoints that are saved or loaded. Furthermore, if more than one NDTP server is already operating in the cluster, only the affected subset of the NDTP servers in an NDTP server cluster are interrupted during this process; the remainder of the NDTP server continues to operate undisturbed. An advantage that splitting and coalescing provides is the redistribution of identifier space without requiring reindexing, which is more expensive computationally.

When reconfiguring an NDTP server cluster, the new NDTP server map must be propagated to all NDTP servers in the cluster so that accurate NDTP redirection messages can be sent. An asynchronous mechanism is preferably used to supply the new NDTP server map. Preferably, the NDTP server transferring the data set will broadcast the new NDTP server map to all other NDTP servers in the cluster over its network connection, such as a TCP connection. In one embodiment, each server may maintain an internal table holding all server locations in memory. Preferably, server map size is selected for a likely maximum number of machines in the NDTP server and is a prime number suitable for use with a well-known function. In one embodiment, a server may appear more than one time on the server map. For example, if

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the initial NDTP server map size is established at 1023, and only a single NDTP server will be used to form the NDTP server cluster so that the single NDTP server machine appears 1023 times in the NDTP server map.

After splitting and coalescing one method of transferring the updated server map to other servers is to use a data structure containing a list or URL's with ranges of identifiers associated with each URL. In another embodiment, the new server map may be carried in a message having the same properties and format as the `NDTP_RDR_RSP` message (see FIG. 17(a)) but having a message code identifying the contents as a server-to-server transmission.

If an NDTP server is added by splitting an existing portion of the data set without changing the NDTP server map size, only the new and old NDTP servers need immediately know about the modification of the NDTP server map. The NDTP servers uninvolved in the split will forward all requests for the data set now existing on either the new or the old NDTP server. The old NDTP server will then return an `NDTP_RSP_RDR` with the new NDTP server map, when responding to requests for the data set that now exists on the new NDTP server. A new NDTP server map will eventually be propagated to all NDTP servers using the NDTP server map propagation mechanism. The NDTP redirection mechanism allows this propagation to be asynchronous to the actual NDTP server cluster reconfiguration. In one preferred embodiment, the server map is transmitted from a server involved in a splitting or coalescing operation to all other servers in a cluster.

Removing NDTP Servers from Server Clusters

The most efficient way to remove NDTP server machines from an NDTP server cluster includes ensuring either sending clients redirects or aliasing the NDTP server. Using redirects, the removed NDTP server machine remains a citizen of the NDTP server cluster, does not manage any particular data set, and simply responds with `NDTP_RDR_RSP` requests with the new NDTP server map. In effect, this simply returns a forwarding address. Using aliasing, the network address of the removed NDTP server is

assigned as an alias to a remaining, active member of the NDTP server cluster.

The methods for splitting data on NDTP servers and removing NDTP servers entirely permit flexibility for coalescing data in NDTP servers. If, for example, an NDTP server needs to transfer some of its data due to performance limitations (physical storage capacity limits, transaction rate limitations, etc.), the target NDTP server for receiving the transferred data set may already contain an active data set. Preferably, copying a subset of data from a first server to a second server already actively processing its own data proceeds according to the splitting process as described above. Utilizing the NDTP server operations and system configuration flexibility described above, numerous applications of the preferred data location system are contemplated.

Content Management

Referring to FIG. 23, a geographically dispersed network of clients 152, NDTP servers 154 and application servers 156 is shown. Each of the clients, NDTP servers and application servers may each represent one or multiple systems. The application servers 156 contain substantive content in one or more forms (text, graphics, etc.) to which the clients 152 require access. The NDTP servers may maintain tables of identifiers, where each identifier represents one or more instances of a specific file, and the associated location or locations of that file. The identifier may be a Universal Resource Identifier (URI) and the location may be a URL for the specific application server 156 at which the substantive content may be accessed, or any other addressing convention. A client at a Paris location 158 may request the location of information relating to an identifier from the local NDTP cluster 154 and receive a URL for an application server 156 residing in a Chicago location 160. The information for the URI maintained at the Chicago URL is preferably cached at the client 152 in the Paris location on a per instance basis such that the file is available for the client in Paris for the duration of that client's needs. In one embodiment, the NDTP server cluster in the Paris location preferably

maintains a record of the number of requests for that particular URI and, if the URI is the subject of a predetermined number of queries, the frequently requested content at the URL in Chicago is automatically transferred to an application server in the Paris location 158 or copied to an application server in the Paris location. Using the NDTP delete, add, or update operations, the NDTP server clusters in Paris and Chicago preferably update the location information for the URI and asynchronously propagate the new server maps to the remaining NDTP servers.

Object Management

In another embodiment, the same geographical arrangement of data and clients applies to object management, where the object is a programming element or file. Examples of some objects include C++ objects or portions of programming toolkits that various geographically dispersed clients may wish to access in executing a program. By assigning each object a unique identifier and maintaining the location information in NDTP servers, efficient transfer of the object may be achieved and accurate accounting of where the object has been, or currently resides, is obtainable. In particular, embodiments of the present invention are well suited to handle high transaction volume for tracking the objects.

Tracking and Sensing

The NDTP protocol and network configurations discussed above may be applied to any one of a number of physical object (animal, telecommunications devices, troop location, package, family member, part, product and etc.) tracking applications. Referring to FIG. 24, one embodiment of a vehicle tracking application is shown. A shipping company 170, which may be any number of moving company, airborne delivery or ground delivery services, may track company vehicles 172 in a delivery territory 174 in order to maintain delivery fleet status or optimize fleet deployment to, for example, select the best vehicle to pick-up materials at designated pick-up location 175. A dispatcher 176 may access an NDTP server 178 having a location store

180 of information containing identifiers 182 corresponding to individual vehicles 172 and a list of locations 184 associated with the identifier for each vehicle. In one embodiment, the vehicles may be automobiles and the identifier assigned to the vehicles may be the unique vehicle identification number (VIN) assigned by automobile manufacturers to the automobiles they produce.

The location store 180 may be maintained such that only the most recent geographic location (e.g. latitude and longitude) is associated with a vehicle, or the table may be maintained to continuously receive current location information for each vehicle at predetermined intervals so that vehicle travel history, speed, heading and other types of information may be obtained with the location information for a vehicle. In one embodiment, the vehicles 172 may each be equipped with a Global Positioning System (GPS) receiver and a transceiver that is programmed to automatically broadcast position information, or any other location identifying technology. The broadcasts may be picked up through a network, such as a cellular network 186 and transmitted to the NDTP server 178. The broadcasts contain the vehicle identifier and geographic information, such as latitude/longitude or any other geographic measure, that is then appended to the appropriate portion of the indexed table 180. An advantage of the NDTP server application in the vehicle tracking example illustrated in FIG. 24 is that the NDTP server performance may be used to track large numbers of vehicles at high update rates.

Mobility Management, With and Without Presence

In another embodiment, the NDTP protocol and network configurations discussed above may be applied to mobility management applications. Additionally, the mobility management applications may include the ability to indicate whether a device is available for interaction ("presence"), where device availability is tracked in addition to the physical location of a device. For example, as illustrated in FIG. 25, an NDTP server 190 may maintain a set of identifier/location associations on the physical location and availability

of portable devices belonging to a particular user. The portable devices 192 may be, in one embodiment, any type of cellular enabled device, or other wireless mobile device, such as personal digital assistants (PDA), notebook computers with cellular modems, mobility-enabled wrist watches, mobile telephones, and etc. The portable devices 192 preferably include location service enabled software 193, such as standard plug-in software modified to translate NDTP and the service protocol of the third party tracking mechanism. In the embodiment of FIG. 25, a third party tracking mechanism, such as a mobile network tower 194, communicates with an NDTP server 190 to update the whereabouts and accessibility of a person through one or more portable devices. In FIG. 25, the mobile network tower 194 communicates with the NDTP server via the portable device. In other embodiments, either the third party tracking mechanism or the portable device 192 may be modified, through a standard API, to directly communicate with the NDTP server. In yet another embodiment, a proxy server (not shown) may provide protocol translation functionality to allow the third party tracking mechanism and/or the portable device to communicate directly with the NDTP server 190 without the need to modify the third party tracking system or the portable device.

As illustrated in FIG. 26, the location store 196 maintained on the NDTP server 190 may be configured to have identifiers 198 such as a person's name, associated with locations 200 which may be a device address 202 paired with a presence (availability) 204 indicator. Whenever a portable device 192 is activated, the mobile network tower 194 will inform the NDTP server 190 of the existence of the portable device and its availability. In the given example, a "1" represents an active device and a "0" represents an inactive device. Each time a portable device associated with a person's identifier is activated (and/or deactivated depending upon implementation), the NDTP server location store 196 will be updated by the mobile network tower 194 with the device address. The device address may be in the form of electronic address or other type of location. Using this system, a party attempting to contact the person or entity represented by the identifier "Alice"

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in the location store 196 may access the NDTP server to receive the address for the most recently activated device, the address for all active devices, and/or addresses for all devices associated with "Alice".

Generic Naming and Addressing

The NDTP system and protocol described above may provide a specialized database designed to solve general naming and addressing needs. NDTP is designed for use in the larger context of a distributed database system including, but not limited to, addressing and namespace services. As such, it supports an architecture in which information about where data associated with particular application entities can be managed and obtained independently of the data itself. One way to understand this is as a highly dynamic domain name service (DNS) for data. DNS maintains a mapping between names and machines. NDTP and its associated servers maintain a mapping between identifiers and locations. The identifier/location mapping maintained by NDTP servers is much more dynamic (suitable for frequent updates), than the domain name/IP address mapping maintained by DNS. NDTP may be viewed in this respect as fully generalized name service suitable for any kind of service and not restricted to a specialized service.

Mobile Telephone Tracking and Dynamic Telephone Numbers

In other applications of the NDTP protocol and system discussed above, mobile telephone tracking and dynamic telephone number applications may be implemented. With respect to mobile telephone tracking, an NDTP server location store may use the electronic serial number (ESN) of, for example, cellular phones as identifiers, and the cellular tower translation encoding or latitude longitude of the phone as the location. Advantages of tracking mobile phone location through an NDTP server may include speed of information access and the ability to construct an audit trail showing where a cell phone has traveled. In another embodiment, a cellular telephone customer may be mapped to a new service provider by mapping the cell phone ESN to an appropriate location of an instruction set that will convert the

cellular telephone customer's telephone number to a new service provider. In this manner, the cellular telephone customer may switch providers without having to obtain a new telephone number.

With respect to dynamic telephone number functionality, a telephone system organized by NDTP would permit telephone service customers to create and delete unique communication roles freely, for any purpose. For example, a customer may create a new communication role identifier to give to a service provider, such as an auto mechanic, to permit contact during the service. After service completion, the customer may delete the communication role identifier, thereby preventing unwanted subsequent contact, such as telemarketing solicitation. In another embodiment, this communication role identifier property can be employed to dynamically control customer-initiated contact. Telephone-based service providers, such as customer relationship management, computer support, medical services, etc., can dynamically control customer initiated contact. For example, a customer with an active case could dial a unique communication role identifier which would be routed directly to the appropriate support specialist until the incident is resolved. The person reached by the customer's unique communication role identifier can be changed by the service provider as the service cycle progresses. After incident resolution, the service provider may delete the communication role identifier, thereby preventing the customer from gaining additional, inappropriate access to support specialists. The dynamic telephone number application of NDTP may be used on various systems, including voice over Internet protocol (VoIP) systems, to allow users to readily map and unmap single use, or limited use, addresses to a desired communication path.

As described above, a method and system for managing data location information in a network has been disclosed having an easily scaleable architecture that permits rapid operation and flexibility for expansion and reconfiguration of service. The system is based on a Network Distributed Tracking Protocol that runs on top of any stream (e.g. TCP) or datagram (e.g. UDP) network transport layer. With NDTP, the system supports a network

service that efficiently manages mappings from each individual identifier (definable using any format, size, encoding, etc.), to one or more locations (which are also definable using any format, size, encoding, etc.). In one embodiment, the identifiers and locations may be formatted as strings. NDTP permits clients to manipulate identifier/location associations, and request the current set of locations for an identifier from protocol servers. The servers in the network may be reconfigured to change the data set currently stored in one or more servers in response to performance goals or limitations.

Regardless of the expected system context of NDTP in a distributed database, those skilled in the art will appreciate that NDTP can be used for any application in which one-to-one or one-to-many associations among identifier and location associations are to be maintained and accessed on a network.

It is to be understood that a wide range of changes and modifications to the embodiments described above will be apparent to those skilled in the art, and are contemplated. It is therefore intended that the foregoing detailed description be regarded as illustrative, rather than limiting, and that it be understood that it is the following claims, including all equivalents, that are intended to define the spirit and scope of the invention.

WE CLAIM:

1. A system for managing location information and providing location information to location queries, the system comprising:

a transfer protocol comprising an identifier and at least one location associated with the identifier, wherein the identifier uniquely specifies an entity and wherein each location specifies a location of data in a network pertaining to the entity;

a location server containing location information corresponding to at least one entity, the location information formatted according to the transfer protocol, and wherein the location of data for the location comprises an application server in communication with the network; and

programming logic stored on the location server responsive to a location query identifying a desired entity to return a location message, the location message comprising all locations associated with the desired entity, wherein the location server returns the location message if the location server contains location information for the desired entity.

2. The system of claim 1, wherein the entity comprises a physical object and wherein the at least one location comprises a geographic location.

3. The system of claim 2, wherein the geographic location comprises at least one of a latitude, a longitude and an altitude.

4. The system of claim 1, wherein the at least one location comprises a plurality of geographic locations, each of the geographic locations representing a position of an object at a different time.

5. The system of claim 1, wherein the location server comprises a plurality of location servers, each of the plurality of location servers comprising at least a portion of a total amount of location information residing on the plurality of location servers, and wherein the location information is formatted according to the transfer protocol; and

wherein the programming logic is stored on each of the plurality of location servers.

6. The system of claim 5, wherein the programming logic stored at each of the location servers further comprises logic responsive to the location query to return one of a location message and a redirect message, wherein the location server returns the location message if the queried location server contains location information for the desired entity, and wherein the location server returns a redirect message if the queried location server lacks location information for the desired entity, the redirect message comprising a list of at least one other location server known to have location information relevant to the location query.

7. The system of claim 6, wherein the list of at least one other location server comprises a list of all location servers in the plurality of location servers and a corresponding list of each of the entities having location information on the respective location servers.

8. The system of claim 5, wherein each of the location servers stores at least a portion of the total amount of location information on a persistent storage device.

9. The system of claim 8, wherein the persistent storage device comprises one of a hard disk drive, tape drive, optical storage device and removable storage media.

10. The system of claim 1, wherein the location information in the location server is maintained in an indexed location store.

11. The system of claim 10, wherein the location store comprises a string store indexed by a hash table.

12. The system of claim 10, wherein the location query identifying the desired entity comprises a unique identifier for the desired entity, and wherein the programming logic stored on the location server further comprises

programming logic for applying an index function to the unique identifier to retrieve at least a portion of the locations associated with the unique identifier in the location store.

13. The method of claim 12, wherein the programming logic further comprises logic for applying the index function to retrieve all of the locations associated with the unique identifier in the location store.

14. The system of claim 12, wherein the location store comprises a string store and the index function comprises a hash function.

15. The system of claim 6, wherein the plurality of location servers are arranged in a network topology having a plurality of nodes organized in a tree-structure, wherein each node comprises at least one location server and wherein each node is connected to at least one other node in the tree structure.

16. The system of claim 12, wherein the data location query is received at a data location server in a first node and wherein the redirect message comprises a list of at least one other location server in a node other than the first node that is known to have data location information relevant to the location query.

17. A system for managing location information and providing data location information to location queries, the system comprising:

a transfer protocol comprising an identifier and at least one location association, wherein the identifier uniquely specifies an entity and wherein each location specifies a location pertaining to the entity;

a plurality of location servers containing location information corresponding to a plurality of entities, the location information formatted according to the transfer protocol, and comprising at least one application server address, wherein the plurality of location servers are arranged in a server cluster topology such that each location server contains a unique portion of the location information; and

programming logic stored on each of the location servers responsive to a location query for a desired identifier to return one of a location message, wherein a queried location server returns a location message if the queried location server contains location information for the desired identifier, and a redirect message if the queried location server does not contain location information relevant to the desired identifier, wherein the redirect message comprises a list of all of the plurality of location servers containing location information related to the desired identifier.

18. The system of claim 17, wherein the location information comprises geographic location information.

19. The system of claim 17, wherein the location information comprises network address information.

20. The system of claim 19, wherein the network address information comprises a network address of a data repository containing data pertaining to the desired identifier.

21. A method of handling location queries in a network, the network comprising a plurality of location servers containing location information correlating each of a plurality of identifiers with at least one location, the method comprising:

receiving a location query from a client at one of the plurality of location servers, the location query requesting an identifier's location;

sending a location response message to the client if the queried location server contains location information relevant to an entity identified in the query, the location response message comprising location information identifying at least one application server containing information relevant to the entity identified in the query; and

sending a redirect message to the client if the queried location server does not contain data location information relevant to the entity identified in

the query, the redirect message comprising a list of location servers containing location information relevant to the entity identified in the query.

22. The method of claim 21, further comprising applying information in the location query from the client to an indexing function to determine if the queried location server contains location information relevant to the entity identified in the query.

23. The method of claim 22, wherein each of the plurality of location servers comprises an indexed table of identifiers and associated locations, and wherein applying information in the location query comprises applying an identifier in the location query to a hash function.

24. A method of scaling at least one of location server capacity and transaction rate capability in a system for storing and retrieving location information, the method comprising:

providing a transfer protocol configured to transport identifier and location information, the location information specifying the location of information relevant to the identifier;

providing a first location server storing location information formatted according to the transfer protocol;

receiving an identifier and a location relevant to the identifier at the first location server;

storing the received location in a location store at the first data location server, the location store comprising a plurality of identifiers, each identifier associated with at least one location, wherein the received location is associated with the received identifier in the location store; and

transferring a portion of the identifiers and associated locations to a second data location server when a performance criterion of the first location server reaches a predetermined performance limit.

25. The method of claim 24, wherein receiving an identifier and a location comprises receiving the identifier and the location at the first location

server from an application server, wherein the location comprises an address for the application server.

26. The method of claim 24, wherein receiving an identifier and a location comprises receiving the identifier and the location at the first location server from a physical object, wherein the identifier identifies the physical object and wherein the location comprises a geographic location for the physical object.

27. The method of claim 26, wherein the physical object comprises a vehicle.

28. The method of claim 26, wherein the physical object comprises a portable telecommunications device.

29. The method of claim 24, wherein transferring a portion of the identifier and location associations comprises:

identifying a portion of identifier and location associations on the first location server to be transferred to the second location server and identifying a data set state of the identified portion at an initial time;

copying a data set for the identified portion corresponding to the identified data set state from the first location server to the second location server and maintaining a second data set containing changes to the identified portion since the initial time;

identifying a data set state for the second data set;

ceasing operation of the first location server with respect to the identified portion and copying the second data set to the second location server, wherein the second data set corresponds to the identified data set state for the second data set; and

initiating operation of the second location server for the identified portion of identifiers and location associations.

30. The method of claim 24, wherein the performance criterion comprises an amount of available persistent storage space in the first location server.

31. The method of claim 24, wherein the performance criterion comprises a transaction rate limit.

32. The method of claim 24, wherein the transaction rate limit comprises a processor speed limit.

33. The method of claim 24, wherein the transaction rate limit comprises a network connection bandwidth limit.

34. The method of claim 24, further comprising transmitting a location server map from the first location server, the location server map comprising information identifying the second location server and a list of identifiers associated with the second location server.

35. The method of claim 34, wherein the first and second location servers are part of a location server cluster comprising a plurality of location servers, and wherein transmitting the location server map comprises transmitting the location server map to each of the plurality of data location servers asynchronously.

36. The method of claim 34, wherein transmitting a location server map comprises transmitting the location server map to a client in response to query received at the first location server from the client regarding an identifier that is not resident on the first location server.

37. The method of claim 24, wherein transferring a portion of the identifiers and associated locations to a second location server when a performance criterion of the first data location server reaches a predetermined performance limit further comprises monitoring the performance criterion and

automatically transferring the portion of identifiers and associated locations when the first location server reaches the predetermined limit.

38. A database comprising:

a computer readable medium;

a plurality of index designations, each index designation representative of one of a plurality of identifiers, wherein each identifier uniquely identifies an entity;

a plurality of locations, wherein each of the locations is associated with at least one of the plurality of index designations and represents a location of information relevant to an identifier represented by an index designation;

a location store stored in the computer readable medium, the location store comprising a table containing the plurality of index designations and associated locations; and

an indexing function stored in the computer readable medium, the indexing function operative to map each of the plurality of identifiers to a respective one of the plurality of index designations.

39. The database of claim 38, wherein the indexing function comprises one of a hash function, a b-tree function, and a t-tree function.

40. The database of claim 39, further comprising a front end in communication with the location store and indexing function, the front end operative to transport identifiers and associated locations via a transport protocol.

41. The database of claim 40, further comprising a buffer in communication with the front end, the buffer configured to maintain a log of each of a plurality of location store update transactions.

42. The database of claim 38, wherein the computer readable medium comprises at least one of RAM and a persistent storage device.

43. The database of claim 38, wherein the location store comprises a string store and wherein the plurality of locations comprise network address strings.

44. The database of claim 43, wherein at least one of the network address strings comprises an address of a database in a network.

45. A system for managing location information and providing location information to location queries, the system comprising:

a location server operating in accordance with a transfer protocol, the transfer protocol comprising instructions for manipulating an identifier and at least one location associated with the identifier, wherein the identifier uniquely specifies an entity and wherein each location specifies a location of data in a network pertaining to the entity, the location server containing location information corresponding to at least one entity and formatted according to the transfer protocol, and wherein the location of data for the location comprises an application server in communication with the network; and

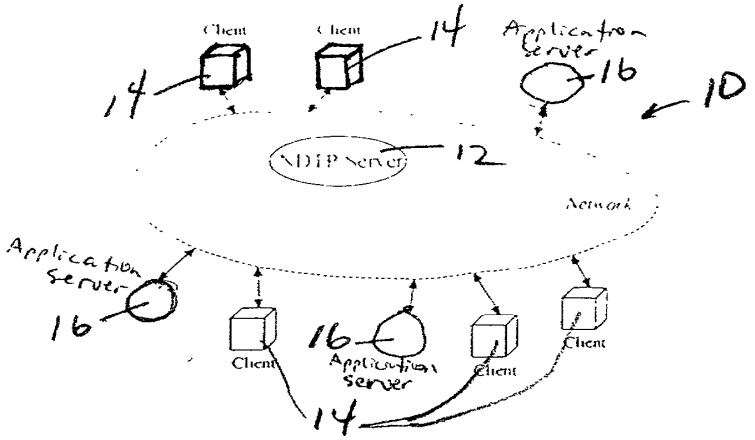
programming logic stored on the location server responsive to a location query identifying a desired entity to return a location message, the location message comprising all locations associated with the desired entity, wherein the location server returns the location message if the location server contains location information for the desired entity.

ABSTRACT OF THE DISCLOSURE

A system and method for storing and retrieving location information across a network is disclosed. The system and method utilize a transfer protocol configured to transport an identifier/location relationship to allow one or more locations to be associated with an identifier in the location store of a location server, where the identifier represents a unique entity and the location represents a location of data pertaining to the identifier. The location server contains programming logic operative to provide responses to location queries and capable of scaling a plurality of location servers according to system performance and logistical requirements.

Docket No. 50277-0501

FIG. 1



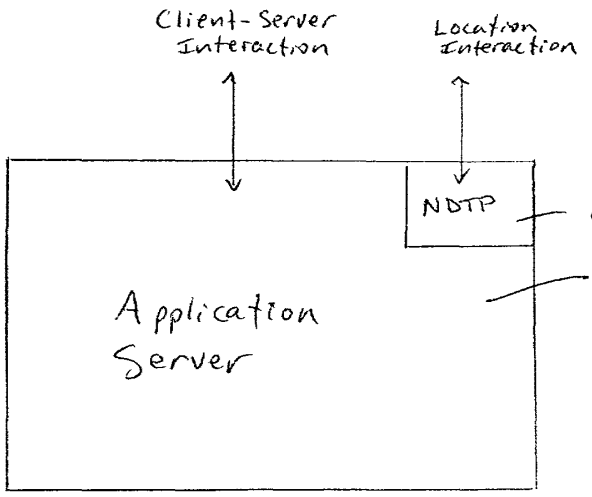


FIG. 2

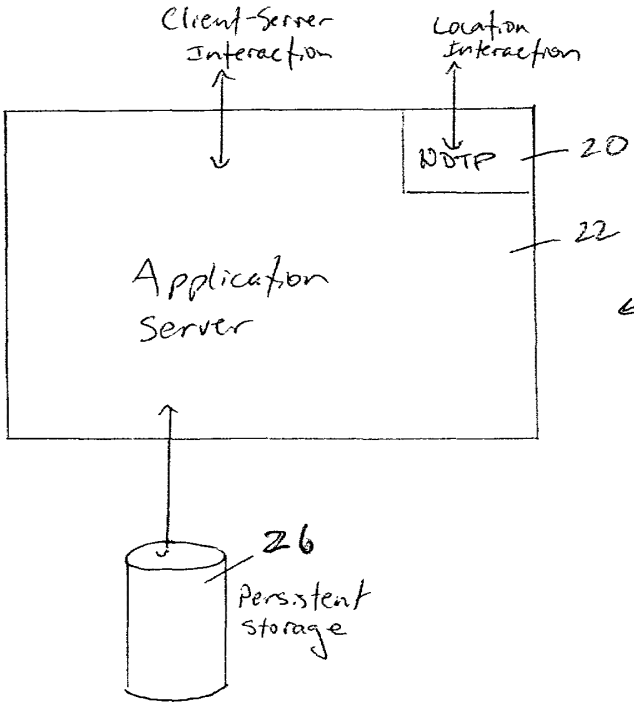
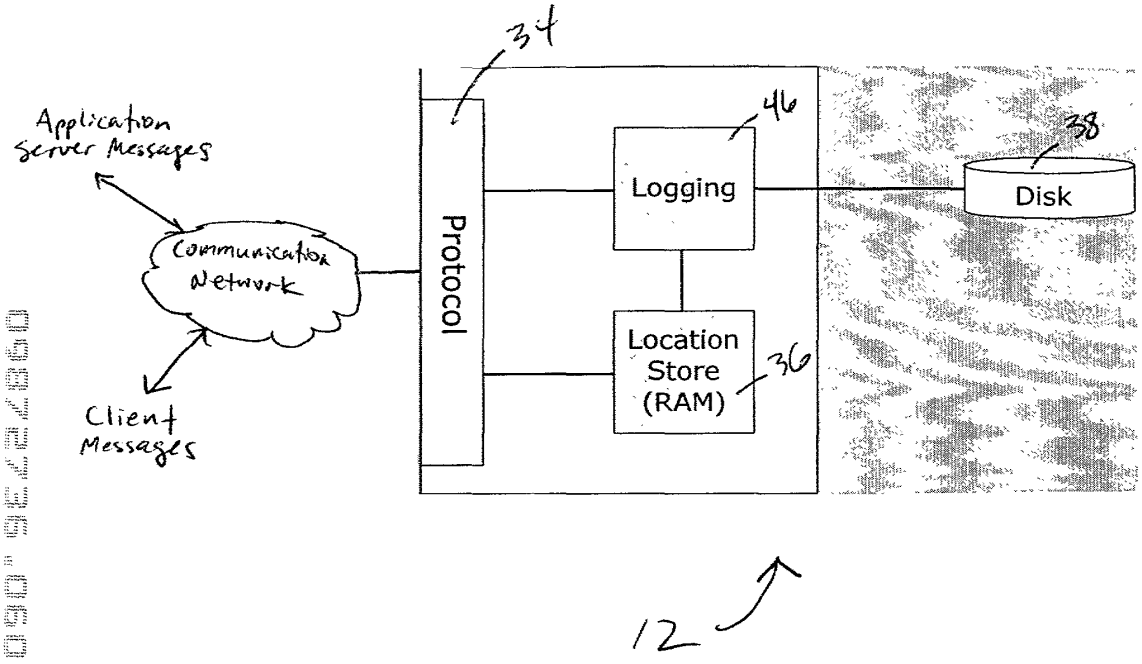


FIG. 3

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FIG. 4



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FIG. 5

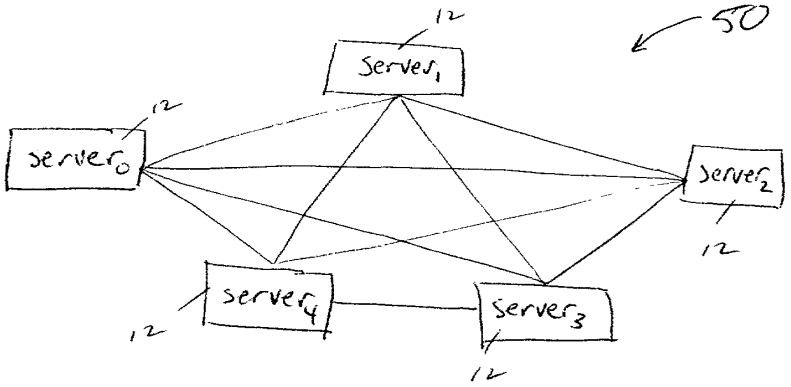
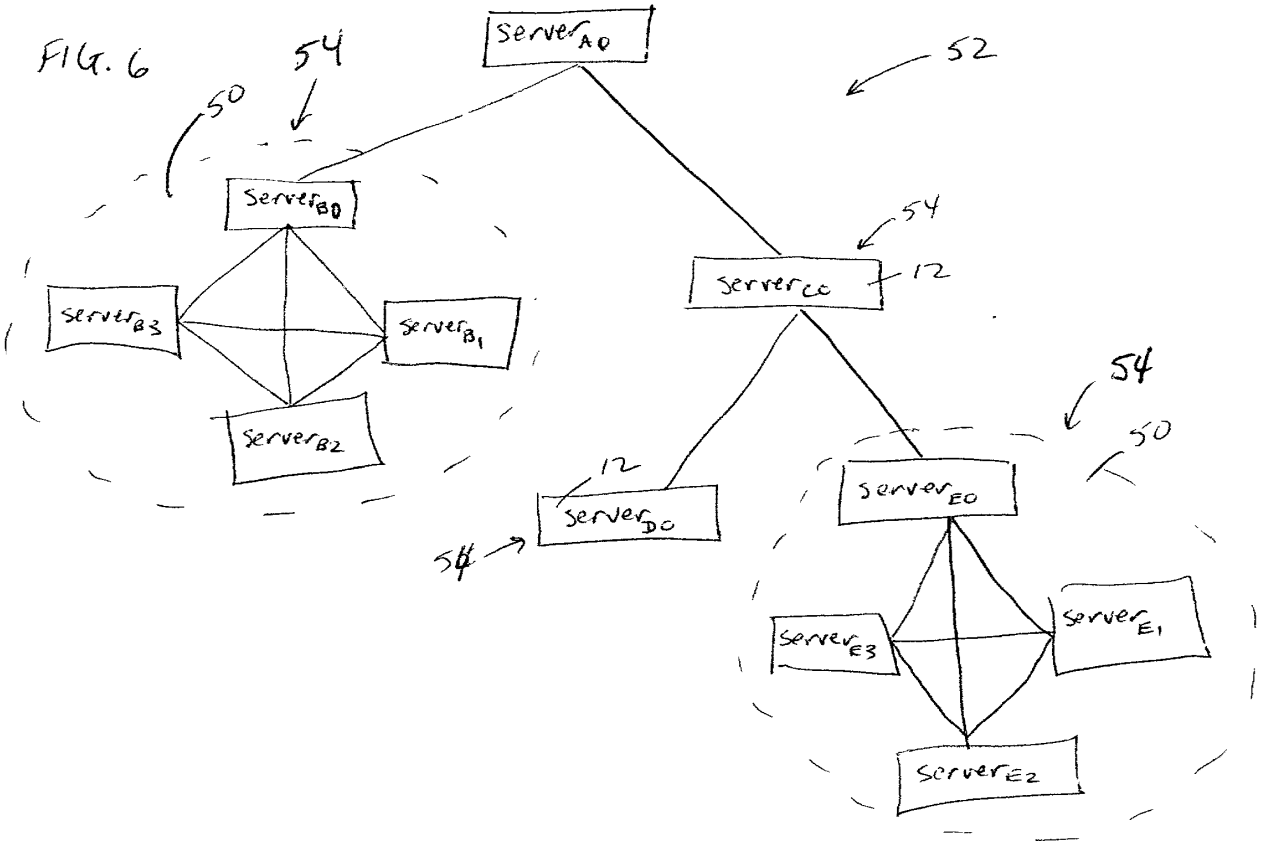

50
12
Server1
Server0
Server2
Server4
Server3

FIG. 6


ServerA0
52
54
50
ServerB0
ServerB3
ServerB1
ServerB2
ServerC0
12
ServerD0
ServerE0
ServerE3
ServerE1
ServerE2

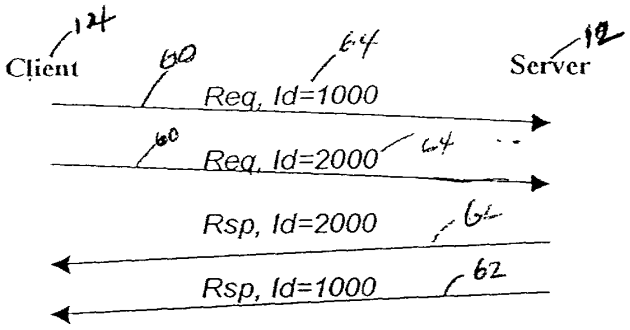


FIG. 7 - Use Of Request Identifiers

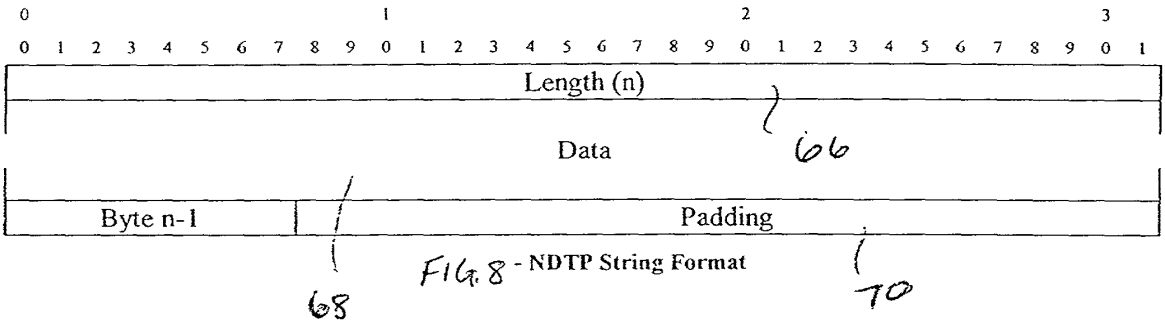


FIG. 8 - NDTP String Format

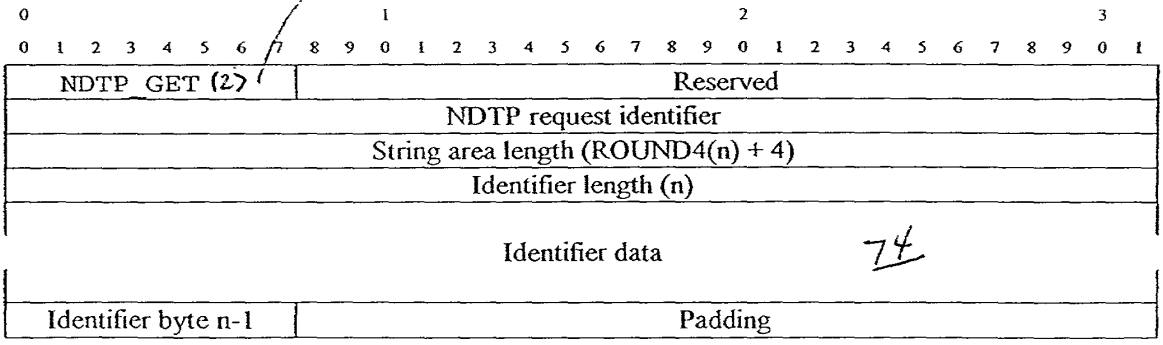


FIG. 9 - NDTP_GET Format

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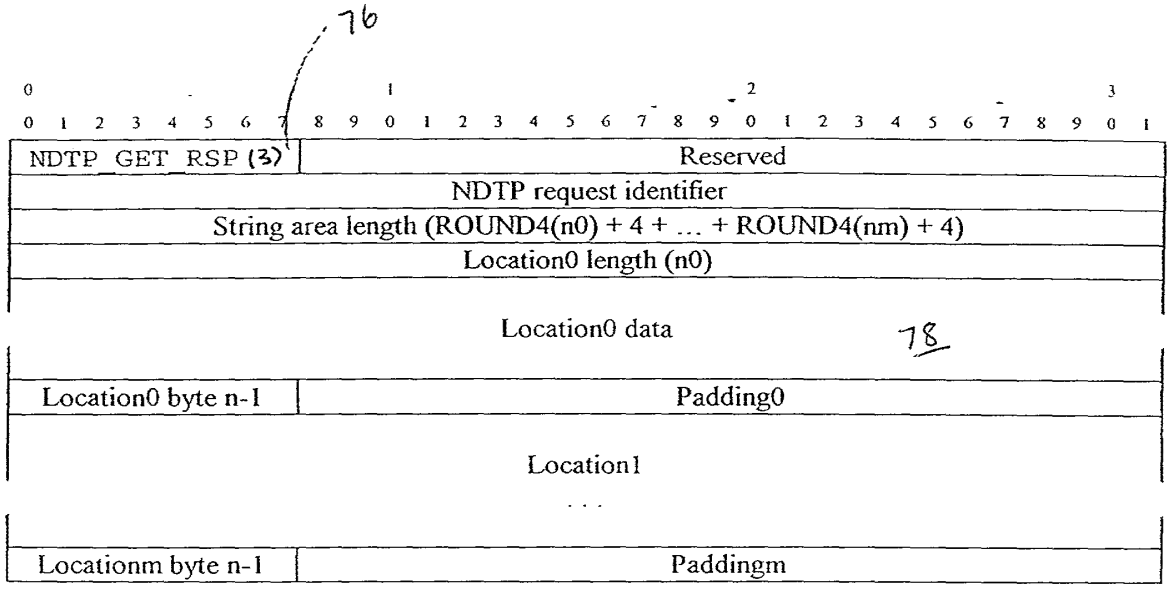


FIG. 10 - **NDTP_GET_RSP Format**

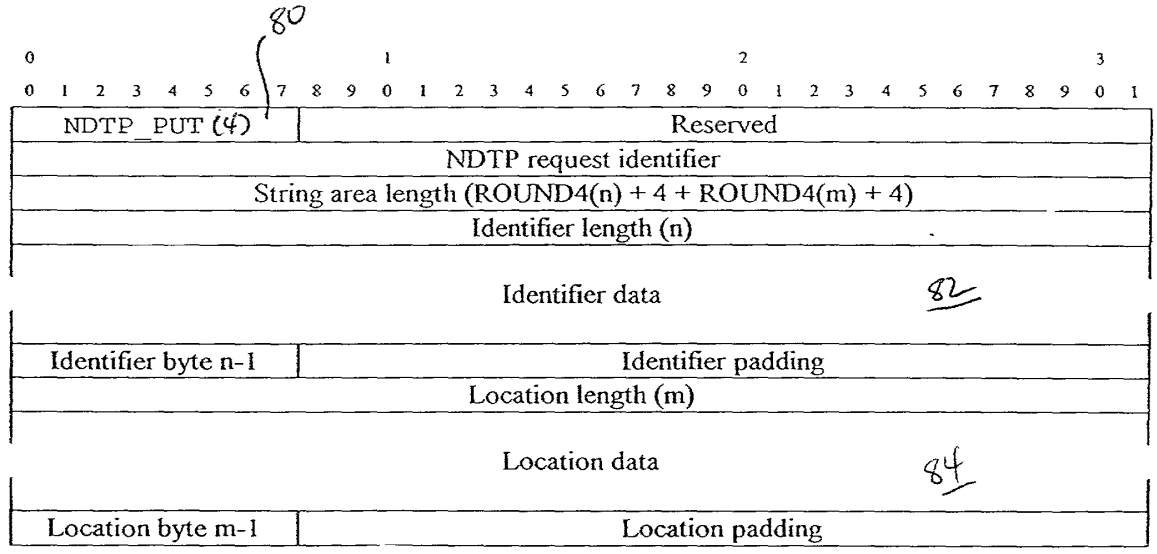


FIG 11 - **NDTP_PUT Format**

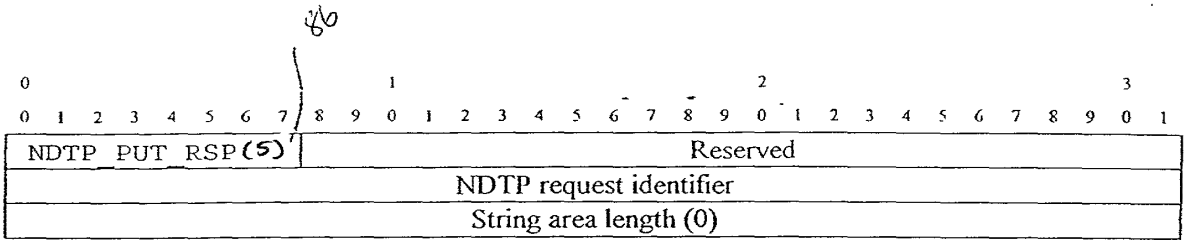


FIG. 12 **NDTP_PUT_RSP Format**

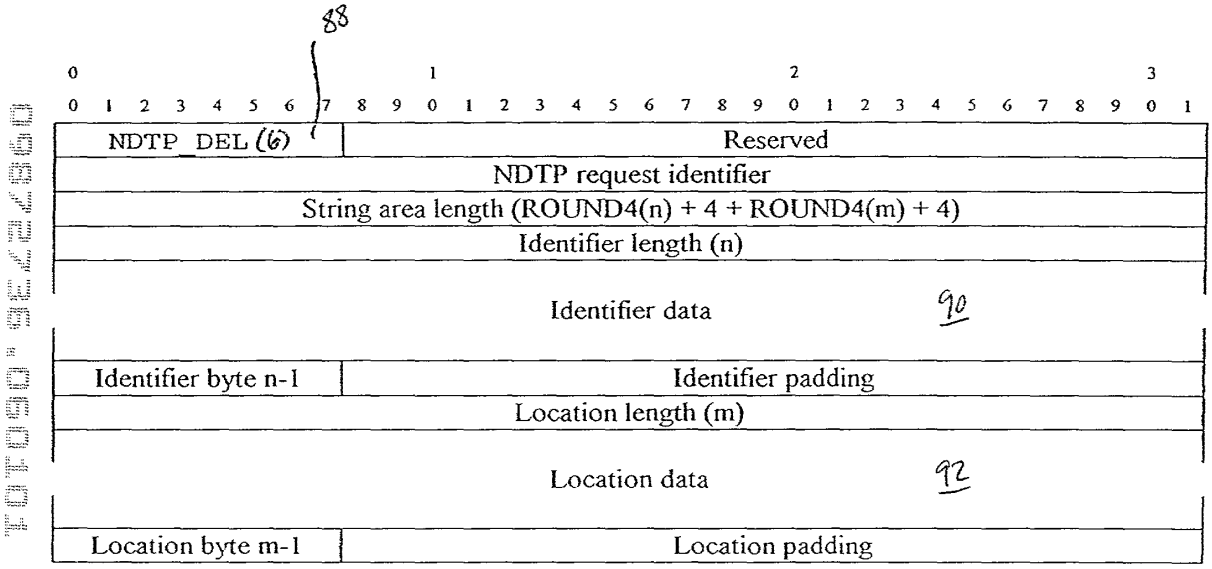


FIG. 13 **NDTP_DEL Format**

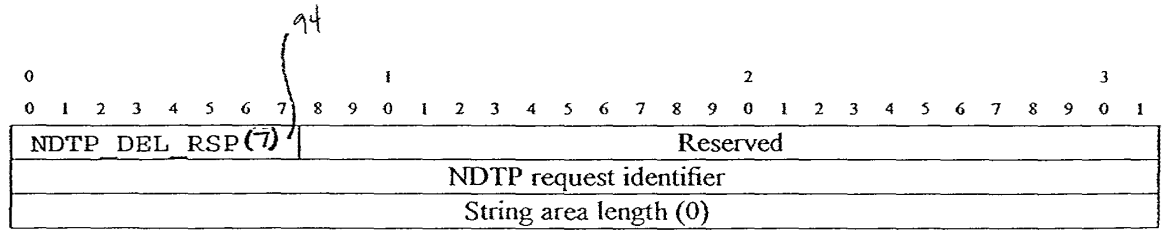


FIG. 14 **NDTP_DEL_RSP Format**

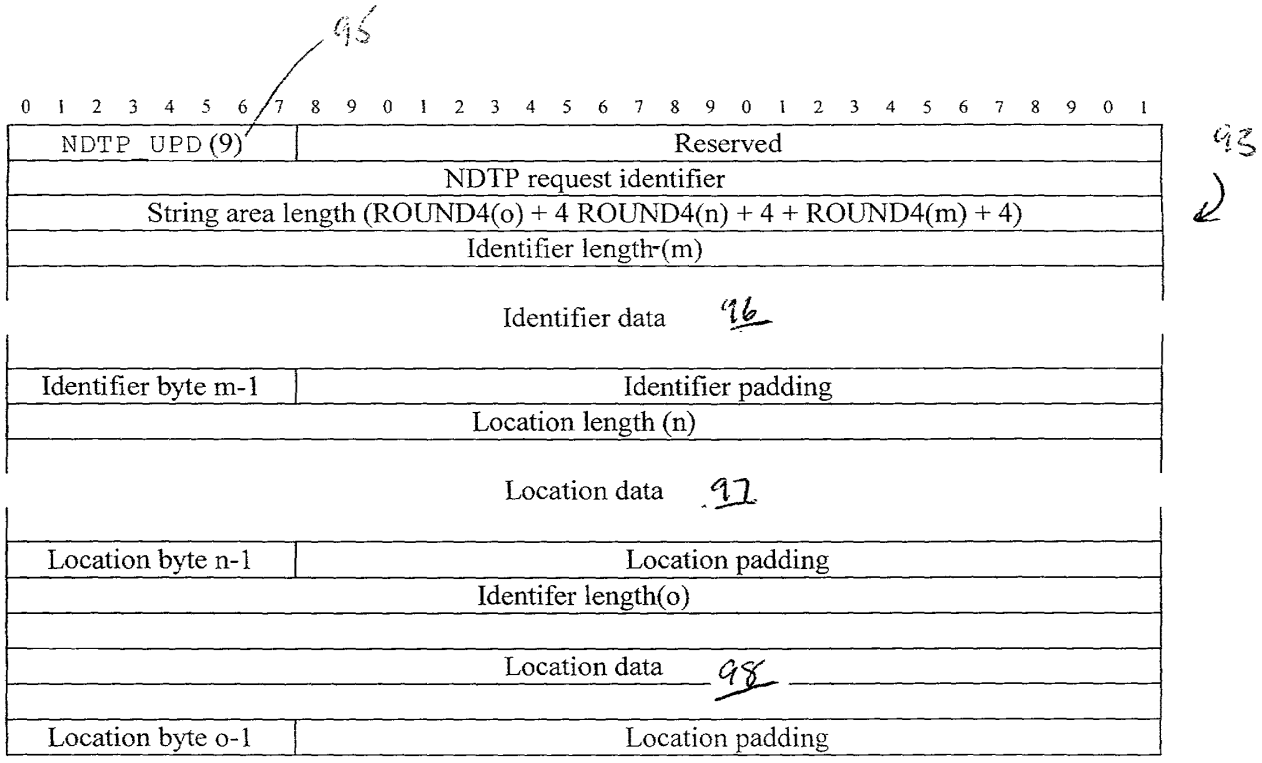


FIG. 15 - **NDTP_UPD Format**

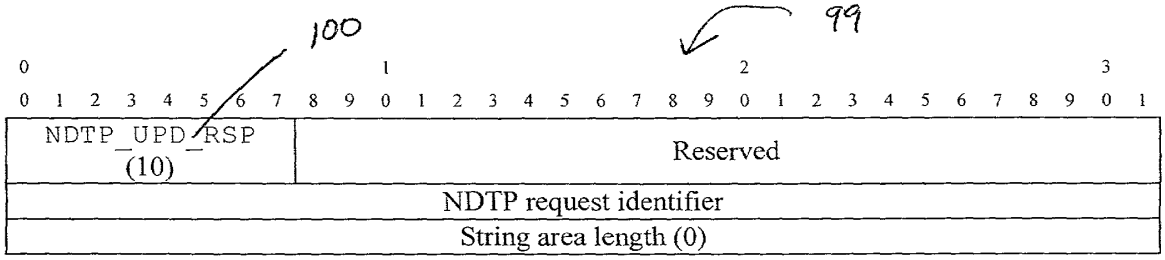
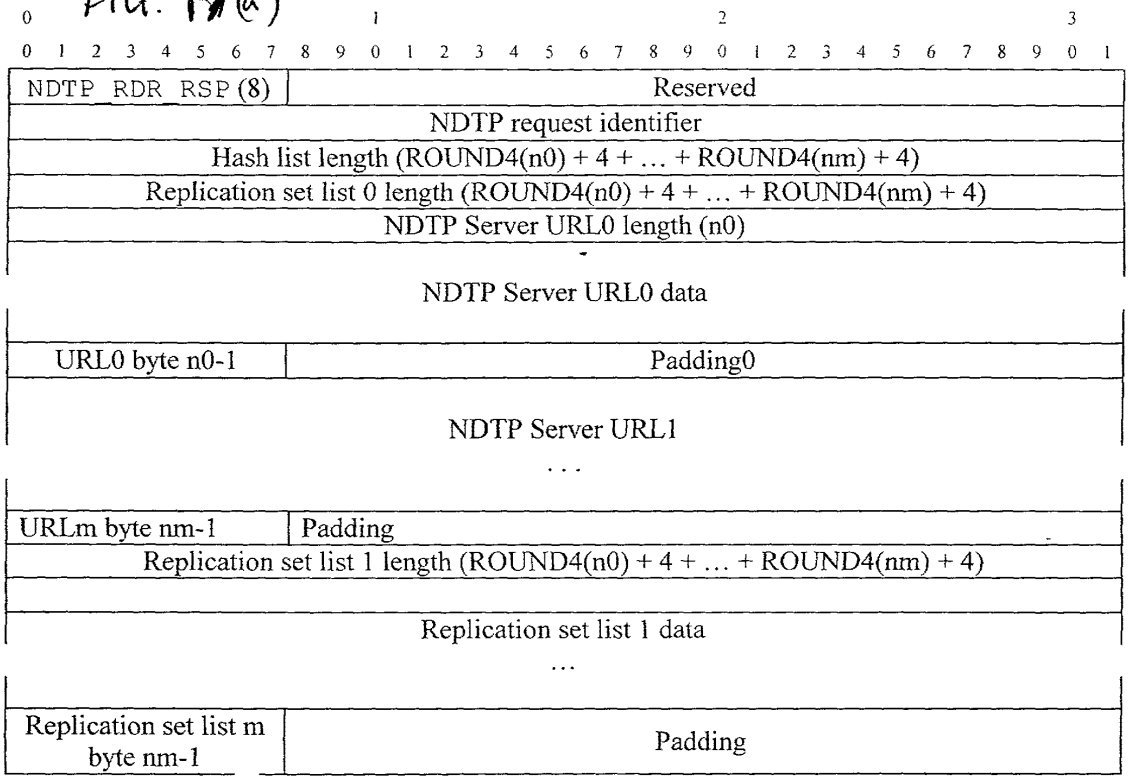


FIG. 16 - **NDTP_UPD_RSP Format**

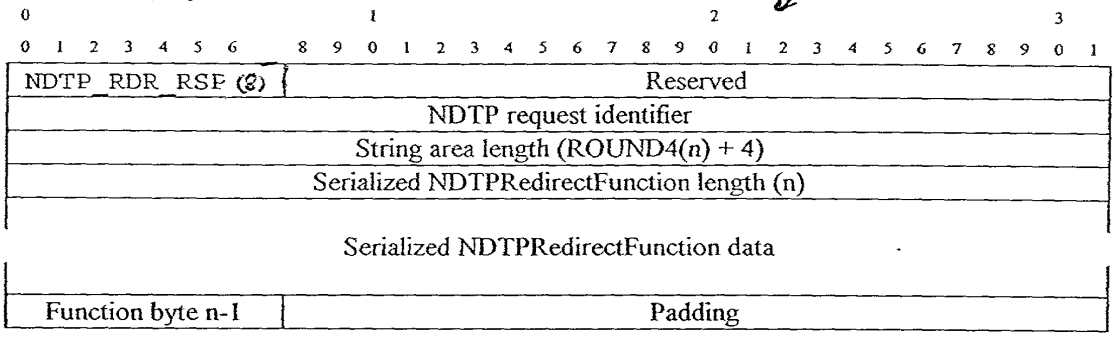
Patent Application Publication

FIG. 17(a)



101

FIG. 17(b)



103

Patent: 6,963,982

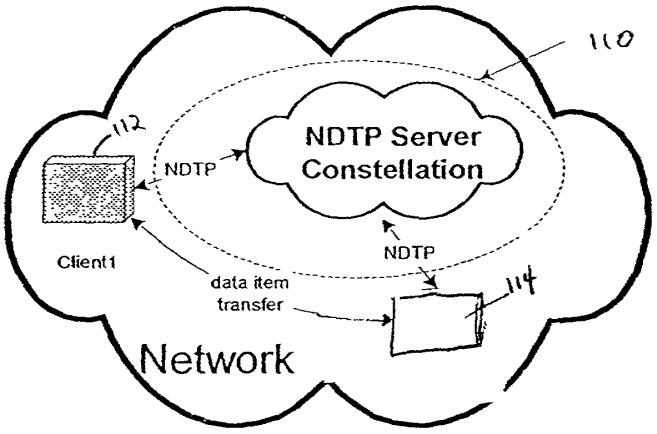


FIG. 18

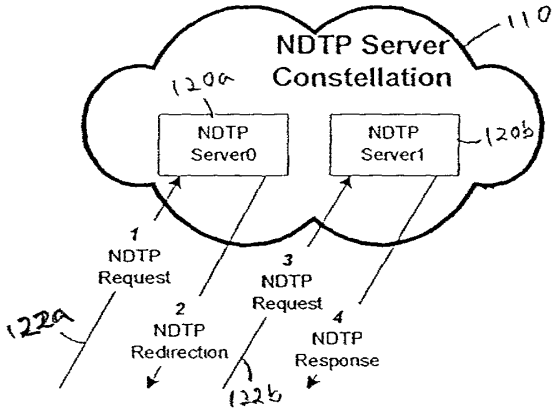


FIG. 19

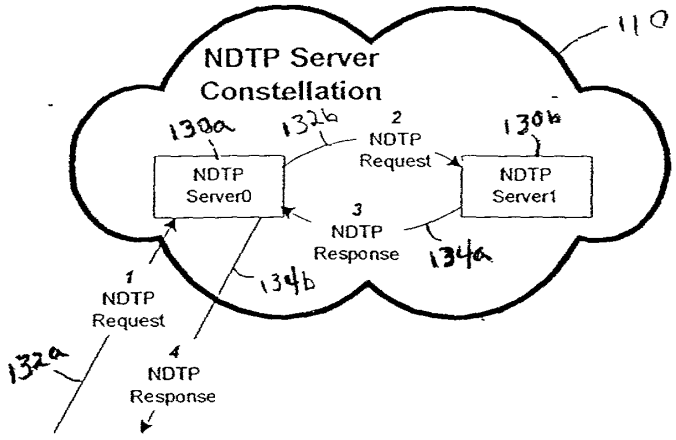


FIG. 20

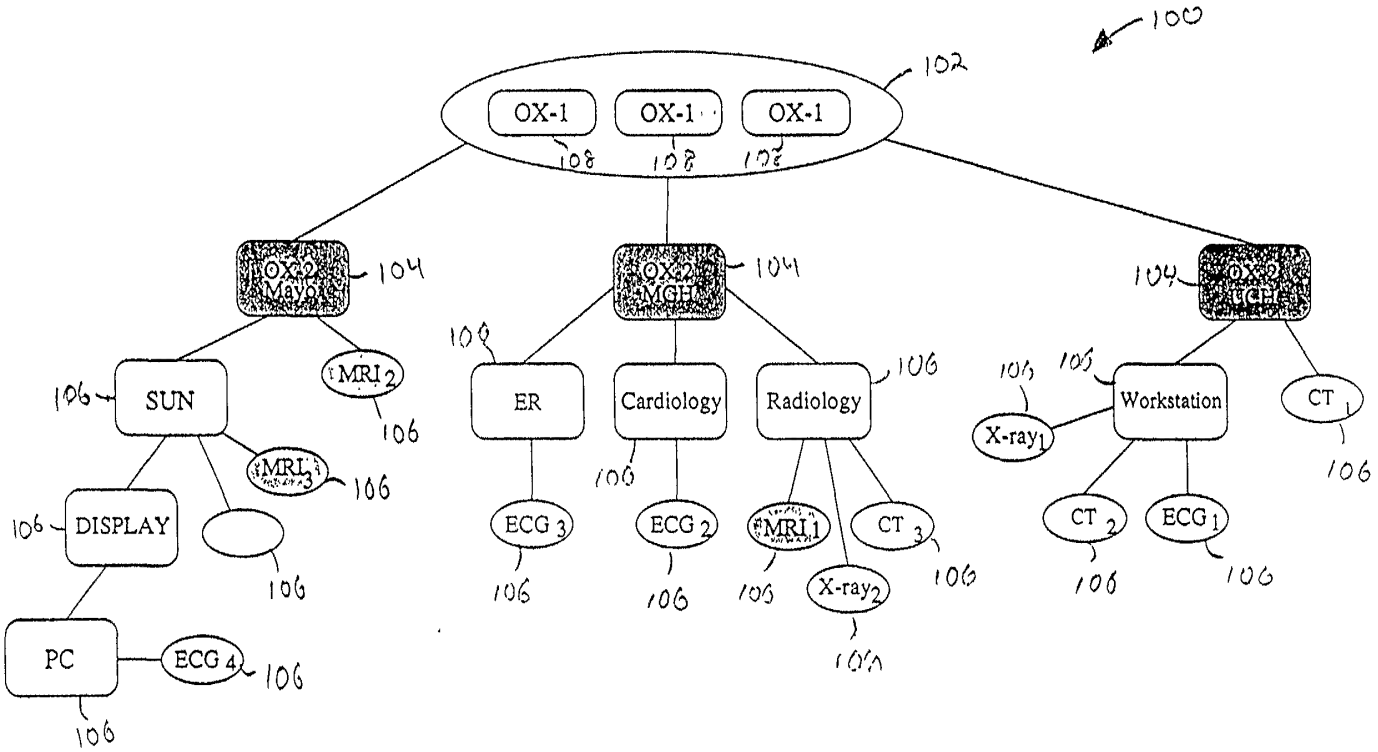
Petitioner's Exhibit 1004 - Page 63 of 470

TOTO90 "9827E860

FIG. 21

Network Distributed Tracking

Distributed Record Retrieval



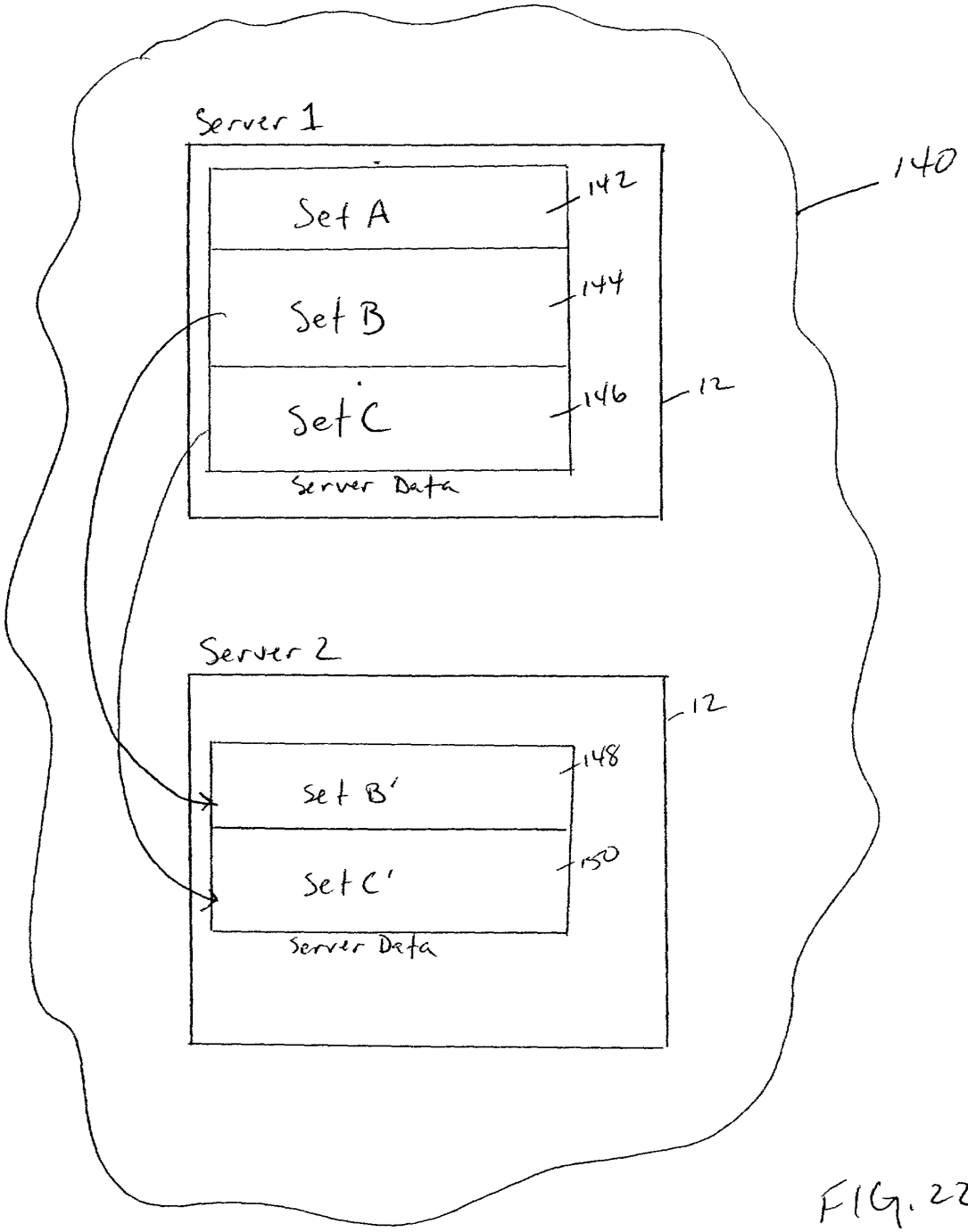


FIG. 22

USPTO - 05/27/05 - 05:01:08

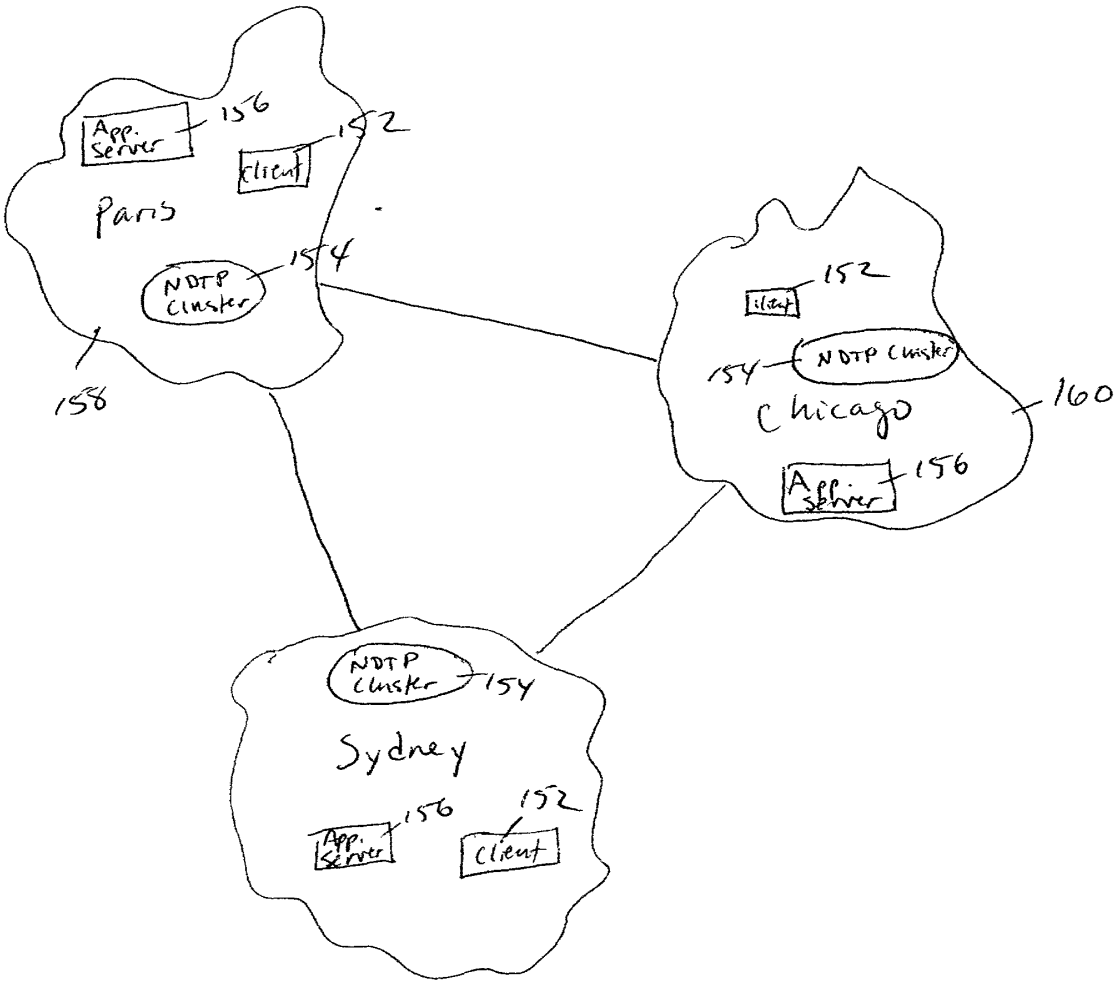


FIG. 23

Petitioner - Exhibit 1003

FIG. 24

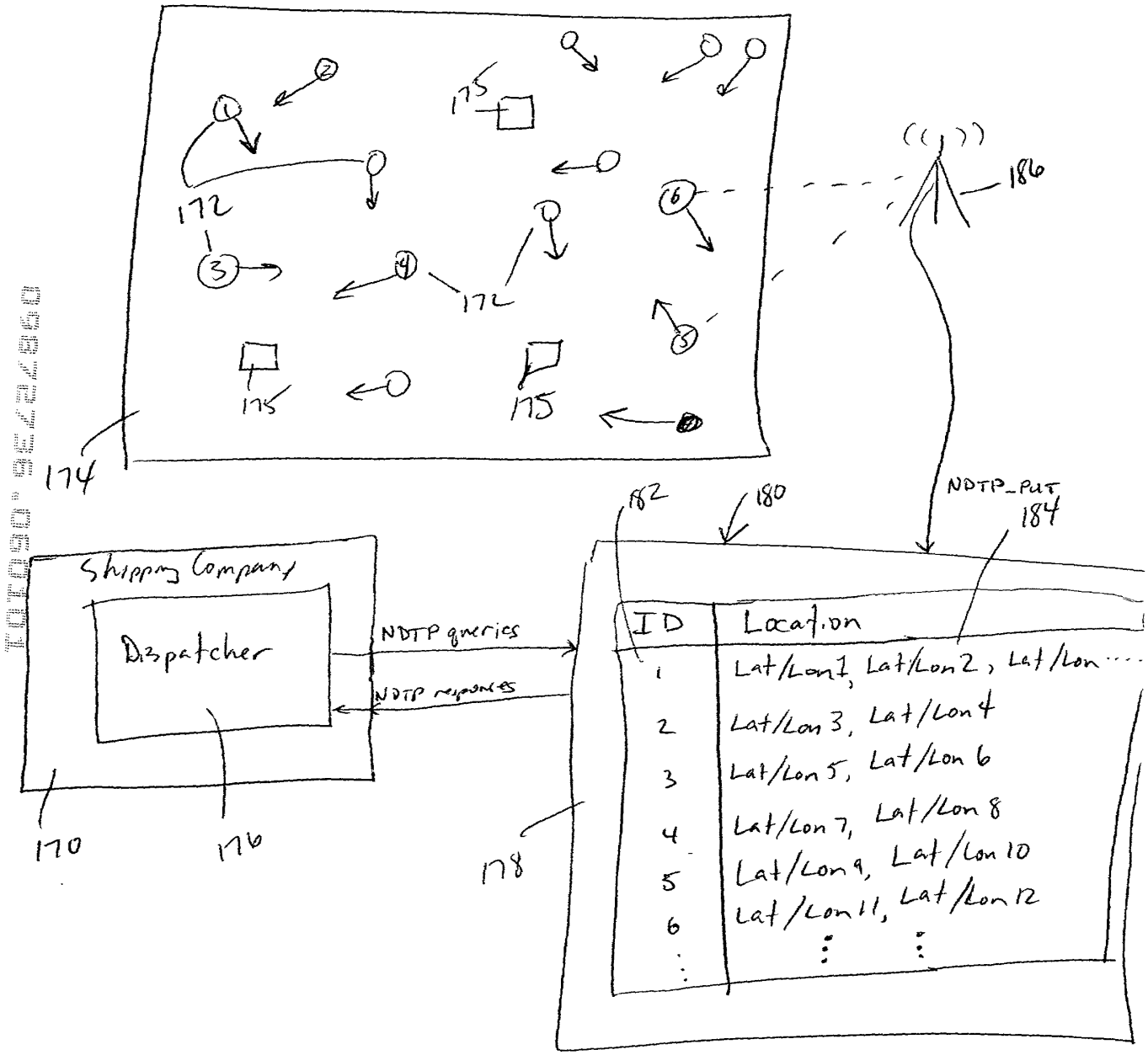

174
172
172
175
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175
186
NDTP_PUT
184
182
180
Shipping Company
Dispatcher
NDTP queries
NDTP responses
170
176
178
ID
Location
1
Lat/Lon1, Lat/Lon2, Lat/Lon ....
2
Lat/Lon3, Lat/Lon4
3
Lat/Lon5, Lat/Lon6
4
Lat/Lon7, Lat/Lon8
5
Lat/Lon9, Lat/Lon10
6
Lat/Lon11, Lat/Lon12

FIG. 25

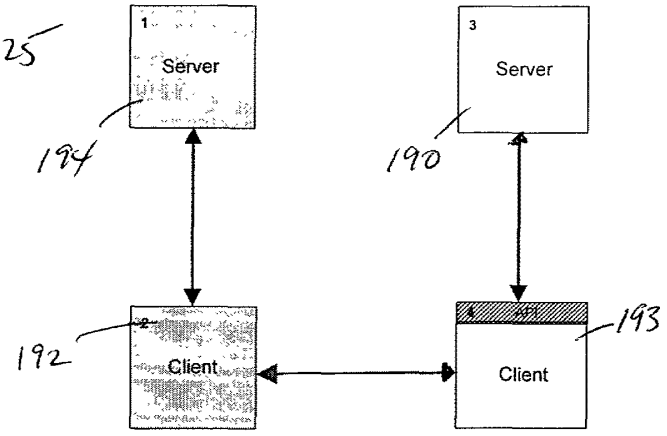


FIG. 26

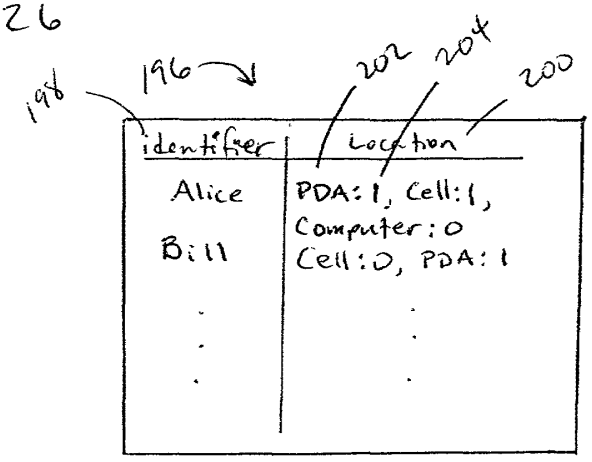


Exhibit 1003 - Page 0068

Best Available Copy

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2000

Application or Docket Number: 10406/49

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	45	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	45 minus 20=	* 25
INDEPENDENT CLAIMS	6 minus 3 =	* 3
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	355.00	OR	BASIC FEE	710.00
X$ 9=		OR	X$18=	450
X40=		OR	X80=	240
+135=		OR	+270=	
TOTAL		OR	TOTAL	1400

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=	
X40=		OR	X80=	
+135=		OR	+270=	
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=	
X40=		OR	X80=	
+135=		OR	+270=	
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=	
X40=		OR	X80=	
+135=		OR	+270=	
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.

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CLAIMS ONLY

SERIAL NO.	FILING DATE
09872736	06-01-01

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				
13		1				
14		1				
15		1				
16		1				
17	1					
18		1				
19		1				
20		1				
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37		1				
38	1					
39		1				
40		1				
41		1				
42		1				
43		1				
44		1				
45	1					
46						
47						
48						
49						
50						
TOTAL IND.	6	⬇		⬇		⬇
TOTAL DEP.	39					
TOTAL CLAIMS	45					

	*		*		*	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
51						
52						
53						
54						
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56						
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94						
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96						
97						
98						
99						
100						
TOTAL IND.		⬇		⬇		⬇
TOTAL DEP.						
TOTAL CLAIMS						

* MAY BE USED FOR ADDITIONAL CLAIMS OR ADMENDMENTS

FORM PTO-2022 (1-98)

U.S.DEPARTMENT OF COMMERCE
Patent and Trademark Office

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UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
09/872,736	06/01/2001	John K. Overton	10406/49

CONFIRMATION NO. 3927

FORMALITIES LETTER

OC000000006386806

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

Date Mailed: 08/06/2001

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
  Applicant must submit $ **710** *to complete the basic filing fee and/or file a small entity statement claiming such status (37 CFR 1.27).*
- Total additional claim fee(s) for this application is $690.
  - **$450** for **25** total claims over 20.
  - **$240** for **3** independent claims over 3 .
- The oath or declaration is missing.
  A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of $130 for a non-small entity, must be submitted with the missing items identified in this letter.
- **The balance due by applicant is $ 1530.**

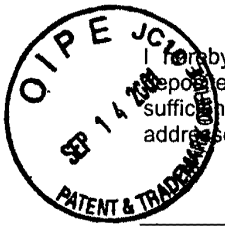
A copy of this notice MUST be returned with the reply.

H.T

Customer Service Center
Initial Patent Examination Division (703) 308-1202

PART 3 - OFFICE COPY

#4/A
10-26-01
M.L.



I hereby certify that this correspondence is being deposited with the United States Postal Service, with sufficient postage, as first class mail in an envelope addressed to:

Commissioner for Patents
Washington, D.C. 20231
on September 10, 2001
Date of Deposit

Kent E. Genin
Name of applicant, assignee or
Registered Representative

Signature

9/10/2001
Date of Signature

Our Case No.10406/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	
J. Overton et al.	
Serial No. 09/872,736	Group Art Unit No. 2152
Filing Date: June 1, 2001	
For METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK	

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Please enter the following amendment prior to examination of the above-identified U.S. patent application.

IN THE SPECIFICATION

On page 1, please amend the paragraph beginning on line 4 to read as follows:

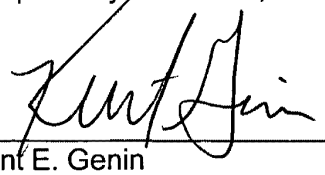
This application claims the benefit of provisional patent application serial no. 60/209,070 filed June 2, 2000 and provisional application serial no. 60/277,408 filed March 19, 2001; and this application is a continuation-in-part of each of the following non-provisional U.S. patent applications: application serial no. 09/661,222 entitled NETWORK DISTRIBUTED TRACKING WIRE TRANSFER PROTOCOL, filed on September 13, 2000; application serial no. 09/503,441 entitled AUTOMATED SYSTEM FOR IMAGE ARCHIVING, filed February 14, 2000; application serial no. 09/367,461 entitled AUTOMATED SYSTEM FOR IMAGING ARCHIVING, filed August 13, 1999; and application serial no. 09/111,896 entitled SYSTEM AND METHOD FOR ESTABLISHING AND RETRIEVING DATA BASED ON GLOBAL INDICES, filed on July 8, 1998, wherein the entirety of each of these provisional and non-provisional applications is incorporated herein by reference.

A1

REMARKS

Applicants have amended the Specification to restate its original claim of priority in a single, continuous sentence. Applicants respectfully request that the Examiner verify that the priority claim properly includes the cited two provisional applications and four non-provisional applications originally identified. No new matter has been added with this amendment. Applicants note that both the original six priority claims, and the enclosed amendments to those priority claims are timely submitted pursuant to 37 C.F.R. §1.78. Pursuant to 37 C.F.R. §1.121, a marked-up copy of the amended portion of the specification is attached at Appendix A. Entry of the above amendment is respectfully requested.

Respectfully submitted,



Kent E. Genin
Registration No. 37,834
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200

APPENDIX A

This application claims the benefit of provisional patent application serial no. 60/209,070 filed June 2, 2000 and provisional application serial no. 60/277,408 filed March 19, 2001 [, the entirety of each of these applications is incorporated herein by reference. This]; and this application is a continuation-in-part of each of [also claims priority to] the following non-provisional U.S. patent applications: application serial no. 09/661,222 entitled NETWORK DISTRIBUTED TRACKING WIRE TRANSFER PROTOCOL, filed on September 13, 2000; application serial no. 09/503,441 entitled AUTOMATED SYSTEM FOR IMAGE ARCHIVING, filed February 14, 2000; application serial no. 09/367,461 entitled AUTOMATED SYSTEM FOR IMAGING ARCHIVING, filed August 13, 1999; and application serial no. 09/111,896 entitled SYSTEM AND METHOD FOR ESTABLISHING AND RETRIEVING DATA BASED ON GLOBAL INDICES, filed on July 8, 1998, wherein the[. The] entirety of each of these provisional and non-provisional applications is [also] incorporated herein by reference.

#3

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UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
09/872,736	06/01/2001	John K. Overton	10406/49

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RECEIVED
AUG 09 2001
RECEIVED
U. S. DOCKET

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

CONFIRMATION NO. 3927

FORMALITIES LETTER

OC000000006386806

Date Mailed: 08/06/2001

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
  Applicant must submit $ **710** *to complete the basic filing fee and/or file a small entity statement claiming such status (37 CFR 1.27).*
- Total additional claim fee(s) for this application is $690.
  - **$450** for **25** total claims over 20.
  - **$240** for **3** independent claims over 3 .
- The oath or declaration is missing.
  A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of $130 for a non-small entity, must be submitted with the missing items identified in this letter.
- **The balance due by applicant is $ 1530.**

A copy of this notice MUST be returned with the reply.

H. T

Customer Service Center
Initial Patent Examination Division (703) 308-1202
PART 2 - COPY TO BE RETURNED WITH RESPONSE

09/17/2001 EEKUBAY1 00000115 09872736

01 FC:201	355.00 OP
02 FC:203	225.00 OP
03 FC:202	120.00 OP
04 FC:205	65.00 OP

OIPE JC10 SEP 14 2001 PATENT & TRADEMARK OFFICE

#3

I hereby certify that this correspondence is being deposited with the United States Postal Service, with sufficient postage, as first class mail in an envelope addressed to:
Commissioner for Patents
Washington, D.C. 20231
on September 10, 2001
Date of Deposit

Kent E. Genin
Name of applicant, assignee or Registered Representative

Signature

9/10/2001
Date of Signature

Case No. 10406/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

J. Overton et al.

Serial No.: 09/872,736

Filed: June 1, 2001

For: METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK

Attention: Manager, Application Branch

RESPONSE TO NOTICE TO FILE MISSING PARTS OF APPLICATION FILING DATE GRANTED

Commissioner for Patents
Washington, D.C. 20231

Attn.: Box Missing Parts

Dear Sir:

In accordance with the Notice to File Missing Parts of Application Filing Date Granted dated August 6, 2001, a copy of which is attached, enclosed herewith for filing are the following documents:

☒ Fully executed Declaration for Patent Application and Power of Attorney for the above-referenced patent application.

☒ Applicant is:

☒ a small entity

☐ other than small entity

☒ Checks totaling $765 for:

☒ Filing Fee of $355.

☒ Surcharge of $65.

☒ Additional Claim Fees of $345.

☐ Petition for Extension of Time (37 C.F.R. § 1.136(a)) to file missing parts (in duplicate).

☒ Other: Preliminary Amendment; Assignment Recordation Cover Sheet; Assignment; Information Disclosure Statement; PTO Form 1449; One Copy of References A68, and A79-A82; Submission of Formal Drawings; 17 Sheets of Formal Drawings.

☒ The Commissioner is hereby authorized to charge any deficiencies in fees or credit overpayment to Deposit Account No. 23-1925. A duplicate copy of this paper is enclosed.

Respectfully submitted,

Dated: September 10, 2001

Kent E. Genin
Registration No. 37,834
Attorney for Applicant(s)

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610
(312)321-4200

rev. Dec.-99
F:\cOMMON\kEG\overX 10406\10406-49\10406-49 Missing Parts.doc

OIPE JC10 SEP 14 2001 PATENT & TRADEMARK OFFICE

H H

Sector 4B

TRANSMITTAL LETTER			Case No. 10406/49
Serial No. 09/872,736	Filing Date June 1, 2001	Examiner	Group Art Unit 2152
Inventor(s) J. Overton et al.			
Title of Invention Method And Apparatus For Managing Location Information In A Network			

TO THE COMMISSIONER FOR PATENTS

Transmitted herewith is Checks for $765.00 (Missing Parts Filing Fee, Surcharge, Extra Claims), and $40.00; Assignment Recordation Fee); Transmittal Letter (in duplicate); Response to Notice to File Missing Parts (in duplicate); Copy of Notice to File Missing Parts; Declaration; Preliminary Amendment; Assignment Recordation Cover Sheet; Assignment; Information Disclosure Statement; PTO Form 1449; One Copy of References A68 and A79-A82; Submission of Formal Drawings; 17 Sheets of Formal Drawings.

☐ Small entity status of this application under 37 CFR § 1.27 has been established by verified statement previously submitted.

☐ A verified statement to establish small entity status under 37 CFR §§ 1.9 and 1.27 is enclosed.

☐ Petition for a _____month extension of time.

☒ Small Entity status is claimed.

☐ The fee has been calculated as shown below:

	Claims Remaining After Amendment		Highest No. Previously Paid For	Present Extra	Small Entity Rate	Small Entity Add'l Fee	or	Other Than Small Entity Rate	Other Than Small Entity Add'l Fee
Total		Minus			x $9=			x $18=	
Indep.		Minus			x 40=			x $80=	
First Presentation of Multiple Dep. Claim					+$135=			+ $270=	
					Total add'l fee	$		Total add'l fee	$

☐ Please charge Deposit Account No. 23-1925 (BRINKS HOFER GILSON & LIONE) in the amount of $_____. A duplicate copy of this sheet is enclosed.

☐ A check in the amount of $_____ to cover the filing fee is enclosed.

☒ The Commissioner is hereby authorized to charge payment of any additional filing fees required under 37 CFR § 1.16 and any patent application processing fees under 37 CFR § 1.17 associated with this communication or credit any overpayment to Deposit Account No. 23-1925. A duplicate copy of this sheet is enclosed.

☒ I hereby petition under 37 CFR § 1.136(a) for any extension of time required to ensure that this paper is timely filed. Please charge any associated fees which have not otherwise been paid to Deposit Account No. 23-1925. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

Kent E. Genin
Registration No. 37,834
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail, with sufficient postage, in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231 on September 10, 2001.

Date: 9/10/2001 Signature:

rev. Dec.-00
F:\COMMON\KEG\OverX 10406\10406-49\10406-49 Transmittal - Missing Parts.doc

OIPE JC10 SEP 14 2001 PATENT & TRADEMARK OFFICE

Case No. 10406/49

#3

DECLARATION 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 And Apparatus For Managing Location Information In A Network, the specification of which:

☐ is attached hereto.

☒ was filed on June 1, 2001 as Application Serial No. 09/872,736.

☐ and was amended on _____ (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 the patentability as defined in Title 37, Code of Federal Regulations, § 1.56(a).

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
			☐ Yes	☐ No
(Number)	(Country)	(Day/Month/Year Filed)		

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

60/209,070	June 2, 2000
(Application Serial No.)	(Filing Date)
60/277,408	March 19, 2001
(Application Serial No.)	(Filing Date)

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or § 365(c) of any PCT International application 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 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

09/661,222	September 13, 2000	Pending
(Application Serial No.)	(Filing Date)	(Status-patented, pending, abandoned)
09/503,441	February 14, 2000	Pending
(Application Serial No.)	(Filing Date)	(Status-patented, pending, abandoned)
09/367,461	August 13, 1999	Pending
(Application Serial No.)	(Filing Date)	(Status-patented, pending, abandoned)
09/111,896	July 8, 1998	Pending
(Application Serial No.)	(Filing Date)	(Status-patented, pending, abandoned)

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.

Case No. 10406/49

Inventor's Signature	Date: 7.19.01
Full name of sole or first inventor	John K. Overton
Residence	5825 S. Blackstone, Chicago, Illinois 60637
Citizenship	US
Post Office Address	5825 S. Blackstone, Chicago, Illinois 60637

Inventor's Signature	Date:
Full name of second joint inventor, if any	Stephen W. Bailey
Residence	18 Alderbrook Road, Andover, MA 01810
Citizenship	US
Post Office Address	18 Alderbrook Road, Andover, MA 01810

BRINKS HOFER GILSON & LIONE
P.O. Box 10395
Chicago, IL 60610
(312) 321-4200

Case No. 10406/49

Inventor's Signature		Date:
Full name of sole or first inventor	John K. Overton	
Residence	5825 S. Blackstone, Chicago, Illinois 60637	
Citizenship	US	
Post Office Address	5825 S. Blackstone, Chicago, Illinois 60637	
Inventor's Signature		Date: 19-JUL-2001
Full name of second joint inventor, if any	Stephen W. Bailey	
Residence	18 Alderbrook Road, Andover, MA 01810	
Citizenship	US	
Post Office Address	18 Alderbrook Road, Andover, MA 01810	

BRINKS HOFER GILSON & LIONE
P.O. Box 10395
Chicago, IL 60610
(312) 321-4200

Case No. 10406/49

0400

9-19-01

Inventor(s): John K. Overton, Stephen W. Bailey

Title: Method And Apparatus For Managing Location Information In A Network

OIPE JC19 SEP 14 2001 PATENT & TRADEMARK OFFICE

POWER OF ATTORNEY

The specification of the above-identified patent application:

☐ is attached hereto

☒ was filed on June 1, 2001 as application Serial No. 09/872,736

I hereby revoke all previously granted powers of attorney in the above-identified patent application and appoint the following attorneys to prosecute said patent application and to transact all business in the Patent and Trademark Office connected therewith:

William A. Webb - 28,277
Joseph F. Hetz - 41,070
Kent E. Genin - 37,834

Please address all correspondence and telephone calls to Kent E. Genin in care of:

Brinks Hofer Gilson & Lione
P.O. Box 10395
Chicago, IL 60610
(312)321-4200

The undersigned hereby authorizes the U.S. attorneys named herein to accept and follow instructions from John K. Overton as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorneys named herein will be so notified by the undersigned.

OverX, Inc., a corporation, certifies that it is the assignee of the entire right, title and interest in the patent application identified above by virtue of either:

☒ An assignment from the inventor(s) of the patent application identified above, a copy of which is attached hereto.
OR

☐ An assignment from the inventor(s) of the patent application identified above. The assignment was recorded in the Patent and Trademark Office at Reel _____, frame _____.
OR

☐ A chain of title from the inventor(s), of the patent application identified above, to the current assignee as shown below:

1. From _____ To: _____
The document was recorded in the Patent and Trademark Office at
Reel _____, frame _____, or a copy thereof is attached.

2. From _____ To: _____
The document was recorded in the Patent and Trademark Office at
Reel _____, frame _____, or a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet.

The undersigned has reviewed the assignment or all the documents in the chain of title of the patent application identified above and, to the best of undersigned's knowledge and belief, title is in the assignee identified above.

The undersigned (whose title is supplied below) is empowered to act on behalf of the assignee.

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 are made with the knowledge that willful false statements, and the like so made, are punishable by fine or imprisonment, or both, under Section 1001, Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature _____ Date: 2001-09-05

Name: John K. Overton

Title: Chief Technology Officer

Rev. Dec.-99
F:\COMMON\KEG\OverX 10406\10406-49\10406-49 Power of Attorney.doc

OIPE JC10 SEP 14 2001 PATENT & TRADEMARK OFFICE

A 5

I hereby certify that this correspondence is being deposited with the United States Postal Service, with sufficient postage, as first class mail in an envelope addressed to:
Commissioner for Patents
Washington, D.C. 20231
on September 10, 2001
Date of Deposit

Kent E. Genin
Name of applicant, assignee or Registered Representative

Signature

9/10/2001
Date of Signature

Our Case No.10406/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

J. Overton et al.

Serial No. 09/872,736

Filing Date: June 1, 2001

For METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK

Group Art Unit No. 2152

SUBMISSION OF FORMAL DRAWINGS

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Please substitute the enclosed 17 sheets of formal drawings for the previously submitted drawings.

Respectfully submitted,

Kent E. Genin, Reg. No. 37,834
Attorney for Applicants

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200

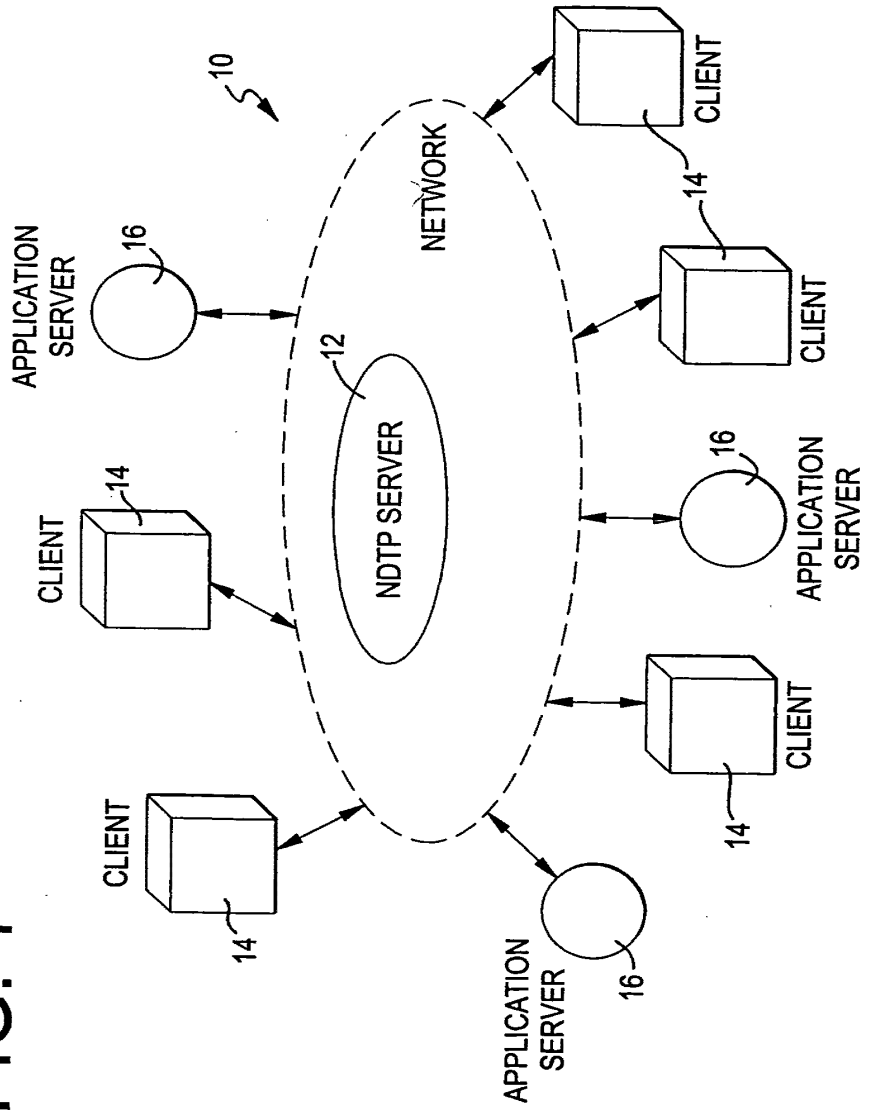


FIG. 1

FIG. 2

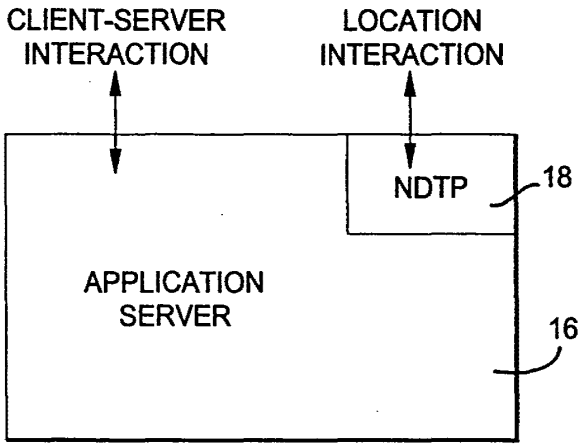

CLIENT-SERVER INTERACTION
LOCATION INTERACTION
NDTP
18
APPLICATION SERVER
16

FIG. 3

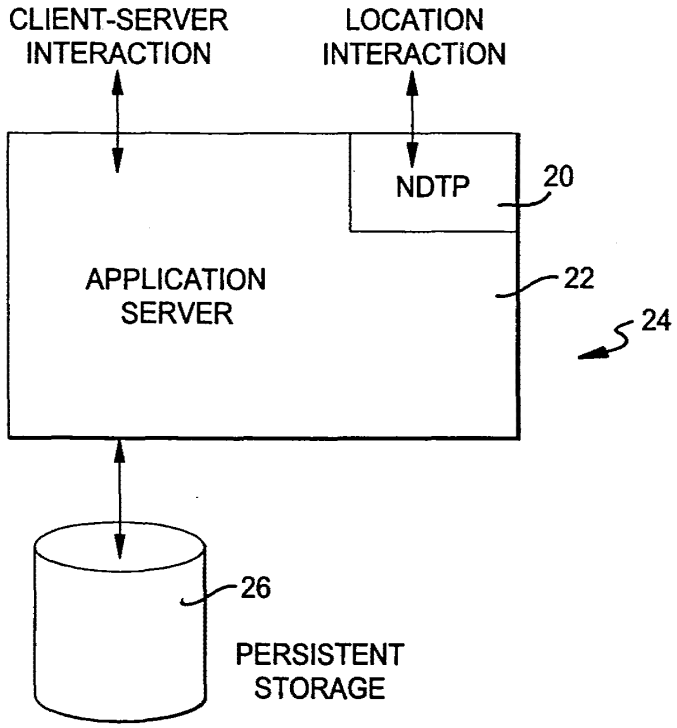

CLIENT-SERVER INTERACTION
LOCATION INTERACTION
NDTP
20
APPLICATION SERVER
22
24
26
PERSISTENT STORAGE

FIG. 4

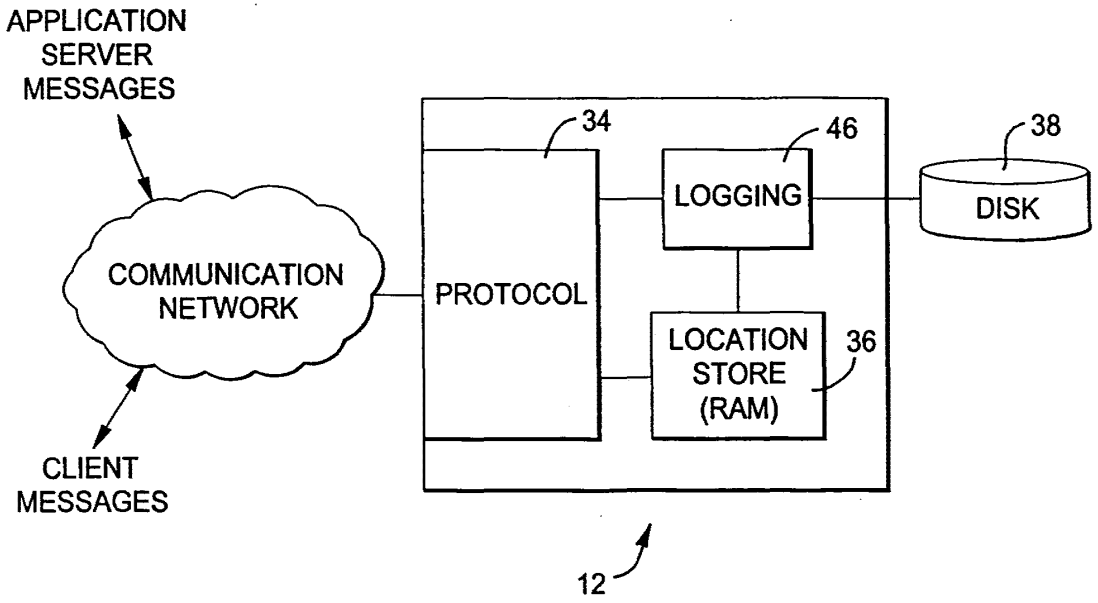

APPLICATION SERVER MESSAGES
COMMUNICATION NETWORK
CLIENT MESSAGES
PROTOCOL
34
LOGGING
46
DISK
38
LOCATION STORE (RAM)
36
12

FIG. 5

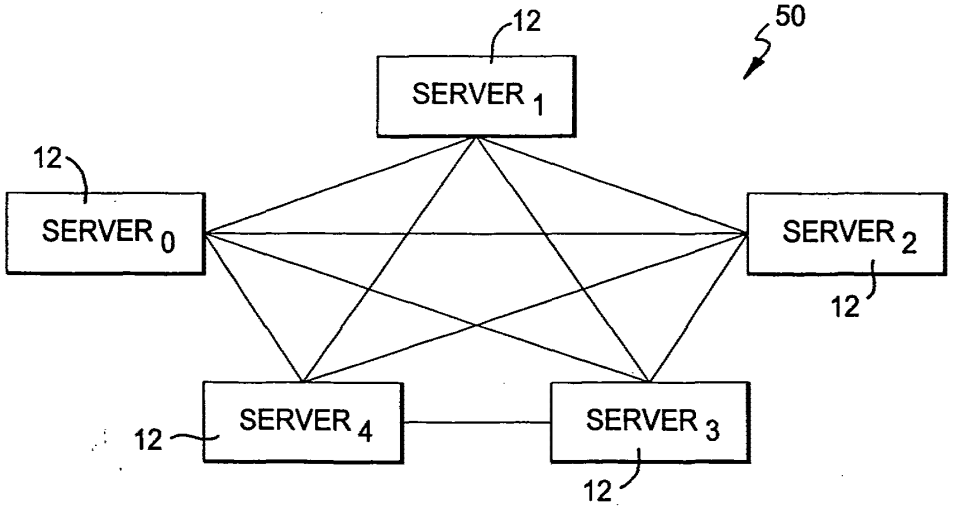
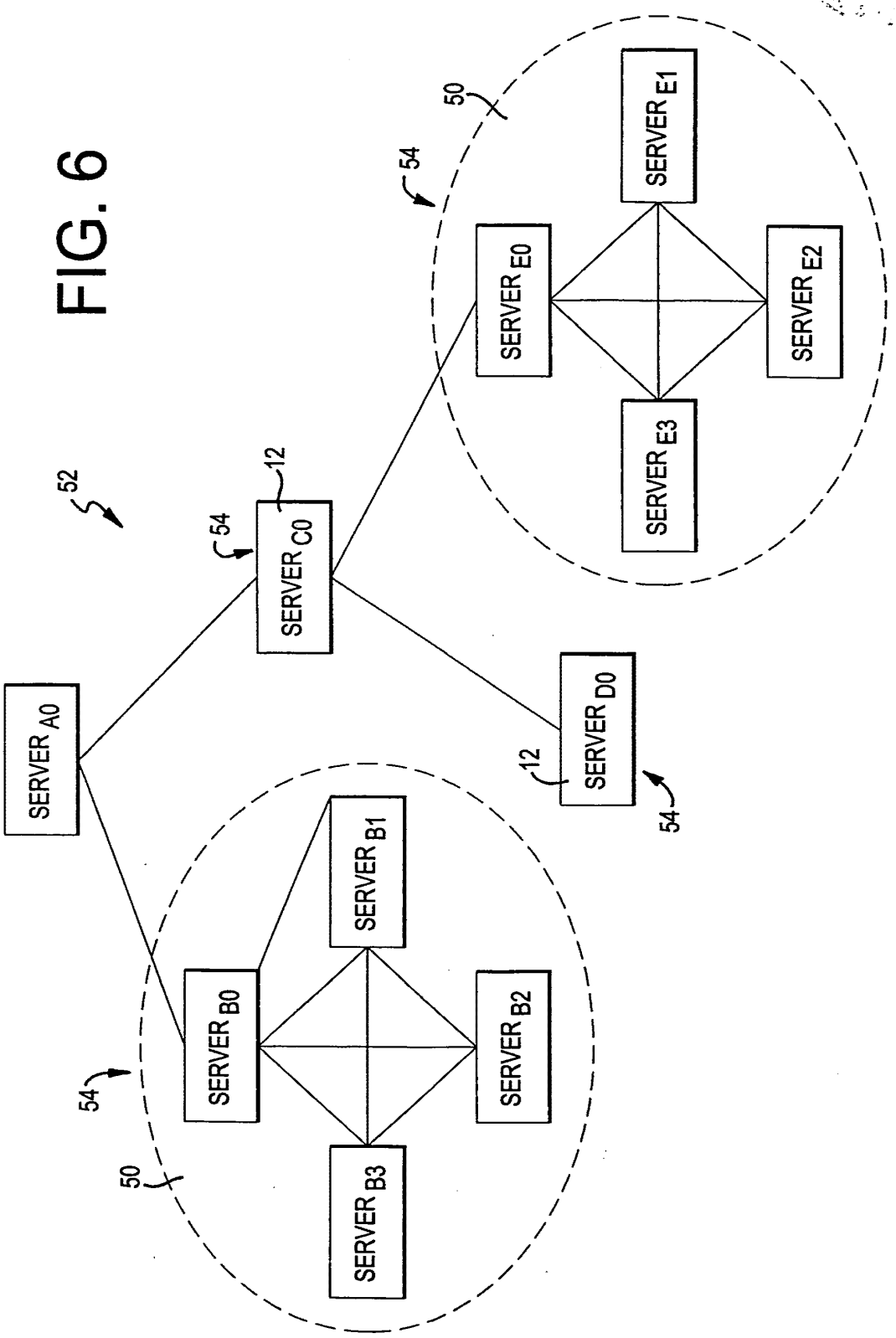

12
50
SERVER 1
12
SERVER 0
SERVER 2
12
12
SERVER 4
SERVER 3
12

FIG. 6


SERVER A0
SERVER C0
SERVER D0
SERVER E0
SERVER E1
SERVER E2
SERVER E3
SERVER B0
SERVER B1
SERVER B2
SERVER B3
50
52
54
12



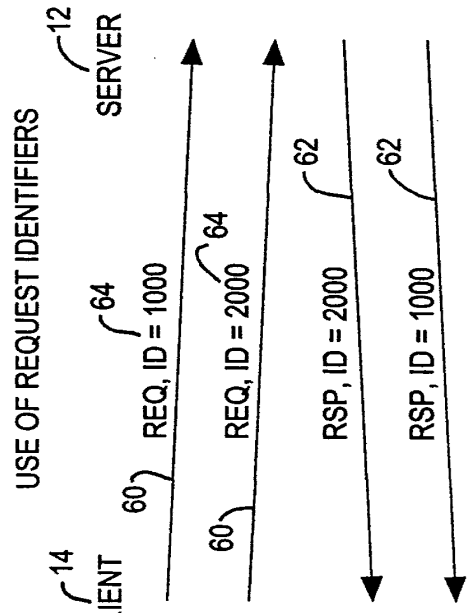

USE OF REQUEST IDENTIFIERS
CLIENT
14
SERVER
12
60
REQ, ID = 1000
64
60
REQ, ID = 2000
64
RSP, ID = 2000
62
RSP, ID = 1000
62

FIG. 7

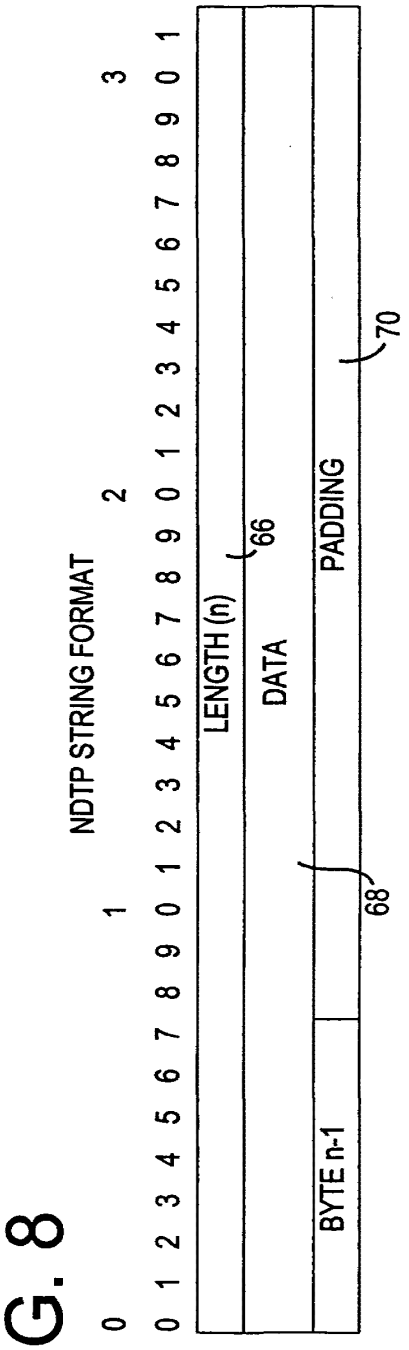

NDTP STRING FORMAT
0 1 2 3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
LENGTH (n)
66
DATA
PADDING
70
BYTE n-1
68

FIG. 8

FIG. 9

NDTP_GET FORMAT

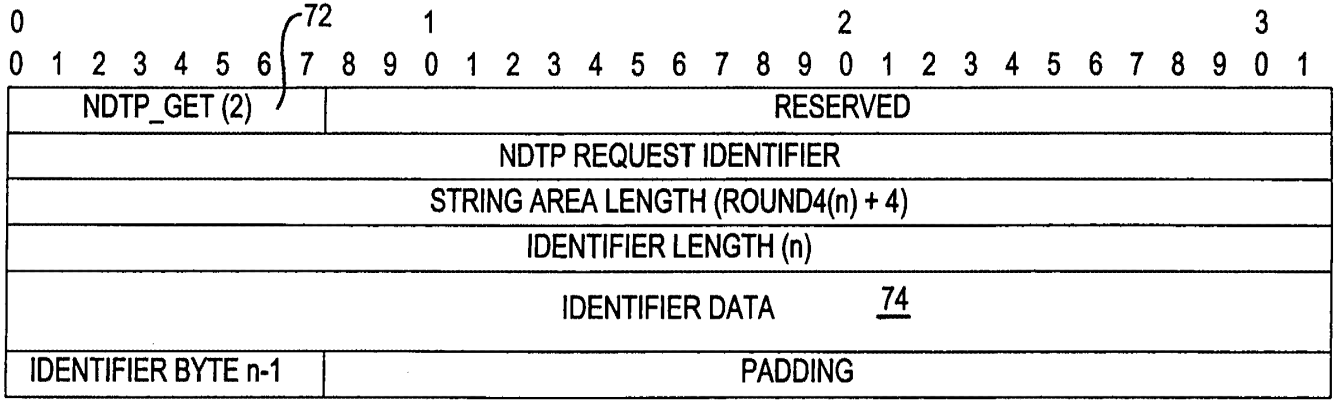


FIG. 10

NDTP_GET_RSP FORMAT

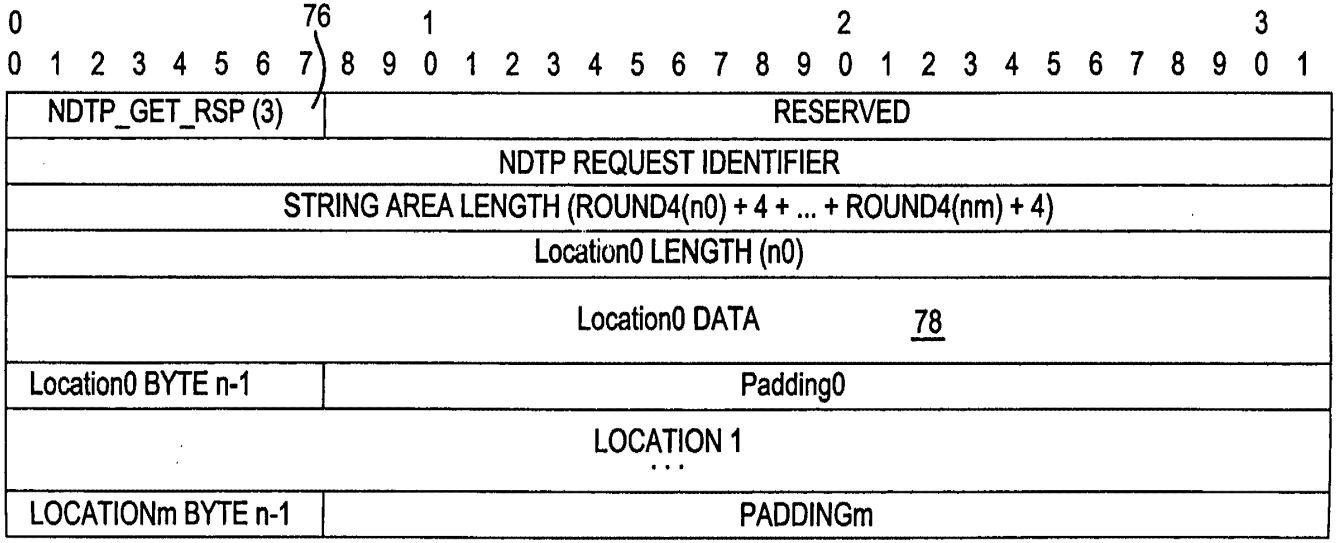


FIG. 11

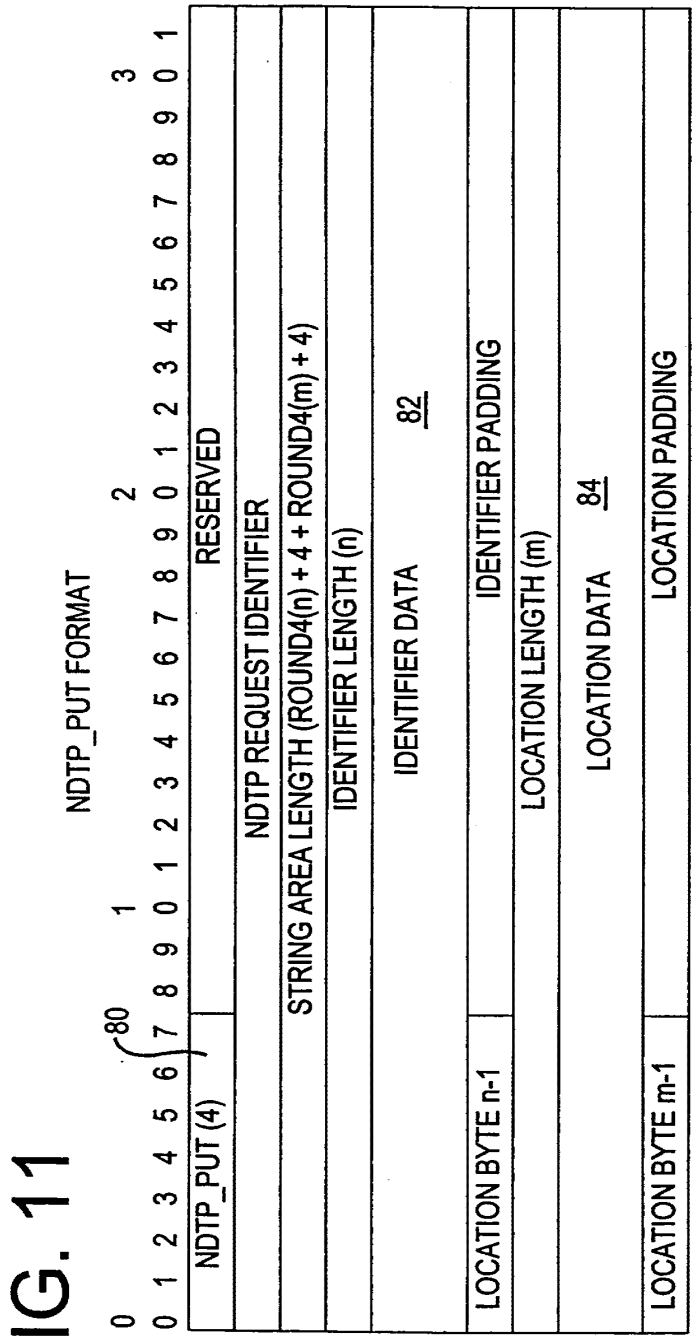

NDTP_PUT FORMAT
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
0 1 2 3
80
NDTP_PUT (4)
RESERVED
NDTP REQUEST IDENTIFIER
STRING AREA LENGTH (ROUND4(n) + 4 + ROUND4(m) + 4)
IDENTIFIER LENGTH (n)
IDENTIFIER DATA 82
LOCATION BYTE n-1
IDENTIFIER PADDING
LOCATION LENGTH (m)
LOCATION DATA 84
LOCATION BYTE m-1
LOCATION PADDING

FIG. 12

NDTP_PUT_RSP FORMAT
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
0 1 2 3
86
NDTP_PUT_RSP (5)
RESERVED
NDTP REQUEST IDENTIFIER
STRING AREA LENGTH (0)



FIG. 13

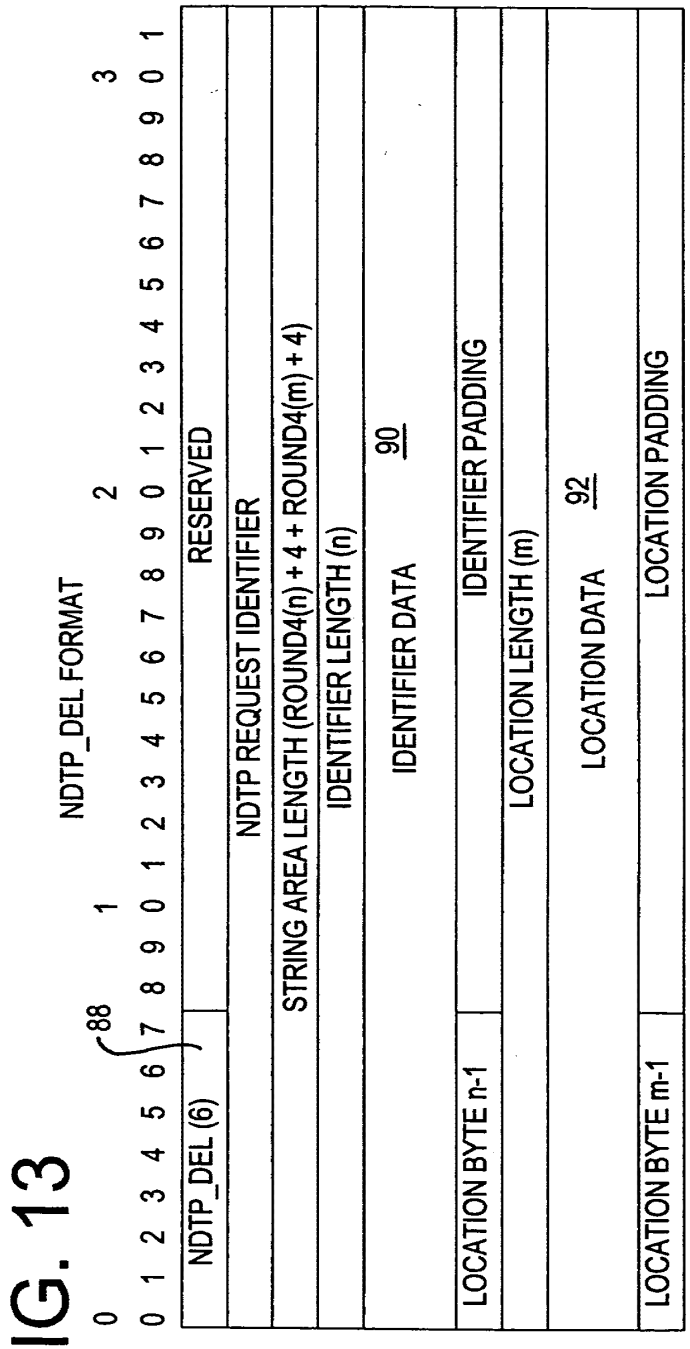
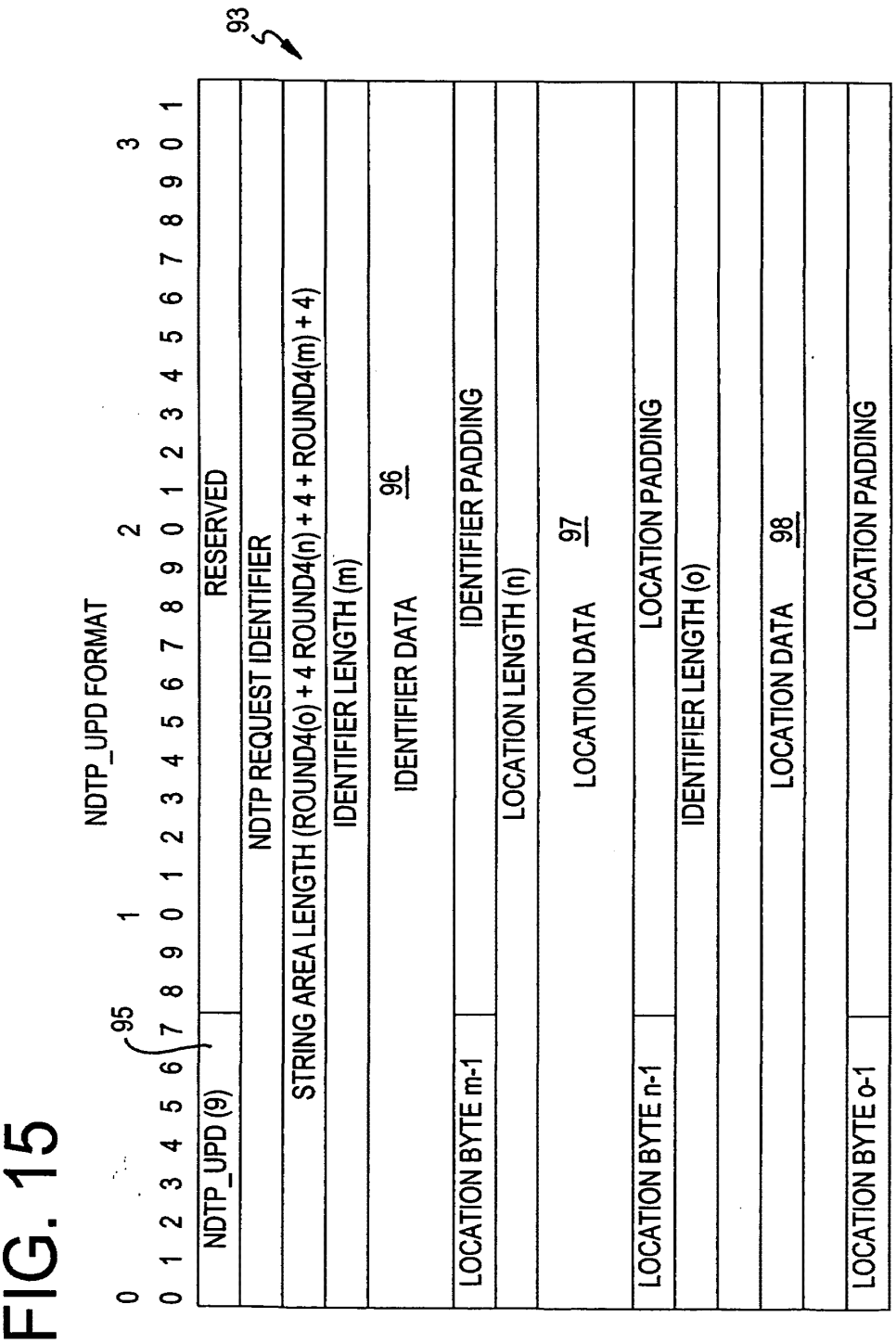

NDTP_DEL FORMAT
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
88
NDTP_DEL (6)
RESERVED
NDTP REQUEST IDENTIFIER
STRING AREA LENGTH (ROUND4(n) + 4 + ROUND4(m) + 4)
IDENTIFIER LENGTH (n)
IDENTIFIER DATA 90
LOCATION BYTE n-1
IDENTIFIER PADDING
LOCATION LENGTH (m)
LOCATION DATA 92
LOCATION BYTE m-1
LOCATION PADDING

FIG. 14

NDTP_DEL_RSP FORMAT
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
94
NDTP_DEL_RSP (7)
RESERVED
NDTP REQUEST IDENTIFIER
STRING AREA LENGTH (0)

FIG. 15


NDTP_UPD FORMAT
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
95
93
NDTP_UPD (9)
RESERVED
NDTP REQUEST IDENTIFIER
STRING AREA LENGTH (ROUND4(o) + 4 ROUND4(n) + 4 + ROUND4(m) + 4)
IDENTIFIER LENGTH (m)
IDENTIFIER DATA 96
LOCATION BYTE m-1
IDENTIFIER PADDING
LOCATION LENGTH (n)
LOCATION DATA 97
LOCATION BYTE n-1
LOCATION PADDING
IDENTIFIER LENGTH (o)
LOCATION DATA 98
LOCATION BYTE o-1
LOCATION PADDING

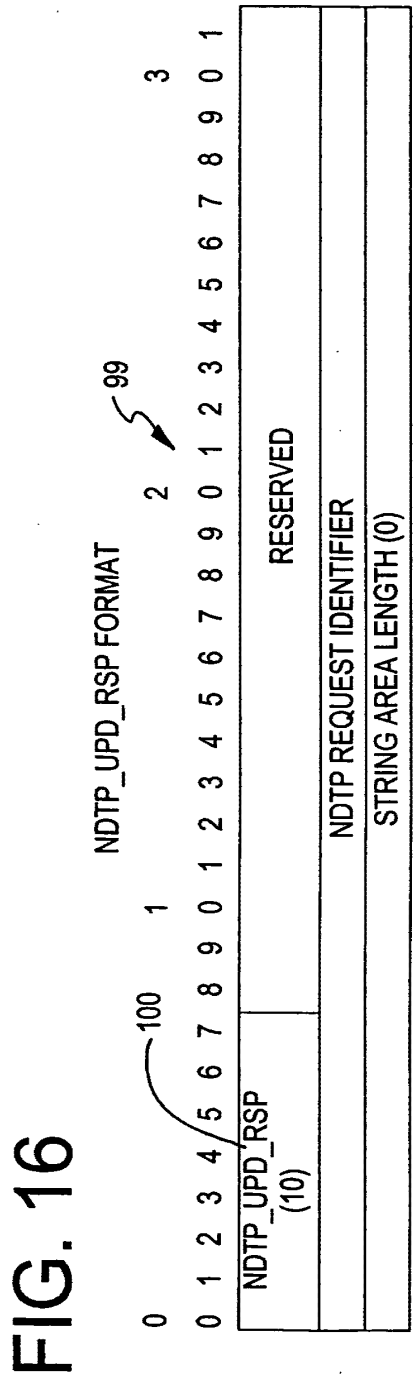

NDTP_UPD_RSP FORMAT
99
100
0 1 2 3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
NDTP_UPD_RSP (10)
RESERVED
NDTP REQUEST IDENTIFIER
STRING AREA LENGTH (0)

FIG. 16

FIG. 17A

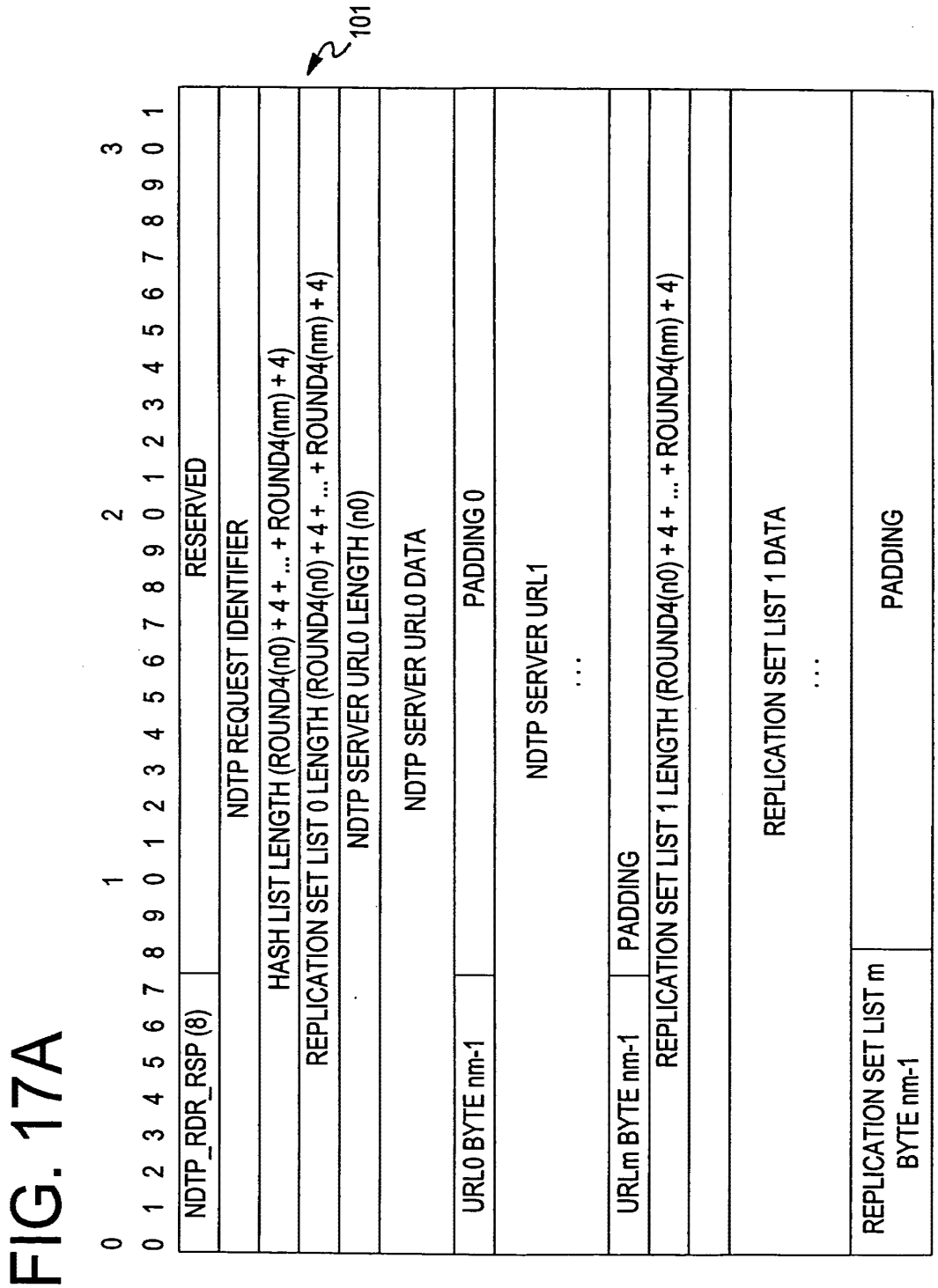

101
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
NDTP_RDR_RSP (8)
RESERVED
NDTP REQUEST IDENTIFIER
HASH LIST LENGTH (ROUND4(n0) + 4 + ... + ROUND4(nm) + 4)
REPLICATION SET LIST 0 LENGTH (ROUND4(n0) + 4 + ... + ROUND4(nm) + 4)
NDTP SERVER URL0 LENGTH (n0)
NDTP SERVER URL0 DATA
URL0 BYTE nm-1
PADDING 0
NDTP SERVER URL1
...
URLm BYTE nm-1
PADDING
REPLICATION SET LIST 1 LENGTH (ROUND4(n0) + 4 + ... + ROUND4(nm) + 4)
REPLICATION SET LIST 1 DATA
...
REPLICATION SET LIST m BYTE nm-1
PADDING

FIG. 17B

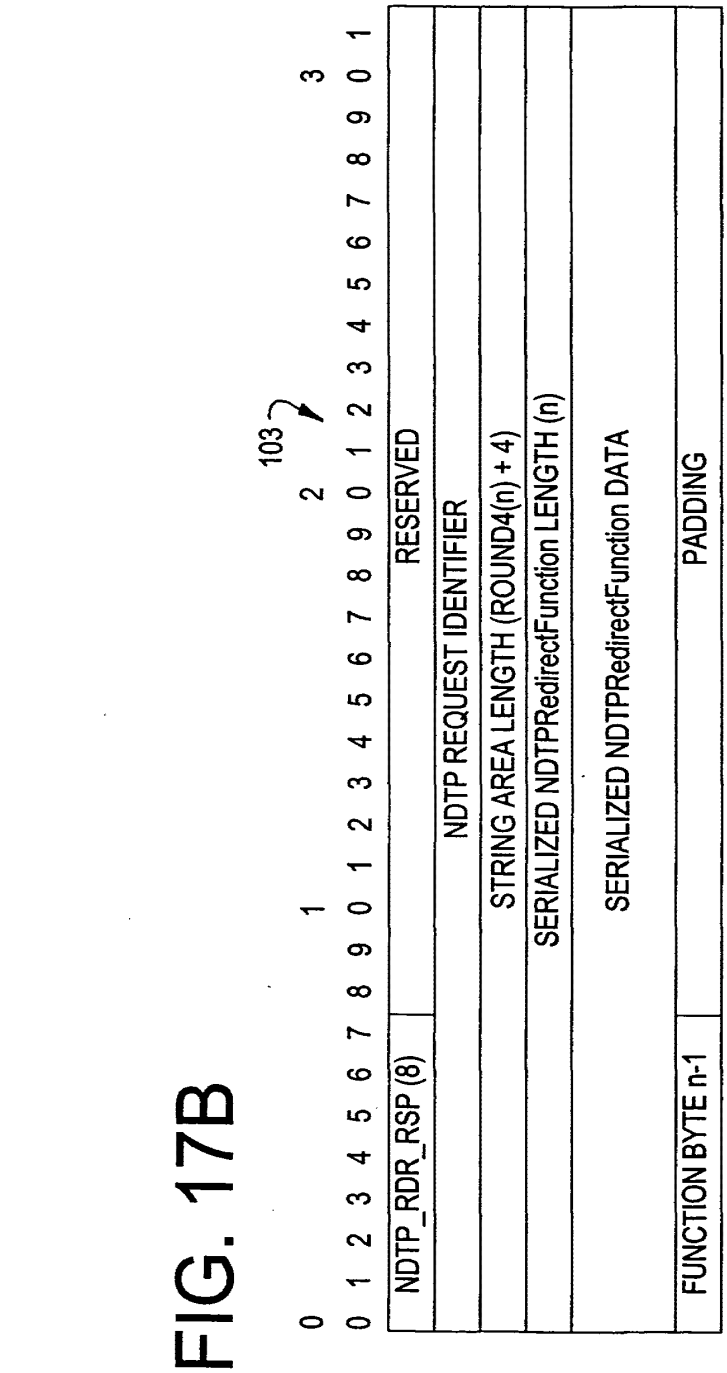

103
0 1 2 3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
NDTP_RDR_RSP (8)
RESERVED
NDTP REQUEST IDENTIFIER
STRING AREA LENGTH (ROUND4(n) + 4)
SERIALIZED NDTPRedirectFunction LENGTH (n)
SERIALIZED NDTPRedirectFunction DATA
FUNCTION BYTE n-1
PADDING

FIG. 18

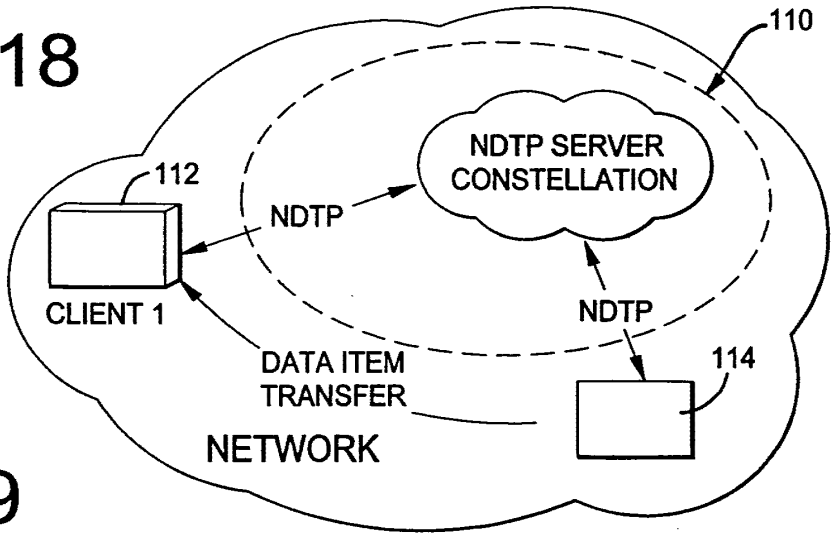


FIG. 19

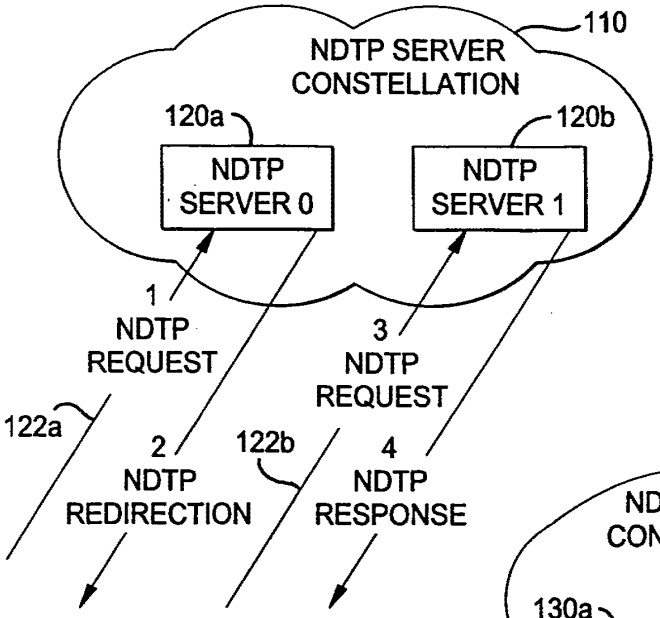


FIG. 20

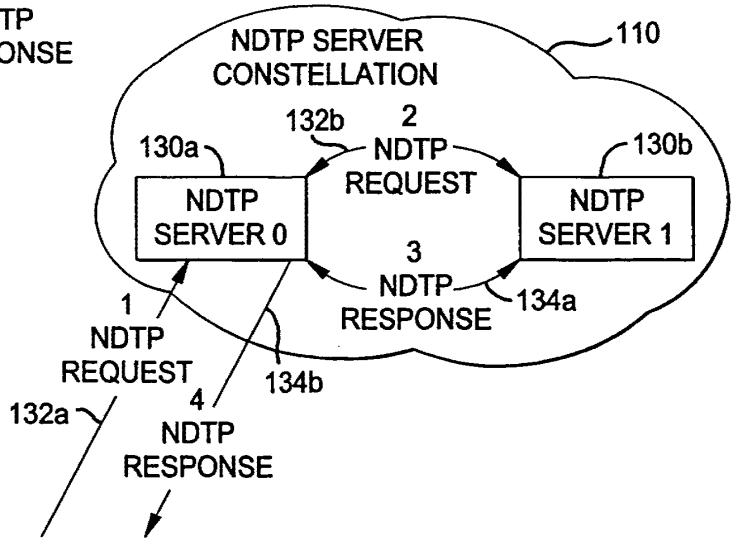


FIG. 21

NETWORK DISTRIBUTED TRACKING
DISTRIBUTED RECORD RETRIEVAL

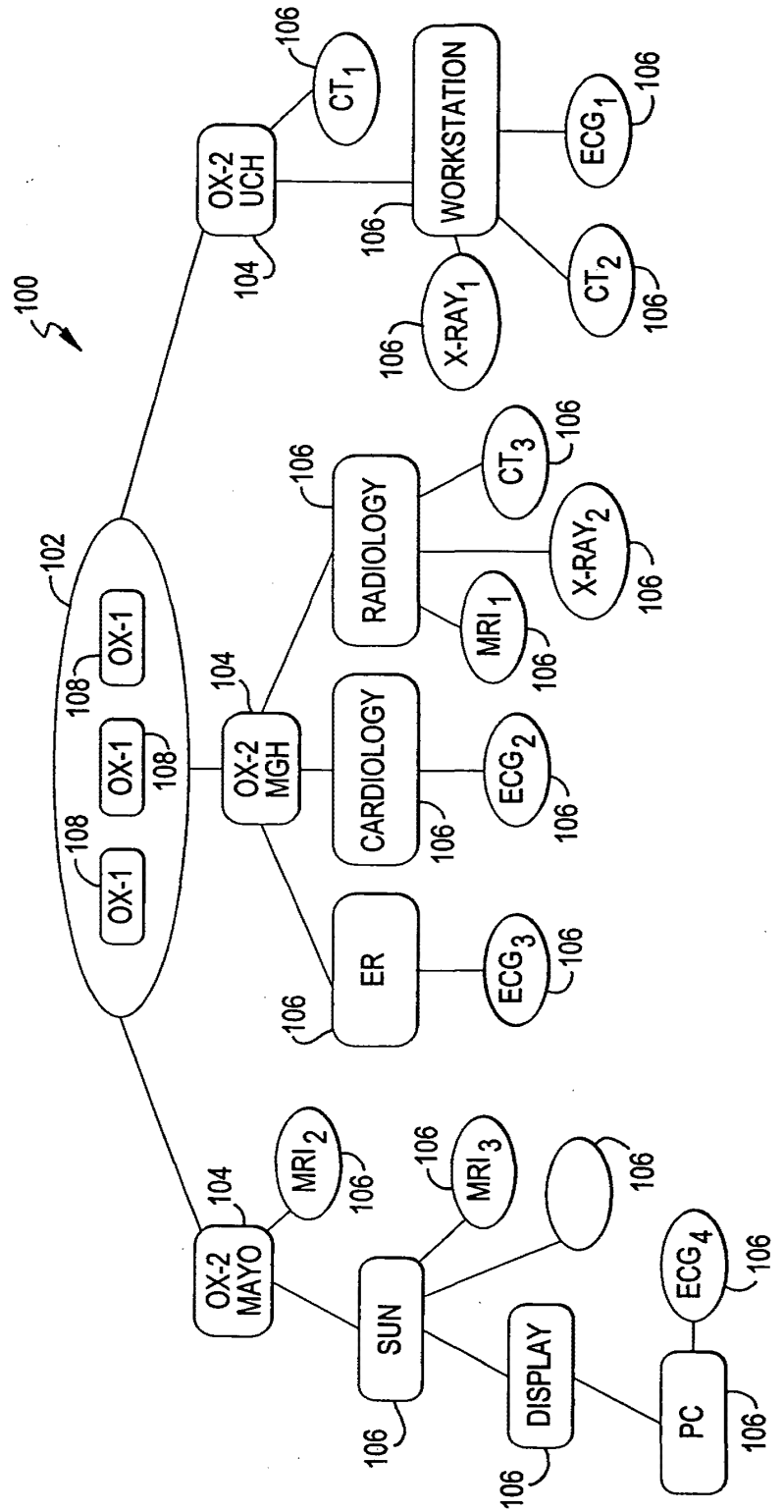


FIG. 22

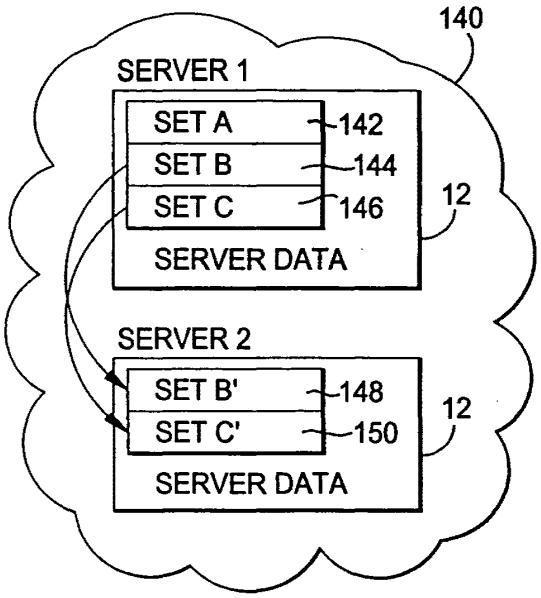
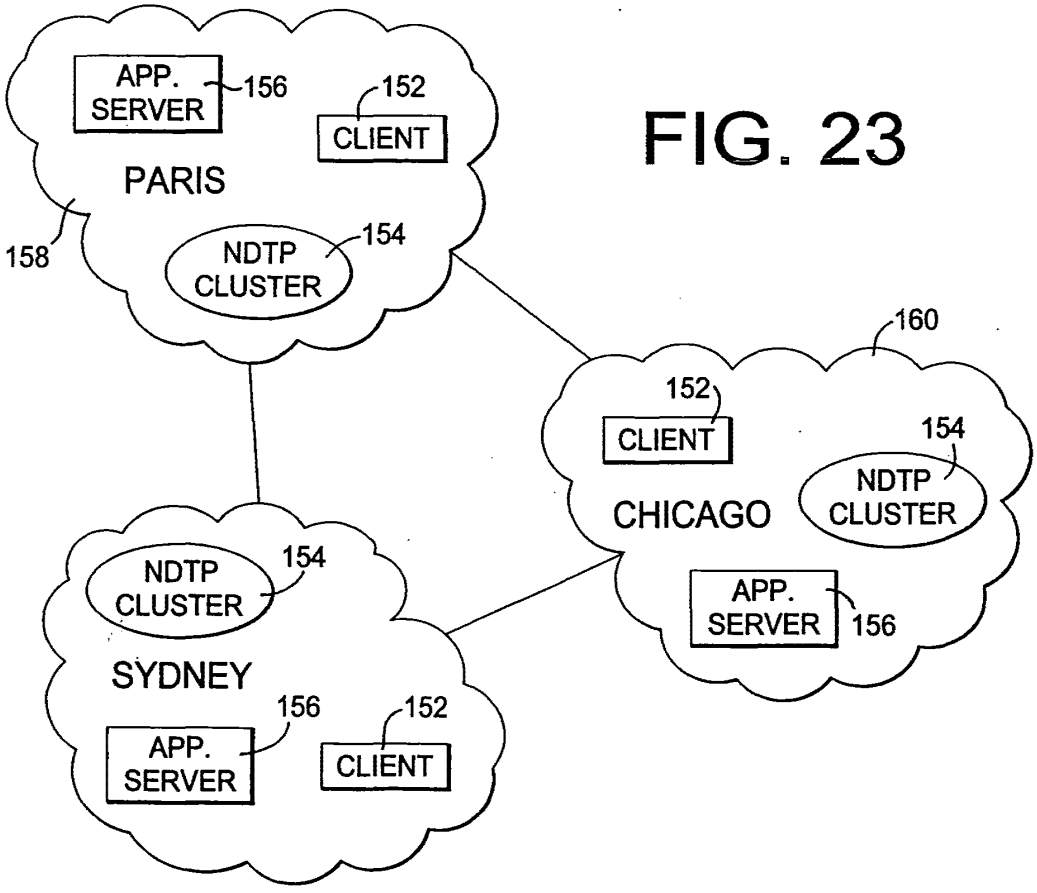

140
SERVER 1
SET A
142
SET B
144
SET C
146
12
SERVER DATA
SERVER 2
SET B'
148
SET C'
150
12
SERVER DATA

FIG. 23


APP. SERVER
156
152
CLIENT
PARIS
158
NDTP CLUSTER
154
160
152
CLIENT
154
NDTP CLUSTER
CHICAGO
APP. SERVER
156
NDTP CLUSTER
154
SYDNEY
156
APP. SERVER
152
CLIENT

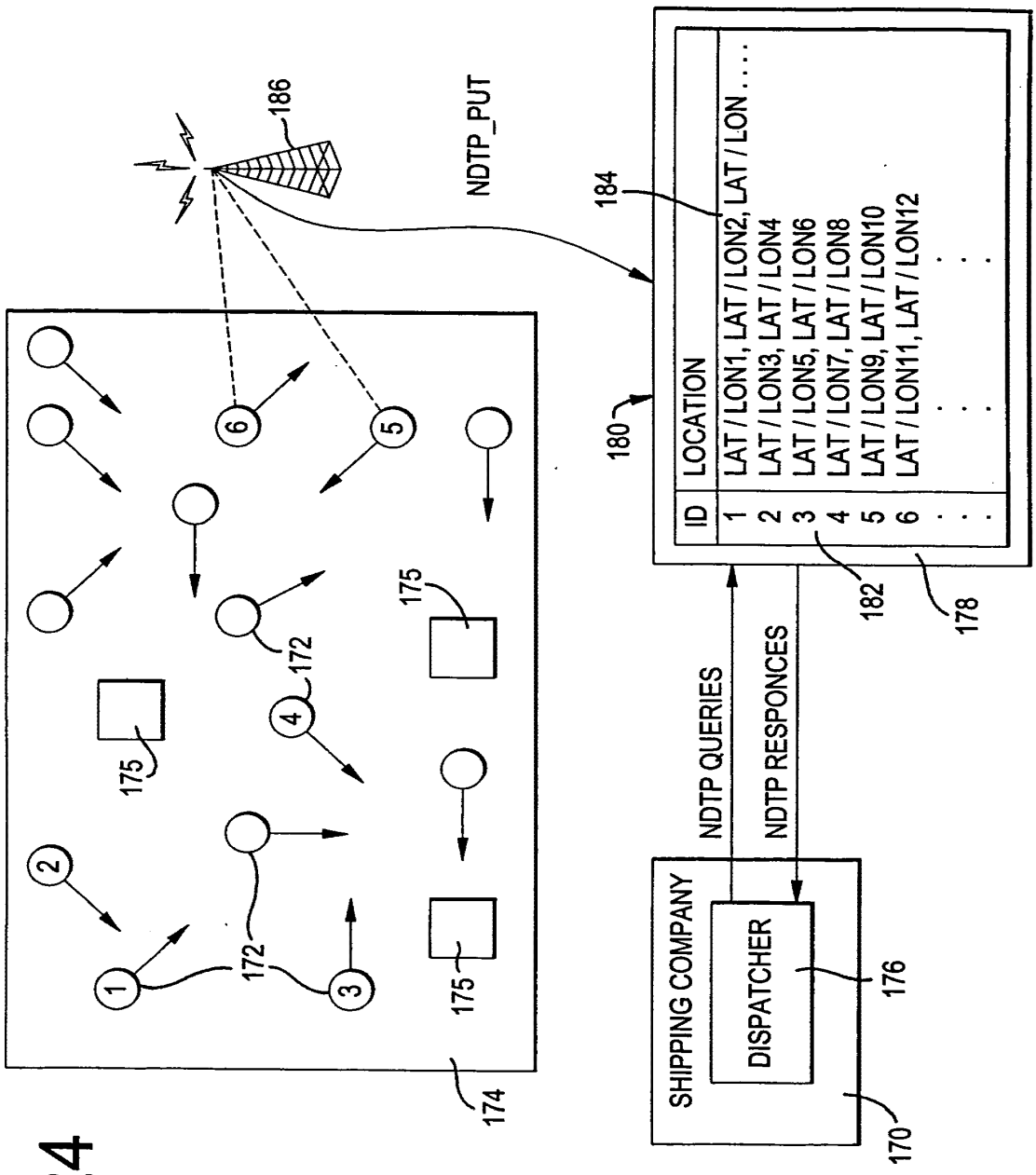

186
NDTP_PUT
184
180
ID
LOCATION
1 LAT / LON1, LAT / LON2, LAT / LON .....
2 LAT / LON3, LAT / LON4
3 LAT / LON5, LAT / LON6
4 LAT / LON7, LAT / LON8
5 LAT / LON9, LAT / LON10
6 LAT / LON11, LAT / LON12
182
178
NDTP QUERIES
NDTP RESPONCES
SHIPPING COMPANY
DISPATCHER
176
170
172
175
174

FIG. 24

FIG. 25

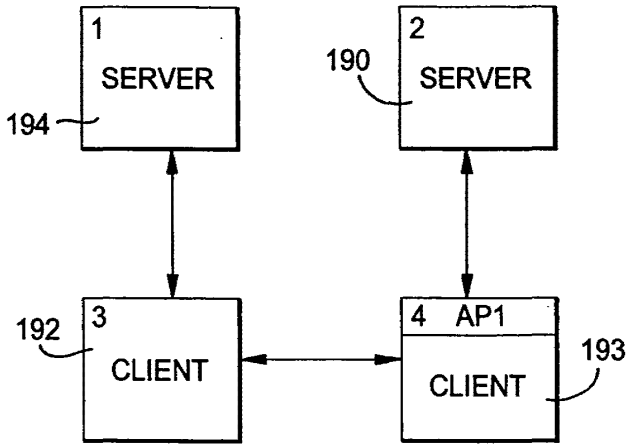
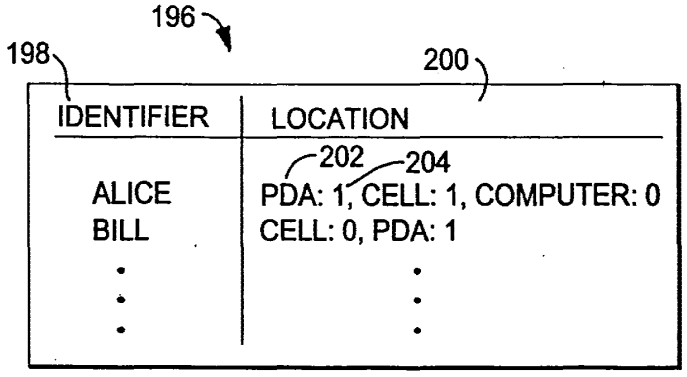

1
SERVER
194
2
190
SERVER
192
3
CLIENT
4 AP1
CLIENT
193

FIG. 26


196
198
200
IDENTIFIER
LOCATION
202
204
ALICE
PDA: 1, CELL: 1, COMPUTER: 0
BILL
CELL: 0, PDA: 1

OIPE JC10 SEP 14 2001 PATENT & TRADEMARK OFFICE

A system for universal image tracking comprising:

An image forming apparatus;

A CPU integral to the image forming apparatus;

User input means connected to the CPU for receiving user input;

Logic stored in the CPU for receiving user input and creating archive data based upon the user input; and

A Graphic code producer responsive to the CPU for producing graphic codes representative of the archive data.

2. The system for universal image tracking of claim 1 wherein the image forming apparatus is a film based camera.

3. The system for universal image tracking of claim 1 wherein the image forming apparatus is a digital based camera.

4. The system for universal image tracking of claim 1 wherein the image forming apparatus is a video camera.

5. The system for universal image tracking of claim 1 wherein the image forming apparatus is a digital image processor.

6. The system for universal image tracking of claim 1 wherein the image forming apparatus is a medical image sensor.

7. The system for universal image tracking of claim 6 wherein the medical image sensor is a magnetic resonance imager.

the medical image sensor is an X-ray imager.

9. The system for universal image tracking of claim 6 wherein the medical image sensor is a CAT scan imager.

10. The system for universal image tracking of claim 1 wherein the user input means is a push button input.

11. The system for universal image tracking of claim 1 wherein the user input means is a keyboard.

12. The system for universal image tracking of claim 1 wherein the user input means is voice recognition equipment.

13. The system for universal image tracking of claim 1 wherein the graphic codes are one-dimensional.

14. The system for universal image tracking of claim 1 wherein the graphic codes are two-dimensional.

15. The system for universal image tracking of claim 1 wherein the graphic codes are three-dimensional.

16. The system for universal image tracking of claim 1 wherein the logic comprises configuration input processing for determining bounds for the archive data generation based on configuration input;

a resolver for determining the correct value of archive data representing the image forming apparatus and the configuration input; and

17. The system for universal image tracking of claim 16 wherein the timer further comprises a filter for processing the time stamp according to configuration input rules.

18. The system for universal image tracking of claim 16 wherein the configuration input comprises at least generation, sequence, data, unit, and constants information.

19. The system for universal image tracking of claim 1 further comprising a graphic code reader connected to the CPU for reading a graphic code on an image representing archive information; and

A decoder for decoding the archive information represented by the graphic code.

20. The system for universal image tracking of claim 19 wherein the logic further comprises:

logic for receiving a second user input and creating lineage archive information relating to the image based upon the archive information and the second user input; and

logic for producing graphic code representative of the lineage archive data.

the archive data comprises location attributes of an image.

22. The system for universal image tracking of claim 1 wherein the archive data comprises physical attribute of an image.

23. The system for universal image tracking of claim 1 wherein each image in an image archive has unique archive data associated with each image.

24. The system for universal image tracking of claim 21 wherein the location data comprises at least:

image generation depth;

serial sequence of lot within an archive;

serial sequence of unit within a lot;

date location of a lot within an archive;

date location of an image within an archive;

author of the image; and

device producing the image.

25. The system for universal image tracking of claim 16 wherein the timer tracks year in the range of from 0000 to 9999.

26. The system for universal image tracking of claim 16 wherein the timer tracks all 12 months of the year.

27. The system for universal image tracking of claim 16

minutes.

28. The system for universal image tracking of claim 16 wherein the timer tracks time in fractions of a second.

29. The system for universal image tracking of claim 16 wherein the system is ISO 8601:1988 compliant.

30. The system for universal image tracking of claim 22 wherein the physical attributes comprise at least:

image category;

image size;

push status;

digital dynamic range;

image medium;

image resolution;

image stain; and

image format.

31. The system for universal image tracking of claim 20 wherein the lineage archive information comprises a parent number.

32. The system for universal image tracking of claim 31 wherein the parent number comprises at least:

a parent conception date; and

a parent conception time.

inputting raw image data to an image forming apparatus; inputting image-related data; creating first archive data based upon the image-related data; and translating the first archive data into a form that can be attached to the raw image data.

34. The method for universally tracking images of claim 33 wherein the raw image data is from a film based camera.

35. The method for universally tracking images of claim 33 wherein the raw image data is from a digital camera.

36. The method for universally tracking images of claim 33 wherein the raw image data is from a video camera.

37. The method for universally tracking images of claim 33 wherein the raw image data is from a digital image processor.

38. The method for universally tracking images of claim 33 wherein the raw image data is from a medical image sensor.

39. The method for universally tracking images of claim 38 wherein the medical image sensor is a magnetic resonance imager.

40. The method for universally tracking images of claim 38 wherein the raw image data is from an X-ray imager.

41. The method for universally tracking images of claim 38

42. The method for universally tracking images of claim 33 wherein the inputting image related data occurs without user intervention.

43. The method for universally tracking images of claim 33 wherein the inputting of image related data occurs via push button input.

44. The method for universally tracking images of claim 33 wherein the inputting of image related data occurs via voice recognition equipment.

45. The method for universally tracking images of claim 33 wherein the inputting of image related data occurs via a keyboard.

46. The method for universally tracking images of claim 33 wherein the form of the translated archive data is an electronic file.

47. The method for universally tracking images of claim 33 wherein the form of the translated data is a graphic code.

48. The method for universally tracking images of claim 47 wherein the graphic code is one dimensional.

49. The method for universally tracking images of claim 47 wherein the graphic code is two dimensional.

50. The method for universally tracking images of claim 47

51. The method for universally tracking images of claim 33 wherein the image data comprises image data and second archive data.

52. The method for universally tracking images of claim 33 further comprising reading the second archive data; and creating lineage archive information relating to the image based upon the first archive information and second archive information.

53. The method for universally tracking images of claim 33 wherein the inputting of image related data comprises configuration input processing for determining bounds for the archive data generation based upon configured input; determining the correct value of archive data representing the image forming apparatus and configuration input; and date/time stamping the image related data.

54. The method for universally tracking images of claim 53 wherein date/time stamping is filtered according to configuration input rules.

55. The method for universally tracking images of claim 33 wherein the configuration input comprises at least generation, sequence, data, unit, and constants information.

wherein the first archive data comprises location attributes of an image.

57. The method for universally tracking images of claim 33 wherein the first archive data comprises physical attributes of an image.

58. The method for universally tracking images of claim 56 wherein the location attributes comprise at least:

image generation depth;

serial sequence of lot within an archive;

serial sequence of unit within a lot;

date location of a lot within an archive;

date location of an image within an archive;

author of the image; and

device producing the image.

59. The method for universally tracking images of claim 57 wherein the physical attributes of an image comprise at least:

image category;

image size;

push status;

digital dynamic range;

image medium;

image resolution;

image stain; and

image format.

60. The method for universally tracking images of claim 52 wherein the lineage archive information comprises a parent number.

61. The method for universally tracking images of claim 52 wherein the parent number comprises at least:

a parent conception date; and

a parent conception time.

62. The system for universal image tracking of claim 1 wherein the input means comprises a magnetic card reader.

63. The system for universal image tracking of claim 1 wherein the input means comprises a laser scanner.

64. The system for universal image tracking of claim 31 wherein the physical attributes further comprise;

imageRes; and

imageCus.

65. The method for universally tracking images of claim 33 wherein the inputting image related data is via a magnetic card reader.

66. The method for universally tracking images of claim 33

scanner.

67. The method of universally tracking images of claim 33 wherein the inputting of image related data is via an optical reader.

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WE CLAIM:

1. A network distributed tracking wire transfer protocol comprising:

a variable length identification string, the identification string for specifying the identity of an entity in a distributed data collection; and

a variable length location string, the location string for specifying the network location of data associated with an entity in a distributed data collection;

wherein a relationship between the identification string and the location string can be spontaneously and dynamically created and modified.

2. The network distributed tracking wire transfer protocol defined in claim 1, wherein the protocol is application independent.

3. The network distributed tracking wire transfer protocol defined in claim 1, wherein the protocol is organizationally independent..

4. The network distributed tracking wire transfer protocol defined in claim 1, wherein the protocol is geographically independent.

5. A system having a network distributed tracking wire transfer protocol for storing and identifying data with a distributed data collection, comprising:

a data repository, the data repository for storing data in a distributed data collection;

a client entity, the client entity for manipulating data in the distributed data collection; and

a first server entity, the first server entity operative to locate data in the distributed data collection;

wherein the client entity transmits an identifier string to the first server entity along with a client request and the first server entity provides at least one location string to the client entity in response thereto.

6. The system defined in claim 5, further comprising a second server entity coupled to the first server entity.

7. The system defined in claim 5, wherein the first server entity maps the identifier string received from the client entity to the at least one location string.

8. The system defined in claim 7, wherein the mapping is performed using a hash operation.

9. The system defined in claim 6, wherein the first server entity transmits the client request to the second server entity if the first server entity cannot provide the at least one location string to the client entity.

10. The system defined in claim 9, wherein the second server entity maps the identifier string received from the first server entity to the at least one location string.

11. The system defined in claim 10, wherein the second server entity transmits the at least one location string to the first server entity for transmission to the client entity.

12. A method for storing and retrieving tracking information over a network using a wire transfer protocol, comprising the steps of:

providing a location string and an identification string, the location string for specifying the location of data associated with an entity in a distributed data collection and the identification string for specifying the identification of an entity in the distributed data collection;

storing information at a data repository entity by associating an identification string with each particular stored unit of information and by mapping the identification string to at least one location string associated with the data repository entity, the identification string and the at least one location

string for a particular unit of information being stored at a first server entity coupled to the data repository entity;

transmitting a request from a client entity to the first server entity to retrieve at least one location string associated with a particular stored unit of information, the request including the identification string associated with the particular stored unit of information; and

receiving the request at the first server entity and responding to the client entity by providing at least one location string associated with the particular stored unit of information to the client entity.

13. The method for storing and retrieving tracking information defined in claim 12, further comprising the step of transmitting the request to a second server entity prior to responding to the client entity, the second server entity coupled to the first server entity and having stored therewith the mapping of the identification string and the at least one location string for the particular unit of information.

14. The method for storing and retrieving tracking information defined in claim 13, wherein the second server entity responds to the client entity by providing the location string associated with the particular stored unit of information to the second client entity.

15. The method for storing and retrieving tracking information defined in claim 12, wherein the lengths of the identification string and the at least one location string are variable.

16. The method for storing and retrieving tracking information defined in claim 12, further comprising the step of spontaneously and dynamically manipulating the mapping of an identification string to a location string.

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We claim:

1. A method for establishing and retrieving data based on global indices comprising:

establishing a unique device ID for each of a plurality of data generating devices on a network;

registering the unique device ID of each of the plurality of data generating devices on the network on at least one server connected to the network when the data generating equipment is first used on the network;

establishing a unique user ID for each user of the data generating devices when the user uses one of the plurality of data generating devices for the first time; and

retrieving data generated by the plurality of data generating devices by searching for instances of the unique user ID.

2. The method for establishing and retrieving data based on global indices of claim 1 wherein establishing the unique user ID further comprises combining the device ID of the data generating device being used by the user with a date/time stamp of the first use by the user.

3. The method for establishing and retrieving data based on global indices of claim 2 further comprising storing the unique user ID on a token given to the user.

4. The method for establishing and retrieving data based on gloval indices of claim 3 further comprising the user using the token with the unique user ID for all subsequent uses of any of the plurality of data generating devices.

5. The method for establishing and retrieving data based on global indices of claim 1 wherein the data generated is medical data concerning the user.

6. The method for establishing and retrieving data based on global indices of claim 1 wherein the data generated is commercial data.

7. A system for establishing and retrieving data based on global indices comprising:

a network;

a plurality of servers connected to the network for storing data and responding to search requests;

a plurality of data generating devices connected to the servers, wherein each data generating device has a unique ID that is registered with at least one server when the data generating device is first used of the network;

unique user ID generator associated with each data generating device whereby a unique user ID is established by combining the unique device ID with a date time stamp of when the user first used any of the plurality of data generating devices on the network; and

search logic for searching for instances of the unique user ID on any of the plurality of servers.

8. The system for establishing and retrieving data based on global indices of claim 7 wherein the data generating devices are medical data generating devices.

9. The system for establishing and retrieving data based on global indices of claim 7 further comprising tokens generated by each of the plurality of data generating devices on which is stored each unique user ID.

10. The system for establishing and retrieving data based on global indices of claim 7 wherein the data generated is commercial data.

11. The system for establishing and retrieving data based on global indices of claim 9

wherein each of the plurality of data generating devices further comprises a token reader for reading the unique user ID stored on the token of a user.

12. The system for establishing and retrieving data based on global indices of claim 7 further comprising data transport logic for transporting data generated from one data generating device to another once the location of the data has been determined by the search logic identifying instances of the unique user ID on any of the plurality of servers.

13. A method for establishing and retrieving data based on global indices comprising:

establishing a unique device ID for each of a plurality of data generating devices on a network;

registering the unique device ID of each of the plurality of data generating devices on the network on at least one server connected to the network when the data generating equipment is first used on the network;

establishing a unique record ID for each record of the data generating devices when the record is created using one of the plurality of data generating devices for the first time; and

retrieving data generated by the plurality of data generating devices by searching for instances of the unique record ID.

14. The method for establishing and retrieving data based on global indices of claim 13 wherein the records creating is creating records of parts of an assembly.

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I Claim:

1. A system for universal object tracking comprising:

an object forming apparatus;

a CPU integral to the image forming apparatus;

user input means connected to the CPU for receiving user input;

logic stored in the CPU for receiving user input and creating archive data based upon the user input; and

a graphic code producer responsive to the CPU for producing graphic codes representative of the archive data.

2. The system for universal object tracking of claim 1 wherein the object forming apparatus is taken from the group consisting of imaging forming apparatus, digital data forming apparatus, electronic data forming apparatus.

3. The system for universal object tracking of claim 1 wherein the object forming apparatus is a digital camera.

4. The system for universal object tracking of claim 1 wherein the object forming apparatus is a video camera.

5. The system for universal object tracking of claim 1 wherein the object forming apparatus is a digital image processor.

6. The system for universal object tracking of claim 1 wherein the object forming apparatus is a medical image sensor.

7. The system for universal object tracking of claim 6 wherein the medical image sensor is a magnetic resonance imager.

8. The system for universal object tracking of claim 6 wherein the medical image sensor is an X-ray imager.

9. The system for universal object tracking of claim 6 wherein the medical image sensor is a CAT scan imager.

10. The system for universal object tracking of claim 1 wherein the user input means is a push button input.

11. The system for universal object tracking of claim 1 wherein the user input means is a keyboard.

12. The system for universal object tracking of claim 1 wherein the user input means is voice recognition equipment.

13. The system for universal object tracking of claim 1 wherein the graphic codes are one-dimensional.

14. The system for universal object tracking of claim 1 wherein the graphic codes are two-dimensional.

15. The system for universal object tracking of claim 1 wherein the graphic codes are three-dimensional.

16. The system for universal object tracking of claim 1 wherein the logic comprises configuration input processing for determining bounds for the archive data generation based on configuration input;

a resolver for determining the correct value of archive data representing the image forming apparatus and the configuration input; and a timer for creating date/time stamps.

17. The system for universal object tracking of claim 16 wherein the timer further comprises a filter for processing the time stamp according to configuration input rules.

18. The system for universal object tracking of claim 16 wherein the configuration input comprises at least generation, sequence, data, unit, and constants information.

19. The system for universal object tracking of claim 1 further comprising a graphic code reader connected to the CPU for reading a graphic code on an image representing archive information; and

A decoder for decoding the archive information represented by the graphic code.

20. The system for universal object tracking of claim 19 wherein the logic further comprises:

logic for receiving a second user input and creating lineage archive information relating to the image based upon the archive information and the second user input; and

logic for producing graphic code representative of the lineage archive data.

21. The system for universal object tracking of claim 1 wherein the archive data comprises location attributes of an image.

22. The system for universal object tracking of claim 1 wherein the archive data comprises physical attribute of an image.

23. The system for universal object tracking of claim 1 wherein each image in an image archive has unique archive data associated with each image.

24. The system for universal object tracking of claim 21 wherein the location data comprises at least:

image generation depth;

serial sequence of lot within an archive;

serial sequence of unit within a lot;

date location of a lot within an archive;

date location of an image within an archive;

author of the image; and

device producing the image.

25. The system for universal object tracking of claim 16 wherein the timer tracks year in the range of from 0000 to 9999.

26. The system for universal object tracking of claim 16 wherein the timer tracks all 12 months of the year.

27. The system for universal object tracking of claim 16 wherein the timer tracks time in at least hours and minutes.

28. The system for universal object tracking of claim 16 wherein the timer tracks time in fractions of a second.

29. The system for universal object tracking of claim 16 wherein the system is ISO 8601:1988 compliant.

30. The system for universal object tracking of claim 22 wherein the physical attributes comprise at least:

image category;

image size;

push status;

digital dynamic range;

image medium;

image resolution;

image stain; and

image format.

31. The system for universal object tracking of claim 20 wherein the lineage archive information comprises a parent number.

32. The system for universal object tracking of claim 31 wherein the parent number comprises at least:

a parent conception date; and

a parent conception time.

33. A method for universally tracking objects comprising:

inputting raw object data to an object forming apparatus; inputting object-related data; creating first archive data based upon the object-related data; and translating the first archive data into a form that can be attached to the raw object data.

34. The method for universally tracking objects of claim 33 wherein the raw object data is from a film based camera.

35. The method for universally tracking objects of claim 33 wherein the raw object data is from a digital camera.

36. The method for universally tracking objects of claim 33 wherein the raw object data is from a video camera.

37. The method for universally tracking objects of claim 33 wherein the raw object data is from a digital image processor.

38. The method for universally tracking objects of claim 33 wherein the raw object data is from a medical image sensor.

39. The method for universally tracking objects of claim 38 wherein the medical object sensor is a magnetic resonance imager.

40. The method for universally tracking objects of claim 38 wherein the raw object data is from an X-ray imager.

41. The method for universally tracking objects of claim 38 wherein the raw object data is from a CAT scan imager.

42. The method for universally tracking objects of claim 33 wherein the inputting object related data occurs without user intervention.

43. The method for universally tracking objects of claim 33 wherein the inputting of object related data occurs via push button input.

44. The method for universally tracking objects of claim 33 wherein the inputting of object related data occurs via voice recognition equipment.

45. The method for universally tracking objects of claim 33 wherein the inputting of object related data occurs via a keyboard.

46. The method for uñiversally tracking objects of claim 33 wherein the form of the translated archive data is an electronic file.

47. The method for universally tracking objects of claim 33 wherein the form of the translated data is a graphic code.

48. The method for universally tracking objects of claim 47 wherein the graphic code is one dimensional.

49. The method for universally tracking objects of claim 47 wherein the graphic code is two dimensional.

50. The method for universally tracking objects of claim 47 wherein the graphic code is three dimensional.

51. The method for universally tracking objects of claim 33 wherein the object data comprises image data and second archive data.

52. The method for universally tracking objects of claim 33 further comprising reading the second archive data; and creating lineage archive information relating to the object based upon the first archive information and second archive information.

53. The method for universally tracking objects of claim 33 wherein the inputting of object related data comprises configuration input processing for determining bounds for the archive data generation based upon configured input;

determining the correct value of archive data representing the object forming apparatus and configuration input; and date/time stamping the object related data.

54. The method for universally tracking objects of claim 53 wherein date/time stamping is filtered according to configuration input rules.

55. The method for universally tracking objects of claim 33 wherein the configuration input comprises at least generation, sequence, data, unit, and constants information.

56. The method for universally tracking objects of claim 33 wherein the first archive data comprises location attributes of an object.

57. The method for universally tracking objects of claim 33 wherein the first archive data comprises physical attributes of an object.

58. The method for universally tracking objects of claim 56 wherein the location attributes comprise at least:

object generation depth;

serial sequence of lot within an archive;

serial sequence of unit within a lot;

date location of a lot within an archive;

date location of an object within an archive;

author of the object; and

device producing the object.

59. The method for universally tracking objects of claim 57 wherein the physical attributes of an object comprise at least:

object category;

image size;

push status;

digital dynamic range;

image medium;

software set;

image resolution;

image stain; and

image format.

60. The method for universally tracking objects of claim 52 wherein the lineage archive information comprises a parent number.

61. The method for universally tracking objects of claim 52 wherein the parent number comprises at least:

a parent conception date; and

a parent conception time.

62. The system for universal object tracking of claim 1 wherein the input means comprises a magnetic card reader.

63. The system for universal object tracking of claim 1 wherein the input means comprises a laser scanner.

64. The system for universal object tracking of claim 31 wherein the physical attributes further comprise;

imageRes; and

imageCus.

65. The method for universally tracking objects of claim 33 wherein the inputting object related data is via a magnetic card reader.

66. The method for universally tracking objects of claim 33 wherein the inputting of object related data is via a laser scanner.

67. The method of universally tracking objects of claim 33 wherein the inputting of object related data is via an optical reader.

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail, with sufficient postage, in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231, on September 10, 2001.

Kent E. Genin
Name of Applicant, Assignee or Registered Representative

Signature

9/10/2001
Date of Signature

PATENT
CASE NO. 10406/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	
J. Overton et al.	Group Art Unit: 2152
Serial No. 09/872,736	
Filed: June 1, 2001	
For: METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK	

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Pursuant to the obligation under 37 C.F.R. § 1.56 and in conformance with 37 C.F.R. § 1.97-1.99, Applicant hereby submits the following references for consideration by the Examiner. Copies of each have been enclosed along with the form PTO-1449.

Except for the references marked with a bullet ("•"), all the references listed below and on the enclosed form PTO-1449 were previously cited or submitted in the

prior application 09/367,461 to which Applicant claims priority under 35 U.S.C. § 120, and therefore copies of these previously cited or submitted references are not provided in this application as permitted by 37 C.F.R. § 1.98 (d).

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• Copy of claims for U.S. Application Serial No. 09/111,896 filed July 8, 1998 entitled System And Method For Establishing And Retrieving Data Based On Global Indices.

• Copy of claims for U.S. Application Serial No. 09/503,441 filed February 14, 2000 entitled Automated Image Archiving System.

• Copy of claims for U.S. Application Serial No. 09/367,461 filed August 13, 1999 entitled Automated Image Archiving System.

• Copy of claims for U.S. Application Serial No. 09/661,222 filed September 13, 2000 entitled Network Distributed Tracking Wire Transfer Protocol.

EXPLANATION OF THE REFERENCES

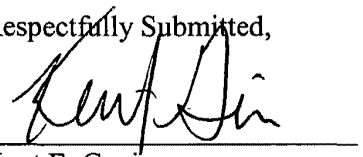
As of the day of filing of this information disclosure statement, a first office action on the merits has not been received by the undersigned. Accordingly, no fee for consideration of the information provided with this disclosure statement is included herewith, as permitted by 37 C.F.R. § 1.97(b)(3). However, if an office action on the

merits is mailed on a date prior hereto, Applicant hereby requests and authorizes the Commissioner to charge Deposit Account 23-1925 for the appropriate fee of $180 as set forth in 37 C.F.R. § 1.97(c) for consideration of the information set forth in this disclosure statement.

Applicant requests to have these references included in the record of this application. Applicant further requests that the Examiner review the entire disclosure of each reference.

Applicant does not represent any of these references to be prior art and Applicant reserves the right to disqualify any references by the showing of an earlier date of invention, if appropriate.

Respectfully Submitted,



Kent E. Genin
Reg. No. 37,834
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
P.O. Box 10395
Chicago, IL 60610
(312) 321-7732

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FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 10406/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

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FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 10406/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

REFERENCE DESIGNATION **U.S. PATENT DOCUMENTS**

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(71)(72) Applicant and Inventor: OVERTON, John [US/US]; 5825 S. Blackstone, Chicago, IL 60637 (US).

(74) Agent: ROBERTS, Jon, L.; Roberts & Brownell, L.L.C., Suite 212, 8381 Old Courthouse Road, Vienna, VA 22182 (US).

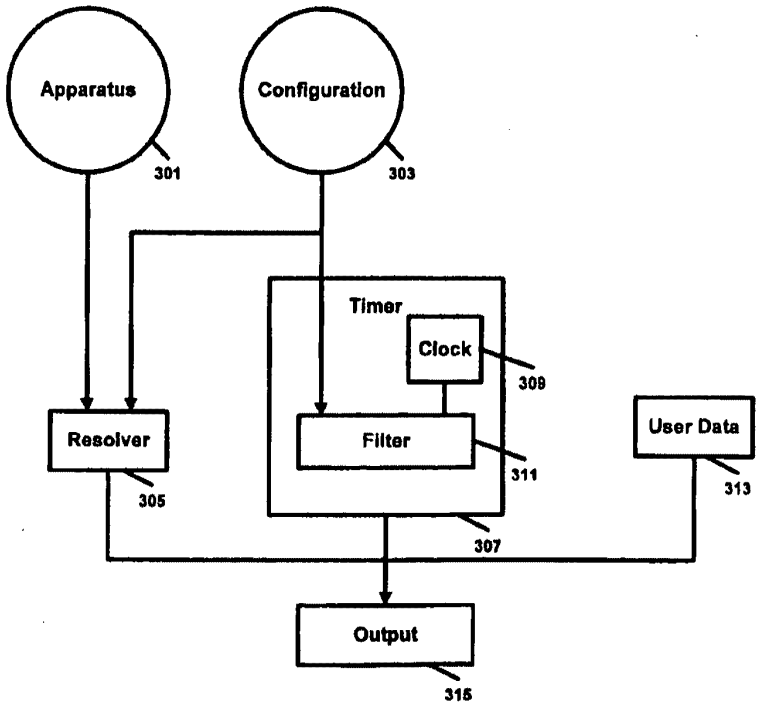
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(54) Title: AUTOMATED SYSTEM FOR IMAGE ARCHIVING

(57) Abstract

A method for producing universal image tracking implementations. This invention provides a functional implementation, from which any image-producing device can construct automatically generated archival enumerations. This implementation uses an encoding schemata based on location numbers, image numbers, and parent numbers, anticipated by the formal specifications. Location numbers encode information about logical sequence in the archive, image numbers encode information about the physical attributes of an image, and parent numbers record the conception date and time of a given image's parent. Parent-child relations are algorithmically derivable from location and parent number relationships, thus providing fully recoverable, cumulative image lineage information. Encoding schemata are optimized for use with all current and arriving barcode symbologies to facilitate data transportation across disparate technologies (e.g., negatives to prints to computers). The implemented system is seamlessly compatible with traditional database "key-driven" recovery systems, as well as with portable decoding systems capable of reading self-contained databases directly from images.



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Title: Automated System for Image Archiving

Reference to Related Application

This application claims the benefit of U.S. Provisional Application No. 60/035,485 filed January 13, 1997 entitled "Automated Image Archiving System."

Field of Invention

This invention relates generally to archive and documentation of data. More particularly this invention is a universal image tracking system wherein generations of images can be related one to another and to original images that contributed to a final image without significant user intervention.

Background of the Invention

Increasingly, images of various types are being used in a wide variety of industrial, digital, medical, and consumer uses. In the medical field, telemedicine has made tremendous advances that now allow a digital image from some medical sensor to be transmitted to specialists who have the requisite expertise to diagnose injury and disease at locations remote from where the patient lies. However, it can be extremely important for a physician, or indeed any other person to understand how the image came to appear as it does. This involves a knowledge of how the image was processed in order to reach the rendition being examined. In certain scientific applications, it may be important to "back out" the effect of

a particular type of processing in order to more precisely understand the appearance of the image when first made.

Varieties of mechanisms facilitate storage and retrieval of archival information relating to images. However, these archival numbering and documentation schemes suffer from certain limitations. For example, classificatory schemata are used to facilitate machine sorting of information about a subject ("subject information") according to categories into which certain subjects fit. Additionally tracking information, that is, information concerning where the image has been or how the image was processed, is also used together with classificatory schemata.

However, relying on categorizing schemata is inefficient and ineffective. On the one hand, category schemata that are limited in size (i.e. number of categories) are convenient to use but insufficiently comprehensive for large-scale applications, such as libraries and national archives. Alternatively if the classificatory schemata is sufficiently comprehensive for large-scale applications, it may well be far too complicated, and therefore inappropriate for small scale applications, such as individual or corporate collections of image data.

It is also an approach to provide customizable enumeration strategies to narrow the complexity of large-scale systems and make them discipline specific. Various archiving schemes are developed to suit a particular niche or may be

customizable for a niche. This is necessitated by the fact that no single solution universally applies to all disciplines, as noted above. However, the resulting customized archival implementation will differ from, for example, a medical image to a laboratory or botanical image archive. The resulting customized image archive strategy may be very easy to use for that application but will not easily translate to other application areas.

Thus, the utility provided by market niche image archiving software simultaneously makes the resulting applications not useful to a wide spectrum of applications. For example, tracking schemata that describes art history categories might not apply to high-tech advertising.

Another type of archival mechanism is equipment-specific archiving. In this implementation a particular type of image device, such as a still camera, a video camera, a digital scanner, or other form of imaging means has its own scheme for imprinting or recording archival information relating to the image that is recorded.

Thus, using different image-producing devices in the image production chain can cause major problems. For example, mixing traditional photography (with its archive notation) with digital touch-up processing(with its own different archive notation). Further, equipment-specific archive schemes do not automate well, since multiple devices within the same archive may use incompatible enumeration schemata.

Certain classification approaches assume single device input. Thus, multiple devices must be tracked in separate archives, or are tracked as archive exceptions. This makes archiving maintenance more time consuming and inefficient. For example, disciplines that use multiple cameras concurrently, such as sports photography and photo-journalism, confront this limitation.

Yet other archive approaches support particular media formats, but not multiple media formats simultaneously occurring in the archive. For example, an archive scheme may support conventional silver halide negatives but not video or digital media within the same archive.

Thus, this approach fails when tracking the same image across different media formats, such as tracking negative, transparency, digital, and print representation of the same image.

Yet another archive approach may apply to a particular state of the image, as the initial or final format, but does not apply to the full life-cycle of all image. For example, some cameras time- and date-stamp negatives, while database software creates tracking information after processing. While possibly overlapping, the enumeration on the negatives differs from the enumeration created for archiving. In another example, one encoding may track images on negatives and another encoding may track images on prints. However, such a state-specific approach makes it difficult automatically to

track image histories and lineages across all phases of an image's life-cycle, such as creation, processing, editing, production, and presentation.

Thus, tracking information that uses different encoding for different image states is not particularly effective since maintaining multiple enumeration strategies creates potential archival error, or at a minimum, will not translate well from one image form to another.

Some inventions that deal with recording information about images have been the subject of U.S. patents in the past. U.S. Patent No. 5579067 to *Wakabayashi* describes a "Camera Capable of Recording Information." This system provides a camera which records information into an information recording area provided on the film that is loaded in the camera. If information does not change from frame to frame, no information is recorded. However, this invention does not deal with recording information on subsequent processing.

U.S. Patent No. 5455648 to *Kazami* was granted for a "Film Holder or for Storing Processed Photographic Film." This invention relates to a film holder which also includes an information holding section on the film holder itself. This information recording section holds electrical, magnetic, or optical representations of film information. However, once the information is recorded, it is to used for purposes other than to identify the original image.

U.S. Patent No. 5649247 to *Itoh* was issued for an "Apparatus for Recording Information of Camera Capable of Optical Data Recording and Magnetic Data Recording." This patent provides for both optical recording and magnetic recording onto film. This invention is an electrical circuit that is resident in a camera system which records such information as aperture value, shutter time, photo metric value, exposure information, and other related information when an image is first photographed. This patent does not relate to recording of subsequent operations relating to the image.

U.S. Patent 5319401 to *Hicks* was granted for a "Control System for Photographic Equipment." This invention deals with a method for controlling automated photographic equipment such as printers, color analyzers, film cutters. This patent allows for a variety of information to be recorded after the images are first made. It mainly teaches methods for production of pictures and for recording of information relating to that production. For example, if a photographer consistently creates a series of photographs which are off center, information can be recorded to offset the negative by a pre-determined amount during printing. Thus the information does not accompany the film being processed but it does relate to the film and is stored in a separate database. The information stored is therefore not helpful for another laboratory that must deal with the image that is created.

U.S. Patent 5193185 to *Lanter* was issued for a "Method and Means for Lineage Tracing of a Spatial Information Processing and Database System." This Patent relates to geographic information systems. It provides for "parent" and "child" links that relate to the production of layers of information in a database system. Thus while the this patent relates to computer-generated data about maps, it does not deal with how best too transmit that information along a chain of image production.

U.S. Patent No. 5008700 to *Okamoto* was granted for a "Color Image Recording Apparatus using Intermediate Image Sheet." This patent describes a system, where a bar code is printed on the image production media which can then be read by an optical reader. This patent does not deal with subsequent processing of images which can take place or recording of information that relates to that subsequent processing.

U.S. Patent No. 4728978 was granted to *Inoue* for a "Photographic Camera." This patent describes a photographic camera which records information about exposure or development on an integrated circuit card which has a semiconductor memory. This card records a great deal of different types of information and records that information onto film. The information which is recorded includes color temperature information, exposure reference information, the date and time, shutter speed, aperture value, information concerning

use of a flash, exposure information, type of camera, film type, filter type, and other similar information. The patent claims a camera that records such information with information being recorded on the integrated circuit court. There is no provision for changing the information or recording subsequent information about the processing of the image nor is there described a way to convey that information through many generations of images.

Thus a need exists to provide a uniform tracking mechanism for any type of image, using any type of image-producing device, which can describe the full life-cycle of an image and which can translate between one image state and another and between one image forming mechanism and another.

Summary of the Invention

It is therefore an object of the present invention to create an archival tracking method that includes relations, descriptions, procedures, and implementations for universally tracking images.

It is a further object of the present invention to create an encoding schemata that can describe and catalogue any image produced on any media, by any image producing device, that can apply to all image producing disciplines.

It is a further object of the present invention to implement to archival scheme on automated data processing means that exist within image producing equipment.

It is a further object of the present invention to apply

to all image-producing devices.

It is a further object of the present invention to support simultaneous use of multiple types of image-producing devices.

It is a further object of the present invention to support simultaneous use of multiple image-producing devices of the same type.

It is a further object of the present invention to provide automatic parent-child encoding.

It is a further object of the present invention to track image lineages and family trees.

It is a further object of the present invention to provide a serial and chronological sequencing scheme that uniquely identifies all images in an archive.

It is a further object of present invention to provide an identification schemata that describes physical attributes of all images in an archive.

It is a further object of the present invention to separate classificatory information from tracking information.

It is a further object of the present invention to provide an enumeration schemata applicable to an unlimited set of media formats used in producing images.

It is a further object of the present invention to apply the archival scheme to all stages of an image's life-cycle, from initial formation to final form.

It is a further object of the present invention to create

self-generating archives, through easy assimilation into any image-producing device.

It is a further object of the present invention to create variable levels of tracking that are easily represented by current and arriving barcode symbologies, to automate data transmission across different technologies (e.g., negative to digital to print).

These and other objects of the present invention will become clear to those skilled in the art from the description that follows.

Brief Description of the Invention

The present invention is a universal image tracking method and apparatus for tracking and documenting images through their complete life-cycle, regardless of the device, media, size, resolution, etc., used in producing them.

Specifically, the automated system for image archiving ("ASIA") encodes, processes, and decodes numbers that characterize images and image related data. Encoding and decoding takes the form of a 3-number association: 1) location number (serial and chronological location), 2) image number (physical attributes), and 3) parent number (parent-child relations).

Brief Description of the Drawings

Figure 1. Invention

Figure 1A. Overview of original image input

Figure 1B. Overview of lineage information generation

Figure 2. Formal specification

Figure 3 Encoding

Figure 4 Decoding

Figure 5 Implementation

Figure 6 Parent-child tree

Figure 7 ASIA

Detailed Description of the Invention

The present invention is a method and apparatus for formally specifying relations for constructing image tracking mechanisms, and providing an implementation that includes an encoding schemata for images regardless of form or the equipment on which the image is produced.

Referring to Figure 1 an overview of the present invention is shown. This figure provides the highest-level characterization of the invention. Figure 1 itself represents all components and relations of the ASIA.

Reference conventions. Since Figure 1 organizes all high-level discussion of the invention, this document introduces the following conventions of reference.

- Whenever the text refers to "the invention" or to the, *"Automated System for Image Archiving"*, it refers to the aggregate components and relations identified in Figure 1.
- Parenthesized numbers to the left of the image in Figure 1 **Invention** represent **layers** of the invention. For example, 'Formal specification'

represents the "first layer" of the invention.

In Figure 1 **Invention**, each box is a hierarchically derived sub-component of the box above it. 'ASIA' is a sub-component of 'Formal objects', which is a sub-component of 'Formal specification'. By implication, thus, ASIA is also hierarchically dependent upon 'Formal specification.' The following descriptions apply.

Formal specification 1. This represents (a) the formal specification governing the creation of systems of automatic image enumeration, and (b) all derived components and relations of the invention's implementation.

Formal objects 2. This represents implied or stated implementations of the invention.

ASIA 3. This is the invention's implementation software offering.

It is useful to discuss an overview of the present invention as a framework for the more detailed aspects of the invention that follow. Referring first to figure 1A an overview of the original image input process according to the present invention is shown. The user first inputs information to the system to provide information on location, author, and other record information. Alternatively, it is considered to be within the scope of the present invention for the equipment that the user is using to input the required information. In this manner, data is entered with minimum user interaction.

This information will typically be in the format of the equipment doing the imaging. The system of the present invention simply converts the data via a configuration algorithm, to the form needed by the system for further processing. The encoding/decoding engine 12 receives the user input information, processes into, and determines the appropriate classification and archive information to be in coded 14. The system next creates the appropriate representation 16 of the input information and attaches the information to the image in question 18. Thereafter the final image is output 20, and comprises both the image data as well as the appropriate representation of the classification or archive information. Such archive information could be in electronic form seamlessly embedded in a digital image or such information could be in the form of a barcode or other graphical code that is printed together with the image on some form of hard copy medium.

Referring to figure 1B the operation of the system on an already existing image is described. The system first receives the image and reads the existing archival barcode information 30. This information is input to the encoding/decoding engine 32. New input information is provided 36 in order to update the classification and archival information concerning the image in question. This information will be provided in most cases without additional user intervention. Thereafter the encoding/decoding engine

determines the contents of the original barcoded information and arrives at the appropriate encoded data and lineage information 34. This data and lineage information is then used by the encoding/decoding engine to determine the new information that is to accompany the image 38 that is to be presented together with the image in question. Thereafter the system attaches the new information to the image 40 and outputs the new image together with the new image related information 42. In this fashion, the new image contains new image related information concerning new input data as well as lineage information of the image in question. Again, such archive information could be in electronic form as would be the case for a digital image or such information could be in the form of a barcode or other graphical code that is printed together with the image on some form of hard copy medium.

Referring to Figure 2 the formal relations governing encoding **4**, decoding **5**, and implementation of the relations **6** are shown. Encoding and decoding are the operations needed to create and interpret the information on which the present invention relies. These operations in conjunction with the implementation of the generation of the lineage information give rise to the present invention. These elements are more fully explained below.

Encoding

Introduction. This section specifies the formal relations characterizing all encoding of the invention, as identified in

Figure 2 **Formal specification.**

Rather than using a "decision tree" model (e.g., a flow chart), Figure 3 uses an analog circuit diagram. Such a diagram implies the traversal of all paths, rather than discrete paths, which best describes the invention's, encoding relations.

Component descriptions. Descriptions of each component in Figure 3 **Encoding** follow.

Apparatus input **301** generates raw, unprocessed image data, such as from devices or software. Apparatus input could be derived from image data, for example, the digital image from a scanner or the negative from a camera system.

Configuration input **303** specifies finite bounds that determine encoding processes, such as length definitions or syntax specifications.

The resolver **305** produces characterizations of images. It processes apparatus and configuration input, and produces values for variables required by the invention.

Using configuration input, the timer 307 produces time stamps. Time-stamping occurs in 2 parts:

The clock **309** generates time units from a mechanism. The filter **311** processes clock output according to specifications from the configuration input. Thus the filter creates the output of the clock in a particular format that can be used later in an automated fashion. Thus the output from the clock is passed through the filter to produce a time-stamp.

User data processing **313** processes user specified information such as author or device definitions, any other information that the user deems essential for identifying the image produced, or a set of features generally governing the production of images.

Output processing **315** is the aggregate processing that takes all of the information from the resolver, timer and user data and produces the final encoding that represents the image of interest.

Decoding

Referring to Figure 4 the relationships that characterize all decoding of encoded information of the present invention are shown. The decoding scheme shown in Figure 4 specifies the highest level abstraction of the formal grammar characterizing encoding. The set of possible numbers (the "language") is specified to provide the greatest freedom for expressing characteristics of the image in question, ease of decoding, and compactness of representation. This set of numbers is a regular language (i.e., recognizable by a finite state machine) for maximal ease of implementations and computational speed. This language maximizes the invention's applicability for a variety of image forming, manipulation and production environments and hence its robustness.

Decoding has three parts: location, image, and parent. The "location" number expresses an identity for an image through use of the following variables.

	generation	Generation depth in tree structures.
	sequence	Serial sequencing of collections or lots of images.
	time-stamp	Date and time recording for chronological sequencing.
	author	Creating agent.
	device	Device differentiation, to name, identify, and distinguish currently used devices within logical space.
	locationRes	Reserved storage for indeterminate future encoding.
	locationCus	Reserved storage for indeterminate user customization.

The "image" number expresses certain physical attributes of an image through the following variables.

	category	The manner of embodying or "fixing" a representation, e.g., "still" or "motion".
	size	Representation dimensionality.
	bit-or-push	Bit depth (digital dynamic range) or push status of representation.
	set	Organization corresponding to a collection of tabular specifiers, e.g. a "Hewlett Packard package of media tables.
	media	Physical media on which representation occurs.
	resolution	Resolution of embodiment on media.

stain	Category of fixation-type onto media, e.g. "color".
format	Physical form of image, e.g. facsimile, video, digital, etc.
imageRes	Reserved storage for indeterminate future encoding.
imageCus	Reserved storage for user customization.

The "parent" number expresses predecessor image identity through the following variables.

time-stamp	Date, and time recording for chronological sequencing.
parentRes	Reserved storage, for indeterminate future encoding.
parentCus	Reserved storage, for indeterminate user customization.

Any person creating an image using "location," "image," and "parent" numbers automatically constructs a representational space in which any image-object is uniquely identified, related to, and distinguished from, any other image-object in the constructed representational space.

Implementation

Referring to figure 5, the formal relations characterizing all implementations of the invention are shown. Three components and two primary relations characterize any implementation of the encoding and decoding components of the present invention. Several definitions of terms are apply.

"**schemata**" **51** are encoding rules and notations.

"**engine** " **53** refers to the procedure or procedures for processing data specified in a schemata.

"**interface**" **55** refers to the structured mechanism for interacting with an engine.

The engine and interface have interdependent relations, and combined are hierarchically subordinate to schemata. The engine and interface are hierarchically dependent upon schemata.

Formal objects

The present invention supports the representation of (1) parent-child relations, (2) barcoding, and (3) encoding schemata. While these specific representations are supported, the description is not limited to these representations but may also be used broadly in other schemes of classification and means of graphically representing the classification data.

Parent-child implementation

Parent-child relations implement the 'schemata' and 'engine' components noted above. The following terms are used in conjunction with the parent child implementation of the present invention:

"**conception date**" means the creation date/time of image.

"**originating image**" means an image having no preceding conception date.

"**tree**" refers to all of the parent-child relations descending from an originating image.

"**node**" refers to any item in a tree.

"**parent**" means any predecessor node, for a given node.

"**parent identifier**" means an abbreviation identifying the conception date of an image's parent.

"**child**" means a descendent node, from a given node.

"**lineage**" means all of the relationships ascending from a given node, through parents, back to the originating image.

"**family relations**" means any set of lineage relations, or any set of nodal relations.

A conventional tree structure describes image relations.

Encoding

Database software can trace parent-child information, but does not provide convenient, universal transmission of these relationships across all devices, media, and technologies that might be used to produce images that rely on such information. ASIA provides for transmission of parent-child information both (1) inside of electronic media, directly; and (2) across discrete media and devices, through barcoding.

This flexibility implies important implementational decisions involving time granularity and device production speed.

Time granularity & number collision. This invention identifies serial order of children (and thus parents) through date- and time-stamping. Since device production speeds for various image forming devices vary across applications, e.g.

from seconds to microseconds, time granularity that is to be recorded must at least match device production speed. For example, a process that takes merely tenths of a second must be time stamped in at least tenths of a second.

In the present invention any component of an image forming system may read and use the time stamp of any other component. However, applications implementing time-stamping granularities that are slower than device production speeds may create output collisions, that is, two devices may produce identical numbers for different images. Consider an example in which multiple devices would process and reprocess a given image during a given month. If all devices used year-month stamping, they could reproduce the same numbers over and over again.

The present invention solves this problem by deferring decisions of time granularity to the implementation. Implementation must use time granularity capable of capturing device output speed. Doing this eliminates all possible instances of the same number being generated to identify the image in question. In the present invention, it is recommended to use time intervals beginning at second granularity, however this is not meant to be a limitation but merely a starting point to assure definiteness to the encoding scheme. In certain operations, tenths of a second (or yet smaller units) may be more appropriate in order to match device production speed.

Specification

All images have parents, except for the originating image which has a null ('0') parent. Parent information is recorded through (1) a generation depth identifier derivable from the *generation* field of the location number, and (2) a parent conception date, stored in the parent number. Two equations describe parent processing. The first equation generates a parent identifier for a given image and is shown below.

Equation 1: Parent identifiers. A given image's parent identifier is calculated by decrementing the location number's *generation* value (i.e. the generation value of the given image), and concatenating that value with the parent number's parent value. Equation 1 summarizes this:

$$parent\ identifier = prev(generation) \bullet parent \qquad (1)$$

To illustrate parent-child encoding, consider an image identified in a given archive by the following key:

B0106-19960713T195913JSA:1-19 S135F-OFCP@0100S:2T-0123 19960613T121133

In this example the letter "B" refers to a second generation. The letter "C" would mean a third generation and so forth. The numbers "19960713" refers to the day and year of creation, in this case July 13, 1996. The numbers following the "T" refers to the time of creation to a granularity of seconds, in this case 19:59:13 (using a 24 hour clock). The date and time for the production of the parent image on which the example image relies is 19960613T121133, or June 13, 1996

at 12:11:33.

Equation 1 constructs the parent identifier:

parent identifier = prev(generation) • parent

or,

parent identifier = prev(B) • (19960613T121133)

= A • 19960613T121133

= A19960613T121133

The location number identifies a B (or "2nd") generation image. Decrementing this value identifies the parent to be from the **A** (or "1st") generation. The parent number identifies the *parent* conception date and time, (19960613T121133). Combining these, yields the parent identifier A19960613T121133, which uniquely identifies the parent to be generation A, created on 13 June 1996 at 12:11:13PM (T121133).

Equation 2 evaluates the number of characters needed to describe a given image lineage.

Equation 2: Lineage lengths. Equation 2 calculates the number of characters required to represent any given generation depth and is shown below:

$$\underset{length}{lineage} = \underset{(\ depth\ )}{len(key)} + (generation - 1) * \underset{(identifier)}{len(\ \ parent\ )} \quad (2)$$

Example: 26 generations, 10^{79} family relations. Providing a 26 generation depth requires a **1** character long definition for *generation* (i.e. A-Z). Providing 1000 possible transformations for each image requires millisecond time

encoding, which in turn requires a 16 character long *parent* definition (i.e. gen. 1-digit, year-4 digit, month 2-digit, day 2-digit, hour 2-digit, min. 2-digit, milliseconds 3-digit). A 1 character long *generation* and 16 character long *parent* yield a 17 character long parent identifier.

Referring to Figure 6, the parent child encoding of the present invention is shown in an example form. The figure describes each node in the tree, illustrating the present invention's parent-child support.

601 is a 1st generation original color transparency.

603 is a 2nd generation 3x5 inch color print, made from parent 601.

605 is a 2nd generation 4x6 inch color print, made from parent 601.

607 is a 2nd generation 8x10 inch color internegative, made from parent 601.

609 is a 3rd generation 16x20 inch color print, made from parent 607.

611 is a 3rd generation 16x20 inch color print, 1 second after 609, made from parent 607.

613 is a 3rd generation 8x10 inch color negative, made from parent 607.

615 is a 4th generation computer 32x32 pixel RGB "thumbnail" (digital), made from parent 611.

617 is a 4th generation computer 1280x1280 pixel RGB screen dump (digital), 1 millisecond after 615, made

from parent 611.

619 is a 4th generation 8.5x11 inch CYMK print, from parent 611.

This tree (Figure 6) shows how date- and time-stamping of different granularities (e.g., nodes 601,615, and 617) distinguish images and mark parents. Thus, computer screen-dumps could use millisecond accuracy (e.g., 615,617), while a hand-held automatic camera might use second granularity (e.g., 601). Such variable date,- and time-stamping guarantees (a) unique enumeration and (b) seamless operation of multiple devices within the same archive.

Applications

The design of parent-child encoding encompasses several specific applications. For example, such encoding can provide full lineage disclosure, and partial data disclosure.

Application 1: Full lineage disclosure, partial data disclosure

Parent-child encoding compacts lineage information into parent identifiers. Parent identifiers disclose parent-child tracking data, but do not disclose other location or image data. In the following example a given lineage is described by (1) a fully specified key (location, image, and parent association), and (2) parent identifiers for all previous parents of the given key. Examples illustrates this design feature.

Example 1: 26 generations, 10^{79} family relations.

Providing a 26 generation depth requires a 1 character long definition for *generation*. Providing 1000 possible transformations for each image requires millisecond time encoding, which in turn requires a **16** character long *parent* definition. A 1 character long *generation* and 16 character long *parent* yield a 17 character long parent identifier (equation 1).

Documenting all possible family relations requires calculating the sum of all possible nodes. This is a geometric sum increasing by a factor of 1000 over 26 *generations*. The geometric sum is calculated by the following equation:

$$sum = \frac{factor^{(generations+1)} - 1}{factor - 1} \qquad (3)$$

or,

$$sum = \frac{1000^{(26+1)} - 1}{1000 - 1}$$

$$= \frac{10^{81} - 1}{999}$$

$$= 1.00 \cdot 10^{79}$$

For 26 generations, having 1000 transformations per image, the geometric sum yields 10^{79} possible family relations. To evaluate the number of characters needed to represent a maximum lineage encoded at millisecond accuracy across 26 generations, the following equation is used (noted earlier):

```
1        lineage = len(key) + (generation) -1 * len(   parent )
2        length               (  depth    )          (identifier)
3
4         or,
```

lineage length = (100) + (26 - 1) * (17)

= 525

Thus, the present invention uses **525 characters** to encode the maximum lineage in an archive having 26 generations and 1000 possible transformations for each image, in a possible total of 10^{79} family relations.

Example 2: 216 generations, 10^{649} family relations. The upper bound for current 2D symbologies (e.g., PDF417, Data Matrix, etc.) is approximately 4000 alphanumeric characters per symbol. The numbers used in this example illustrate, the density of information that can be encoded onto an internally sized 2D symbol.

Providing a 216 generation depth requires a 2 character long definition for *generation*. Providing 1000 possible transformations for each image requires millisecond time encoding, which in turn requires a 16 character long *parent* definition. A 2 character long *generation* and 16 character long *parent* yield an 18 character long parent identifier. To evaluate the number of characters needed to represent a maximal lineage encoded at millisecond accuracy across 216 generations, we recall equation 2:

$$\underset{\text{length}}{\textit{lineage}} = \textit{len(key)} + \underset{(\ \textit{depth}\ )}{\textit{(generation)}} \text{ -1 } * \underset{\textit{(identifier)}}{\textit{len(}\ \ \textit{parent}\ \textit{)}}$$

or,

lineage = (100) + (216-1) * (18)
length
= 3970

In an archive having 216 generations and 1000 possible modifications for each image, a maximal lineage encoding requires **3970 characters**.

Documenting all possible family relations requires calculating the sum of all possible nodes. This is a geometric sum increasing by a *factor* of 1000 over 216 *generations*. To calculate the geometric sum, we recall equation 3:

$$sum = \frac{factor^{(generations+1)} - 1}{factor - 1}$$

or,

$$sum = \frac{1000^{(216+1)} - 1}{1000 - 1}$$

$$= \frac{10^{651} - 1}{999}$$

$$= 1.00 \cdot 10^{649}$$

For 216 generations, having 1000 transformations per image, the geometric sum yields **10^{641} possible family relations**. Thus, this invention uses **3970 characters** to encode a maximal lineage, in an archive having 216 generations and 1000 possible transformations for each image, in a possible total of 10^{649} family relations.

Conclusion. The encoding design illustrated in **Application 1: Full lineage disclosure, partial data disclosure** permits exact lineage tracking. Such tracking discloses full data for a given image, and parent identifier data for a given image's ascendent family. Such design protects proprietary information while providing full data recovery for any lineage by the proprietor.

A 216 generation depth is a practical maximum for 4000 character barcode symbols, and supports numbers large enough for most conceivable applications. Generation depth beyond 216 requires compression and/or additional barcodes or the use of multidimensional barcodes. Furthermore, site restrictions may be extended independently of the invention's apparati. Simple compression techniques, such as representing numbers with 128 characters rather than with 41 characters as currently done, will support 282 generation depth and 10^{850} possible relations.

Application 2: Full lineage disclosure, full data disclosure In direct electronic data transmission, the encoding permits full transmission of all image information without restriction, of any archive size and generation depth. Using 2D+ barcode symbologies, the encoding design permits full lineage tracking to a 40 generation depth in a single symbol, based on a 100 character key and a theoretical upper bound of 4000 alphanumeric characters per 2D symbol. Additional barcode symbols can be used when additional generation depth

is needed.

Application 3: Non-tree-structured disclosure

The encoding scheme of the present invention has extensibility to support non-tree-structured, arbitrary descent relations. Such relations include images using multiple sources already present in the database, such as occurring in image overlays.

Conclusion

Degrees of data disclosure. The invention's design supports degrees of data disclosure determined by the application requirements. In practicable measures the encoding supports:

1. Full and partial disclosure of image data;
2. Lineage tracking to any generation depth, using direct electronic data transmission;
3. Lineage tracking to restricted generation depth, using barcode symbologies, limited only by symbology size restrictions.

Further, ASIA supports parent-child tracking through time-stamped parent-child encoding. No encoding restrictions exist for electronic space. Physical boundaries within 2D symbology space promote theoretical encoding guidelines, although the numbers are sufficiently large so as to have little bearing on application of the invention. In all cases, the invention provides customizable degrees of data disclosure appropriate for application in commercial, industrial, scientific, medical, etc., domains.

Barcoding implementation

Introduction. The invention's encoding system supports archival and classifications schemes for all image-producing devices, some of which do not include direct electronic data transmission. Thus, this invention's design is optimized to support 1D-3D+ barcode symbologies for data transmission across disparate media and technologies.

1D symbology

Consumer applications may desire tracking and retrieval based on 1 dimensional (1D) linear symbologies, such as Code 39. Table 5 shows a configuration example which illustrates a plausible encoding configuration suitable for consumer applications.

The configuration characterized in Table 5 yields a maximal archive size of 989,901 images (or 19,798 images a year for 50 years), using a 4 digit *sequence* and 2 digit *unit*. This encoding creates 13 character keys and 15 character long, Code 39 compliant labels. A database holds full location, image, and parent number associations, and prints convenient location number labels, for which database queries can be made.

<generation>	=	1 character
<sequence>	=	4 digits
<date>	=	6 digits
<unit>	=	2 digits
constants	=	2 characters
Total	=	15 characters

Table 5: Configuration example

With such a configuration, a conventional 10 mil, Code 39 font, yields a 1.5 inch label. Such a label conveniently fits onto a 2x2 inch slide, 3x5 inch prints, etc. Note, that this encoding configuration supports records and parent-child relations through a conventional "database key" mechanism, not through barcode processing.

Conclusion. The ASIA implementation provides native 1D symbology support sufficient for many consumer applications. However, 2D symbology support is preferred since it guarantees data integrity. 2D symbology also provides greater capacity and so can support a richer set of functionality provided by the ASIA.

2D symbology

Comprehensive tracking suitable for commercial, industrial, and scientific applications is achievable electronically, and/or through 2 dimensional (2D), stacked matrix or full matrix symbologies, such as PDF417, Data Matrix, etc. These symbologies have adequate capacity to support complex implementations of the various archival and classification schemes presented.

Example application. 2D symbology can support a rich set of the present invention's encoding. The following examples present some of the possibilities.

1. **Parent-child tracking**. 2D symbology can support significant parent-child encoding including parent-child relations, lineage, tracking mechanisms, and derivative

applications.

2. **Copyright protection.** Combined with certification programs, 2D image encodings of this invention can enhance copyright protection. Referential tracking to production source can be provided on any image, which can include partial or full disclosure of image data. Encryption technologies can further enhance authentication control.

3. **Migration paths.** 2D symbology also includes important potential migration paths for encoding schemata in commercial and industrial image management. 2D applications may include arbitrary encryption; variable sizing; Reed-Solomon error correction (e.g., providing full data recovery with 50% symbol loss); printability through ink, invisible ink, etching, embossing, exposing (e.g., onto negatives or transparencies); and efficient scan rates suitable for automated film processing equipment.

In summary, 2D symbology can facilitate universal data transmission, regardless of the producing technology; or data transmission *from* any form of image-producing device *to* any other form of image-producing device.

Further, the present invention provides viable 1D symbology support at the implementation layer, and a specific implementation with the ASIA software. However, with 1D symbology the same number or classification being assigned to

different images is, in a 1D implementation, theoretically possible.

Use of 2D symbology barcoding eliminates the possibility of ambiguity resulting from the same classification or archive identifiers being assigned to the same image and is therefore preferred. The use of 2D symbology together with the classification and archiving scheme of the present invention can protect any granularity of proprietary image data; provide unobtrusive labeling on prints or print description plates; expose archival encoding directly onto media at exposure, processing, and/or development time; and yield rapid data collection through sorting machines for media, such as transparencies, prints, etc. ASIA provides native support of 2D Data Matrix to facilitate such application development.

3D+ (holographic) symbologies will permit tracking greater lineage depths in single symbols. Supporting this 3D implementation requires no additional complexity to the system.

Schemata

This section describes the invention's schemata, characterized through the tables that follow. Tables 6 and 7, provide a guide to the organization of schemata of the present invention. Tables 9-17 describe the conventions, syntax, and semantics of *location numbers*, *image numbers*, and *parent numbers*. Tables 19-26 fully expand the semantics listed in Table 13 entitled "Image semantics."

Table 6 (following) lists all tables that specify the classification scheme of the present invention. In this table, exact table names are identified together with a brief description of each table which describes the contents of that table.

Tables	Description
Table 9 Conventions	Conventions for all tables
Table 10 Syntax	Syntactic summaries
Table 11 Size/res. syntax	"
Table 12 Locations semantics	Semantic summaries
Table 13 Image semantics	"
Table 14 Parent semantics	"
Table 15 Measure semantics	"
Table 15 Software Packages	"
Table 16 Format semantics	"
Table 17 Size examples	Illustrations of *size*
Table 18 Resolution examples	"
Table 19 Reserved media slots	Specifics for Table 13
Table 20 Color transparency film	"
Table 21 Color negative film	"
Table 22 Black & White film	"
Table 23 Duplicating & internegative film	"
Table 24 Facsimile	"
Table 25 Prints	"
Table 26 Digital	"

Table 6: Schemata tables

Similarly, Table 7 (following) entitled **"Table groupings"** further groups the specification table by the categories in which they are discussed in the following pages.

Title	**Table No.**
Conventions:	Table 9
Syntax:	Tables 10-11
Semantics:	Tables 12-16
Examples:	Tables 17-18
Media:	Tables 19-26

Table 7: Table groupings

Conventions: Table 9

Table 9 entitled **"Conventions"** fully specifies the conventions governing all tabular information in the archival and classification scheme of the present invention. In Table

9, the column **Form** lists the conventions governing syntactic items for all tables in of the present invention. Specific conventions are the following.

- *Emphasized* words indicate variables.
- ROMAN words indicate constant or literal values.
- Angle-brackets <> indicate required material.
- Brackets [] indicate optional material.
- Parentheses () indicate logical groupings.
- Braces {} indicate regular expression modifiers.
- The bar '|' character indicates an alternative.
- The star '*' character indicates "0 or more".
- The plus '+' character indicates "1 or more".

The columns **Variables** comprehensively lists all variables used in Appendix **Schemata**. Each variable represents a single length character, so *n* represents any single digit (not any number of any digit). Specific variables are:

- '*l*' indicates any alphabetical character a-z
- '*n*' indicates any number 0-9
- '*c*' indicates any alphabetical character a-z, or a number 0-9
- '*y*' indicates a digit used to construct the year
- '*m*' indicates a digit used to construct the month
- '*d*' indicates a digit used to construct the day
- '*h*' indicates a digit used to construct the

hour

'*t*' indicates a digit used to construct the minute

- '*s*' indicates a digit used to construct the second
- '*i*' indicates a digit used to construct a fractional second.

Table 9: Conventions

Form	Description	Variables	Description
emphasis	variable	*l*	letter
ROMAN	constant	*n*	number
< >	required	*c*	class *ln*
[ ]	optional		
( )	grouping	*y*	year
{ }	modifier	*m*	month
|	alteration	*d*	day
*	0 or more	*h*	hour
+	1 or more	*t*	minute
		s	second
		i	fractional second

Syntax: Tables 10-11

Tables 10-11 strictly conform to the syntactic rules of Table 9 **Conventions** (above). Specifics are described according to two logical divisions:

1. ¶**Location, image, & parent syntax**. This is described in Table 10 entitled "Syntax." Table 10 Syntax

provides a compact summary of the present invention's functionality.

2. ¶**Size & resolution syntax**. This is described in Table 11 entitled "Size/res. syntax." Table 11 **Size/res. syntax** expands the syntax rules for the variable *size* and *resolution*, introduced in Table 10.

Location, image & parent syntax. In Table 10 **Syntax**, the *rows* assigned to **Location, Image** and **Parent** respectively provide:

1. An example of a number ('Example'), showing small and large illustrations of the schemata.
2. The names of each field used by a number ('Names').
3. The specific syntactic rules governing a number('Syntax').

The *columns* identify the type of number ('#'), category, and row illustration.

The association of a *location number* and *image number* guarantees a unique identification of every image in an archive. The association of a *location number, image number,* and *parent number* guarantees unique identification and fully recoverable patent-child relations.

Location numbers track serial and chronological location. Specific fields are (a) required entries *generation, sequence,* and *date*; and (b) optional entries *time, author, device, unit, locationRes,* and *locationCus*. The required entries guarantee minimal tracking information and data consistency for basic electronic sorting, while the optional entries provide

additional granularity for high volume tracking (there are no theoretical size limitations).

Image numbers track primarily physical attributes of images across devices, media types, and storage conditions. Specific fields are (a) required entries *category size, media, push* **or** *bit, resolution, stain,* and *format;* and (b) optional entries, *imageRes* and *imageCus.* Either *push* or *bit* is always required, but both are never permissible. The *format* field determines whether *push* or *bit* is used: *bit* is used when *format* is digitally related, otherwise *push* is used.

Parent numbers track the date and time of parent conception, and optional data. Specific fields are (a) the required entry *parent,* and (b) optional entries *parentRes* and *parentCus.* The required entry encodes parent information for a given child image, while the optional entries provide specification extension and user customization.

Table 10: Syntax

#	Category	Illustration
Location	Example:	small: A1040-199609; large: A1011-19920417T0536599CPG@2-12345:A1.Z2
	Names:	*<generation>* *<sequence>* *<date>* *[time]* *[author]* *[device]* *[unit]* *[locationRes]* *[locationCus]*
	Syntax:	*<{+}>* *<n{+}>* *<yyyymm[dd]* *[T hhtt[ss[i{+}]]]]* *[/{+}]* *[@c{+}]* *[-n{+}]* *[.c{+}]* *[:c{+}]*
	:	
Image	Example:	small: S135+1KCAM@0200S:2T; large: S135F-024GIF8@HP@0300DI:6D:1A2B.5E
	Names:	*<category>* *<size>* *<[push]>|[bit]>* *<media>* *[set]* *<resolution>* *<stain>* *<format>* *[imageRes]* *[imageCus]*
	Syntax:	*<{+}>* *<nc{*}>* *<[(-|+)n{+}]|[-n{+}]>* *<dc{*}>* *[@c{+}]* *@<c{+}>* *:<n{+}>* *<a{+}>* *[:c{+}]* *[.c{+}]*
	:	
Parent	Example:	19961231T235959; large: 19961231T235959999
	Names:	*<parent>* *<parentRes>* *<parentCus>*
	Syntax:	*<yyyymm[dd]>[T hhtt[ss[i{+}]]]* *[:c{+}]* *[.c{+}]*
	:	

NB: Second accuracy is minimally recommended for parent-child encoding. Both (a) *parent* and (b) **Location**'s *date* and *time* should use the same specification when possible.

Size & resolution syntax. Table 11 **Size/res. syntax** specifies syntactic rules governing the variables *size* and *resolution*, previously introduced in Table 10. Table 11 describes how the variables *size* and *resolution* express (a) dimension and (b) units of measure.

The row 'Names' indicates variable names, such as '*<measure>*' for the unit of measure. 'Syntax 1' and 'Syntax 2' are the canonical syntaxes.

Table 11: Size/res. syntax

Category	Illustration			
Names	*<dimension>*			*<measure>*
Syntax 1	*<c{+}>*			*<lc{*}>*
Names	*<X-dimension>*	X	*<Y-dimension>*	*<measure>*
Syntax 2	*<n{+}>*	X	*<n{+}>*	*<lc{*}>*

NB: Variables *size* and *resolution* use either syntax form. Table 15 **Measure Semantics** lists *measure* values. Table 17 **Size examples** and 18 **Resolution examples** provide illustrations.

Semantics: Tables 12-16

Introduction. Tables 12-16 describe semantic conventions, and fully specify the syntactic rules of Tables 10-11. Values for all variables are *case insensitive*. Tables 12-16 describe the meanings of syntactic names, literal values, descriptions of syntactic elements, and lengths of all fields. Specifics are described according to the following conceptual divisions.

Location semantics	Table 12
Image semantics	Table 13
Parent semantics	Table 14

Measure semantics Table 15

Format semantics Table 16

Location semantics. In Table 12 **Location semantics**, **Location** indicates the location number classification. The column **Name** indicates the name of a given location number *field*, while the column **Description,** describes what a *field* means. For example, the field <*date*> within the classification **Location**, describes the date when the lot was made.

In the next column of Table 12, **Syntax,** Table 10's row **Syntax** is relisted in vertical form. The column **Literal** lists the corresponding values or ranges of permissible values. For example, the **Syntax** '*-yyyy*' for the field <*date*> literally expands into a permissible range of 0000-9,999 years. The next column **Description**, describes what the legal value means. For example, '*yyyy*' is the year.

Finally, the column **Length** indicates the permissible length of a given argument. For example, in the <*date*> field, a minimum of 7 characters is required, and a maximum of 9 characters is permissible.

Table 12: Location semantics

				Legal Values			
#	Name	Description	Syntax	Literal	Description	Length
Location	*<generation>*	Lot generation	*l{+}*	A-Z	A =1st	1+
				AA-ZZ	AA = 27th	
				..	etc.	
	<sequence>	Sequence in	*n{+}*	0-9	Lot number	1+
		archive		0000-9999		
				..	etc.	
	<date>	Date made	*-yyyy*	0000-9999	Year	7 [9]
		(ISO 8601:1988	*mm*	01-12	Month	
		compliant)	*[dd]*	01-31	Day	
	[time]	Time made	*[T hh*	00-23	Hour	[5+]
		(ISO 8601:1988	*tt*	00-59	Minute	
		compliant, plus	*[ss*	00-59	Second	
		any fractional	*[i{+}]]]*	0-9	Fractional	
		second)			second	
	[author]	Author	*[lc{*}]*	a-zA-Z	Author's name	[1+]
				..	etc.	
	[device]	Device used	*[@c{+}]*	0-9	Device number	[2+]
				..	etc.	
	[unit]	Image in Lot	*[-n{+}]*	0-9	Image number	
				0000-9999		
				..	etc.	[2+]
	[locationRes]	Unspecified	*[:c{+}]*	a-zA-Z0-9	Future use	[2+]
	[locationCus]	Unspecified	*[.c{+}]*	a-zA-Z0-9	User Customization	[2+]
					Total	**9 [-25+]**

Imag semantics. In Table 13 **Image semantics**, **Image** indicates the image number classification. The column **Name** indicates the name of a given image number *field*, while the column **Description** describes what a *field* means. For example, the field <*category*> describes the category of the image number.

In the next column of Table 13, **Syntax,** Table 10's row **Syntax** is relisted in vertical form. The next column **Literal**, lists the corresponding values or ranges of permissible values. The next column **Description**, describes what the **Literal** value means. Finally, the column **Length** indicates the permissible length of a given argument. For example, the <*size*> field uses 1 or more characters.

Table 13: Image semantics

				Legal Values		
#	Name	Description	Syntax	Literal	Description	Length
Image	<*category*>	Category	*l*{+}	S	Single Frame	1+
				M	Motion Picture	
	<*size*>	Image or film size	*nc*{*}	(See Table 11	Size/res. syntax)	1+
				(See Table 15	Measure semantics)	
				(See Table 18	Size examples)	
	<*push* |	Exposure	<(-|+)*n*{+} |	0	No push ('+' = up)	<2+|
				3	3 stops ('-' = down)	
				..	etc.	
	bit>	Dynamic range	-*n*{+}>	0-9	E.g, 8=8 bit	2+>
		("bit depth")		..	etc.	

	#	Name	Description	Syntax	Literal	Description	Length
1		*<media>*	Image media	*lc{*}*	(See Table 20	Reserved)	
2					(See Table 21	Slides)	2+
3					(See Table 22	Negatives)	
4					(See Table 23	B&W)	
5					(See Table 24	Dups & Internegs	
6					(See Table 25	Facsimiles)	
7					(See Table 26	Prints)	
					(See Table 27	Digital)	
8		[*set*]	Package	[@c{+}]	(See Table 17	Packages)	
9		*<resolution>*	Resolution	*@c{+}*	(See Table 11	Size/res. syntax	2+
10					(See Table 15	Measure semantics	
					(See Table 19	Resolution examples	
11		*<stain>*	Presentation	*:n{+}*	0	Black & White	1+
12			form		1	Gray scale	
13					2	Color	
14					3	RGB (Red,Grn,Blu)	
15					4	YIQ (RGB TV	
16						variant)	
17					5	CYMK	
18						(Cyn,Ycl,Mag,BlK)	
19					6	HSB (Hue, Sat,	
20						Bright)	
21			("bit depth")		7	CIE (Commission	
22						de l'Eclairage)	
23					8	LAB	
24						etc.	
25							
26		*<format>*	Image form	*lc{*}*	(See Table 16	Format sematics)	1+

#	Name	Description	Syntax	Literal	Description	Length
1	[*imageRes*]	Unspecified	[:c{+}]	a-zA-Z0-9	Future use	[2+]
	[*imageCus*]	Unspecified	[.c{+}]	a-zA-Z0-9	User customization	[2+]
2					Total 10[-16+]	

3

4 **Parent semantics.** In Table 14 Parent semantics, **Parent**
5 indicates the parent number classification. The column **Name**
6 indicates the name of a given parent number field, while the
7 column **Description** describes what a given *field* means. For
8 example, the field <*parentRes*> is a reserved field for future
9 use.

10 In the next column of Table 14, **Syntax,** Table 10's row
11 **Syntax** is relisted in vertical form. The next column **Literal**,
12 lists the corresponding values or ranges of permissible
13 values. The next column **Description**, describes what the
14 **Literal** value means. Finally, the column **Length** indicates the
15 permissible length of a given argument. For example, the
16 <*parent*> field uses 6 or more characters.
17 **Measure semantics**. Table 15 **Measure semantics** specifies legal
18 values for the variables *size* and *resolution*, previously
19 described by the rules in Table 11 **Size/res. syntax**.

Table 14: Parent semantics

#	Name	Description	Syntax	Legal Values: Literal	Desription	Length
Parent	*<parent>*	Parent	*yyyymm*[*dd*] [*Thhtt*[*ss*[*i*{+}]]]	0-9 0-9T0-9	Date/time	6+
	[*parentRes*]	Unspecified	[*:c*{+}]	a-zA-Z0-9	Future use	[1+]
	[*parentCus*]	Unspecified	[*.c*{+}]	a-zA-Z0-9	User customization	[1+]
						Total
	6 [-8+]					

The column **Category** identifies which values are shared by *size* and *resolution* and which are unique. The column **Literal** lists the abbreviations used in *size* and *resolution* values. The column **Description** expands the abbreviations into their corresponding names.

Table 15: Measure semantics

Category	Literal	Description	
Shared	DI	Dots per inch	(dpi)
	DE	Dots per foot	(dpe)
	DY	Dots per yard	(dpy)
	DC	Dots per centimeter	(dpc)
	DM	Dots per millimeter	(dpm)
	DP	Dots per pixel	(dpp)
	DT	Dots per meter	(dpt)
	M	Millimeters	
	C	Centimeters	
	T	Meters	
	I	Inches	
	E	Feet	
	Y	Yard	
	P	Pixel	
	L	Lines	
	R	Rows	
	O	Columns	
	B	Columns & Rows	
	. .	etc.	
Size	F	Format	
Unique	. .	etc.	
Res. Unique	S	ISO	
	. .	etc.	

Format semantics. Table 16 Format semantics specifies legal values for the variable *format*, previously described in Table 13 Image semantics. The **Literal** column lists legal values and

the **Description** column expands the abbreviations into their corresponding names.

Table 16: Format semantics

Literal	Description
A	Audio-visual
C	Photocopy
D	Digital
F	Facsimile
L	Plotter
M	MRI
N	Negative
P	Print
R	Vector graphics
T	Transparency
V	Video
X	X-radiographic
..	etc.

Table 17: Packages

Literal	Description
3C	3Com
3M	3M
AD	Adobe
AG	AGFA
AIM	AIMS Labs
ALS	Alesis
APP	Apollo
APL	Apple
ARM	Art Media
ARL	Artel
AVM	Aver Media Technologies
ATT	AT&T
BR	Bronica
BOR	Borland
CN	Canon
CAS	Casio
CO	Contax
CR	Corel
DN	Deneba
DL	DeLorme
DI	Diamond
DG	Digital
DIG	Digitech

1	EP	Epson
2	FOS	Fostex
3	FU	Fuji
4	HAS	Hasselblad
5	HP	Hewlett Packard
6	HTI	Hitachi
7	IL	Ilford
8	IDX	IDX
9	IY	Iiyama
10	JVC	JVC
11	KDS	KDS
12	KK	Kodak
13	KN	Konica
14	IBM	IBM
15	ING	Intergraph
16	LEI	Leica
17	LEX	Lexmark
18	LUC	Lucent
19	LOT	Lotus
20	MAM	Mamiya
21	MAC	Mackie
22	MAG	MAG Innovision
23	MAT	Matrox Graphics
24	MET	MetaCreations
25	MS	Microsoft
26	MT	Microtech
27	MK	Microtek
28	MIN	Minolta
29	MTS	Mitsubishi
30	MCX	Micrografx
31	NEC	NEC
32	NTS	Netscape
33	NTK	NewTek
34	NK	Nikon
35	NS	Nixdorf-Siemens
36	OLY	Olympus
37	OPC	Opcode
38	OR	O'Reilly
39	PAN	Panasonic
40	PNC	Pinnacle
41	PNX	Pentax
42	PO	Polaroid
43	PRC	Princeton Graphics
44	QT	Quicktime
45	ROL	Roland
46	RO	Rollei
47	RIC	Ricoh
48	SAM	Samsung
49	SAN	SANYO
50	SHA	Sharp
51	SHI	Shin Ho
52	SK	Softkey
53	SN	Sony
54	SUN	SUN
55	TAS	Tascam
56	TEAC	TEAC

TKX	Tektronix
TOS	Toshiba
ULS	Ulead systems
UMX	UMAX
VWS	ViewSonic
VID	Videonics
WG	Wang
XX	Unknown
XE	Xerox
YAS	Yashica
YAM	Yamaha

Table 18: Size examples

Literal	Dimension	Measure	
Syntax 1	135F	35mm	format
	120F	Medium	format
	220F	Full	format
	4X5F	4x5	format
	..	..	etc.
Syntax 2	9X14C	9x14	centimeter
	3X5I	3x5	inch
	4X6I	4x6	inch
	5X7I	5x7	inch
	8X10I	8x10	inch
	11X14I	11x14	inch
	16X20I	16x20	inch
	20X24I	20x24	inch
	24X32I	24x32	inch
	24X36I	24x36	inch
	32X40I	32x40	inch
	40X50I	40x50	inch
	50X50I	50x50	inch
	40X50P	40X50	pixels
	100X238P	100X238	pixels
	1024X1280P	1024X1280	pixels
	A4S	210x297mm	sheet
	A5S	148x210mm	sheet
	JIS B5S	182x257mm	sheet
	LETTERS	8.5x11in	sheet
	LEGALS	8.5x14in	sheet
	EXECUTIVES	7.25x10.5in	sheet
	..	..	etc.

Examples: Tables 18-19

Size & resolution examples. Table 18 **Size examples** illustrates typical *size* values, and Table 19 **Resolution examples** illustrates typical *resolution* values.

Values in these tables represent limited defaults since

size and *resolution* are algorithmically generated from the rules contained in Table 11 **Size/r s. syntax**, and from the values contained in Table 15 **Measure semantics**. See ¶**Size & resolution syntax** for details.

Table 19: Resolution examples

Literal	Dimension	Measure	
Syntax 1	50S	50	ISO
	200S	200	ISO
	300DC	600	dpc
	1200DI	1200	dpi
	..	..	etc.
Syntax 2	640X768P	640X768	pixels
	1024X1280P	1024X1280	pixels
	1280X1600P	1024X1280	pixels
	..	..	etc.

Media: Tables 20-27

Table 20-27 specify the supported *media* listed in Table 13 **Image semantics**. Values of *media* are tied to values of *format*, so any *format* value may have its own *media* table. Since *format* is unlimited in size, *media* support is also unlimited.

Tables 20-24: Film Media. In Tables 20-24, the first character represents film manufacturers in the following ways:

- 'A' represents Agfa
- 'F' represents Fuji
- 'I' represents Ilford
- 'C' represents Konica
- 'K' represents Kodak
- 'P' represents Polaroid

- 'S' represents Seattle Film Works
- 'T' represents 3M
- 'X' represents an unknown film manufacturer

This leaves 17 slots for additional major film manufacturers, before a single first letter prefix must represent multiple manufacturers, or before additional letters must be added. Any number of film media may be supported, but 223 defaults are provided in the preferred embodiment of the present invention.

Table 20: Reserved media slots

Reserved For	Literal	Description
Unknown	XXXX	Unknown film
User	UX0	Customization
	UX1	"
	UX2	"
	UX3	"
	UX4	"
	UX5	"
	UX6	"
	UX7	"
	UX8	"
	UX9	"
Specification	UR0	For future use
	UR1	"
	UR2	"
	UR3	"
	UR4	"
	UR5	"
	UR6	"
	UR7	"
	UR8	"
	UR9	"

Table 21: Color Transparency film

Company	Literal	Description
Agfa	AASC	Agfa Agfapan Scala Reversal (B&W)
	ACRS	Agfa Agfachrome RS
	ACTX	Agfa Agfachrome CTX
	ARSX	Agfa Agfacolor Professional RSX Reversal
Fuji	FCRTP	Fuji Fujichrome RTP
	FCSE	Fuji Fujichrome Sensia
	FRAP	Fuji Fujichrome Astia
	FRDP	Fuji Fujichrome Provia Professional 100
	FRPH	Fuji Fujichrome Provia Professional 400
	FRSP	Fuji Fujichrome Provia Professional 1600
	FRTP	Fuji Fujichrome Professional Tungsten
	FRVP	Fuji Fujichrome Velvia Professional
Ilford	IICC	Ilford Ilfochrome
	IICD	Ilford Ilfochrome Display
	IICM	Ilford Ilfochrome Micrographic
Konica	CAPS	Konica APS JX
	CCSP	Konica Color Super SR Professional
Kodak	K5302	Kodak Eastman Fine Grain Release Positive Film 5302
	K7302	Kodak Fine Grain Positive Film 7302
	KA2443	Kodak Aerochrome Infrared Film 2443
	KA2448	Kodak Aerochrome II MS Film 2448
	KE100SW	Kodak Ektachrome Professional E100SW Film

	KE100S	Kodak Ektachrome Professional E100S Film
	KE200	Kodak Ektachrome Professional E200 Film
	KEEE	Kodak Ektachrome Elite
	KEEO100	Kodak Ektachrome Electronic Output Film 100
	KEEO200	Kodak Ektachrome Electronic Output Film
	KEEO64T	Kodak Ektachrome Electronic Output Film 64T
	KEEP	Kodak Ektachrome E Professional
	KEES	Kodak Ektachrome ES
	KEEW	Kodak Ektachrome EW
	KEIR	Kodak Ektachrome Professional Infrared EIR Film
	KEK	Kodak Ektachrome
	KELL	Kodak Ektachrome Lumiere Professional
	KELX	Kodak Ektachrome Lumiere X Professional
	KEPD	Kodak Ektachrome 200 Professional Film
	KEPF	Kodak Ektachrome Professional
	KEPH	Kodak Ektachrome Professional P1600 Film
	KEPJ	Kodak Ektachrome 320T Professional Film, Tungsten
	KEPL400	Kodak Ektachrome Professional 400X Film
	KEPL	Kodak Ektachrome 200 Professional Film
	KEPL	Kodak Ektachrome Plus Professional
	KEPN	Kodak Ektachrome 100 Professional Film
	KEPO	Kodak Ektachrome P Professional
	KEPR	Kodak Ektachrome 64 Professional
	KEPT	Kodak Ektachrome 160T Professional Film, Tungsten
	KEPY	Kodak Ektachrome 64T Professional Film, Tungsten
	KETP	Kodak Ektachrome T Professional
	KETT	Kodak Ektachrome T
	KEXP	Kodak Ektachrome X Professional
	KCCR	Kodak Kodachrome
	KPKA	Kodak Kodachrome Professional 64 Film
	KPKL	Kodak Kodachrome Professional 200 Film
	KPKM	Kodak Kodachrome Professional 25
	KVSSO279	Kodak Film Vericolor Slide Film SO-279
	KVS	Kodak Vericolor Slide Film
Polaroid	PPCP	Polaroid Professional High Contrast Polychrome
Reserved	--	See Table 20
Seattle Film Works	SFWS	Seattle Film Works
3M	TSCS	3M ScotchColor Slide
	TSCT	3M ScotchColor T slide

Table 22: Color negative film

Company	Literal	Description
Agfa	ACOP	Agfa Agfacolor Optima
	AHDC	Agfa Agfacolor HDC
	APOT	Agfa Agfacolor Triade Optima Professional
	APO	Agfa Agfacolor Professional Optima
	APP	Agfa Agfacolor Professional Portraita
	APU	Agfa Agfacolor Professional Ultra
	APXPS	Agfa Agfacolor Professional Portrait XPS
	ATPT	Agfa Agfacolor Triade Portraita Professional
	ATUT	Agfa Agfacolor Triade Ultra Professional
Fuji	FHGP	Fuji Fujicolor HG Professional

1		FHG	Fuji Fujicolor HG
2		FNHG	Fuji Fujicolor NHG Professional
3		FNPH	Fuji Fujicolor NPH Professional
4		FNPL	Fuji Fujicolor NPL Professional
5		FNPS	Fuji Fujicolor NPS Professional
6		FPI	Fuji Fujicolor Print
7		FPL	Fuji Fujicolor Profcssional, Type L
8		FPO	Fuji Fujicolor Positive
9		FRG	Fuji Fujicolor Reala G
10		FR	Fujicolor Reala
11		FSGP	Fuji Fujicolor Super G Plus
12		FSG	Fuji Fujicolor Super G
13		FSHG	Fuji Fujicolor Super HG 1600
14		FS	Fuji Fujicolor Super
15	Kodak	K5079	Kodak Motion Picture 5079
16		K5090	Kodak CF1000 5090
17		K5093	Kodak Motion Picture 5093
18		K5094	Kodak Motion Picture 5094
19		KA2445	Kodak Aerocolor II Negative Film 2445
20		KAPB	Advantix Professional Film
21		KCPT	Kodak Kodacolor Print
22		KEKA	Kodak Ektar Amateur
23		KEPG	Ektapress Gold
24		KEPPR	Kodak Ektapress Plus Professional
25		KGOP	Kodak Gold Plus
26		KGO	Kodak Gold
27		KGPX	Kodak Ektacolor Professional GPX
28		KGTX	Kodak Ektacolor Professional GTX
29		KPCN	Kodak Professional 400 PCN Film
30		KPHR	Kodak Ektar Professional Film
31		KPJAM	Kodak Ektapress Multispeed
32		KPJA	Kodak Ektapress 100
33		KPJC	Kodak Ektapress Plus 1600 Profession
34		KPMC	Kodak Pro 400 MC Film
35		KPMZ	Kodak Pro 1000 Film
36		KPPF	Kodak Pro 400 Film
37		KPRMC	Kodak Pro MC
38		KPRN	Kodak Pro
39		KPRT	Kodak Pro T
40		KRGD	Kodak Royal Gold
41		KVPS2L	Kodak Vericolor II Professional Type L
42		KVPS3S	Kodak Vericolor III Professional Type S
43		KVP	Kodak Vericolor Print Film
44	Konica	CCIP	Konica Color Impresa Professional
45		CIFR	Konica Infrared 750
46		CCSR	Konica SRG
47	Polaroid	POCP	Polaroid OneFilm Color Print
48	Reserved	--	See Table 20
49			
50			

Table 23: Black & white film

Company	Literal	Description
Agfa	AAOR	Agfa Agfapan Ortho
	AAPX	Agfa Agfapan APX
	APAN	Agfa Agfapan
Ilford	IDEL	Ilford Delta Professional
	IFP4	Ilford FP4 Pl
	IHP5	Ilford HP5 Plus
	IPFP	Ilford PanF Plus
	IPSF	Ilford SFX750 Infrared
	IUNI	Ilford Universal
	IXPP	Ilford XP2 Plus
Fuji	FNPN	Fuji Neopan
Kodak	K2147T	Kodak PLUS-X Pan Professional 2147, ESTAR Thick Base
	K2147	Kodak PLUS-X Pan Professional 2147, ESTAR Basc
	K4154	Kodak Contrast Process Ortho Film 4154, ESTAR Thick Base
	K4570	Kodak Pan Masking Film 4570, ESTAR Thick Base
	K5063	Kodak TRI-X 5063
	KA2405	Kodak Double-X Aerographic Film 2405
	KAI2424	Kodak Infrared Aerographic Film 2424
	KAP2402	Kodak PLUS-X Aerographic II Film 2402, ESTAR Base
	KAP2412	Kodak Panatomic-X Aerographic II Film 2412, ESTAR Base
	KEHC	Kodak Ektagraphic HC
	KEKP	Kodak Ektapan
	KH13101	Kodak High Speed Holographic Plate, Type 131-01
	KH13102	Kodak High Speed Holographic Plate, Type 131-02
	KHSIET	Kodak High Speed Infrarcd, ESTAR Thick Base
	KHSIE	Kodak High Speedo nfrared, ESTAR Base
	KHSI	Kodak High Speed Infrared
	KHSO253	Kodak High Speed Holographic Film, ESTAR Base SO-253
	KLPD4	Kodak Professional Precision Line Film LPD4
	KO2556	Kodak Professional Kodalith Ortho Film 2556
	KO6556	Kodak Professional Kodalith Ortho Film 6556, Type 3
	KPMF3	Kodak Professional Personal Monitoring Film, Type 3
	KPNMFA	Kodak Professional Personal Neutron Monitor Film, Type A
	KPXE	Kodak PLUS-X Pan Professional, Retouching Surface, Emulsion & Base
	KPXP	Kodak PLUS-X Pan Professional, Retouching Surface, Emulsion
	KPXT	Kodak PLUS-X Pan Professional, Retouching Surface, Emulsion & Base
	KPXX	Kodak Plus-X
	KPX	Kodak PLUS-X Pan Film
	KREC	Kodak Recording 2475
	KSAF1	Kodak Spectrum Analysis Film, No. 1
	KSAP1	Kodak Spectrum Analysis Plate, No. 1
	KSAP3	Kodak Spectrum Analysis Plate, No. 3
	KSWRP	Kodak Short Wave Radiation Plate
	KTMXCN	Kodak Professional T-MAX Black and White Film CN
	KTMY	Kodak Professional T-MAX
	KTMZ	Kodak Professional T-MAX P3200 Film
	KTP2415	Kodak Technical Pan Film 2415, ESTAR-AH Base
	KTPKTRP	KodakKTechnicaloPandFilmak TRI-Pan Professional
	KTRXPT	Kodak TRI-X Pan Professional 4164, ESTAR Thick Base
	KTRXP	Kodak TRI-Pan Professional

		KTXP	Kodak TRI-X Professional, Interior Tungsten
		KTXT	Kodak TRI-X Professional, Interior Tungsten
		KTX	Kodak TRI-X Professional
		KVCP	Kodak Verichrome Pan
	Konica	CIFR	Kodak Infrared 750
	Polaroid	PPGH	Konica Polagraph HC
		PPLB	Polaroid Polablue BN
		PPPN	Polaroid Polapan CT
	Reserved	--	See Table 20

Table 24: Duplicating & Internegative Film

Company	Literal	Description
Agfa	ACRD	Agfa Agfachrome Duplication Film CRD
Fuji	FCDU	Fuji Fujichrome CDU Duplicating
	FCDU1	Fujichrome CDU Duplicating, Type I
	FCDU2	Fuji Fujichrome CDU Duplicating, Type II
	FITN	Fuji Fujicolor Internegative IT-N
Kodak	K1571	Kodak 1571 Internegative
	K2475RE	Kodak Recording Film 2475
	K4111	Kodak 4111
	KC4125	Kodak Professional Professional Copy Film 4125
	K6121	Kodak 6121
	KA2405	Kodak Double-X Aerographic Film 2405
	KA2422	Kodak Aerographic Direct Duplicating Film 2422
	KA2447	Kodak Aerochrome II Duplicating Film 2447
	KAR	Kodak Aerographic RA Duplicating Film 2425, ESTAR Base
	KARA4425	Kodak Aerographic RA Duplicating Film 4425, ESTAR Thick Base
	KARA	Kodak Aerographic RA Duplicating Film
	KCIN	Kodak Commercial Internegative Film
	KE5071	Kodak Ektachrome Slide Duplicating Film 5071
	KE5072	Kodak Ektachrome Slide Duplicating Film 5072
	KE6121	Kodak Ektachrome Slide Duplicating Film 6121
	KE7121K	Kodak Ektachrome Duplicating Film 7121, Type K
	KESO366	Kodak Ektachrome SE Duplicating Film SO -366
	KS0279	Kodak S0279
	KS0366	Kodak S0366
	KSO132	Kodak Professional B/W Duplicating Film SO-132
	KV4325	Kodak Vericolor Internegative 4325
	KVIN	Kodak Vericolor Internegative Film
Reserved	--	See Table 20

Table 24: Facsimile. Table 24 **Facsimile** lists supported file formats used in facsimile imaging. All digital formats are supported, plus G1-G5, for a total of 159 supported formats. Any number of facsimile media are permissible.

Table 25: Facsimile

Category	Literal	Description
Digital	--	See Table 27
Facsimile	DFAXH	DigiBoard, DigiFAX Format, Hi-Res
	DFAXL	DigiBoard, DigiFAX Format, Normal-Res
	G1	Group 1 Facsimile
	G2	Group 2 Facsimile
	G3	Group 3 Facsimile
	G32D	Group 3 Facsimile, 2D
	G4	Group 4 Facsimile
	G42D	Group 4 Facsimile, 2D
	G5	Group 4 Facsimile
	G52D	Group 4 Facsimile, 2D
	TIFFG3	TIFF Group 3 Facsimile
	TIFFG3C	TIFF Group 3 Facsimile, CCITT RLE 1D
	TIFFG32D	TIFF Group 3 Facsimile, 2D
	TIFFG4	TIFF Group 4 Facsimile
	TIFFG42D	TIFF Group 4 Facsimile, 2D
	TIFFG5	TIFF Group 5 Facsimile
	TIFFG52D	TIFF Group 5 Facsimile, 2D
Reserved	--	See Table 20

Table 26: Prints. Table 26 **Prints** lists supported file formats used in print imaging, such as paper prints for display. 230 defaults are provided; any number of print media are permissible.

Table 26: Prints

Company	Literal	Description
Agfa	ACR	Agfacolor RC
	ABF	Agfa Brovira, fiber, B&W
	ABSRC	Agfa Brovira-speed RC, B&W
	APF	Agfa Portriga, fiber, B&W
	APSRC	Agfa Portriga-speed RC, B&W
	ARRF	Agfa Record-rapid, fiber, B&W
	ACHD	Agfacolor HDC
	AMCC111FB	Agfacolor Multicontrast Classic MC C 111 FB, double weight, glossy surface
	AMCC118FB	Agfacolor Multicontrast Classic MC C 118 FB, double weight, fine grained matt surface
	AMCC1FB	Agfacolor Multicontrast Classic MC C 1FB, single weight, glossy surface

1		AMCP310RC	Agfacolor Multicontrast Premium RC 310, glossy surface
2		AMCP312RC	Agfacolor Multicontrast Premium RC 312, semi-matt surface
3		APORG	Agfacolor Professional Portrait Paper, glossy surface CN310
4		APORL	Agfacolor Professional Portrait Paper, semi-matt surface
5			CN312
6		APORM	Agfacolor Professional Portrait Paper, lustre surface CN319
7		ASIGG	Agfacolor Professional Signum Paper, glossy surface CN310
8		ASIGM	Agfacolor Professional Signum Paper, matt surface CN312
9	Konica	CCOL	Konica Color
10	Fuji	FCHPFCPI	FujicolorFHGuProfessionaljicolor Print
11		FCSP	Fujicolor Super G Plus Print
12		FCT35	Fujichrome paper, Type 35, glossy surface
13		FCT35HG	Fujichrome reversal copy paper, Type 35, glossy surface
14		FCT35HL	Fujichrome reversal copy paper, Type 35, lustre surface
15		FCT35HM	Fujichrome reversal copy paper, Type 35, matt surface
16		FCT35L	Fujichrome paper, Type 35, lustre surface
17		FCT35M	Fujichrome paper, Type 35, matt surface
18		FCT35PG	Fujichrome Type535, polyester, super glossly surface
19		FSFA5G	Fujicolor paper super FA, Type 5, glossy SFA5 surface
20		FSFA5L	Fujicolor paper super FA, Type 5, lustre SFA5 surface
21		FSFA5M	Fujicolor paper super FA, Type 5, matt SFA5 surface
22		FSFASCG	Fujicolor paper super FA5, Type C, glossy surface
23		FSFA5SL	Fujicolor paper super FA5, Type C, lustre surface
24		FSFA5SM	Fujicolor paper super FA5, Type C, matt surface
25		FSFA5SPG	Fujicolor paper super FA, Type 5P, glossy SFA P surface
26		FSFA5SPL	Fujicolor paper super FA, Type 5P, lustre SFA P surface
27		FSFA5SPM	Fujicolor paper super FA, Type 5P, matt SFA P surface
28		FSFAG	Fujicolor paper super FA, Type 5, glossy surface
29		FSFAL	Fujicolor paper super FA, Type 5, lustre surface
30		FSFAM	Fujicolor paper super FA, Type 5, matt surface
31		FSFAS5PG	Fujicolor paper super FA, Type P, glossy SFA 5P surface
32		FSFAS5PL	Fujicolor paper super FA, Type P, lustre SFA 5P surface
33		FSFAS5PM	Fujicolor paper super FA, Type P, matt SFA 5P surface
34		FSFASCG	Fujicolor paper super FA, Type C, glossy surface
35		FSFASCL	Fujicolor paper super FA, Type C, lustre surface
36		FSFASCM	Fujicolor paper super FA, Type C, matt surface
37		FTRSFA	Fujitrans super FA
38		FXSFA	Fujiflex super FA polyester (super gloss), Fujiflex SFA
39			surface
40	Ilford	ICF1K	Ilfochrome Classic Deluxe Glossy Low Contrast
41		ICLM1K	Ilfochrome Classic Deluxe Glossy Medium Contrast
42		ICPM1M	Ilfochrome Classic RC Glossy
43		ICPM44M	Ilfochrome Classic RC Pearl
44		ICPS1K	Ilfochrome Classic Deluxe Glossy
45		IGFB	Ilfochrome Galerie FB
46		IILRA1K	Ilfocolor Deluxe
47		IIPRAM	Ilfocolor RC
48		IMG1FDW	Ilford Multigrade Fiber, Double Weight
49		IMG1FW	Ilford Multigrade Fiber Warmtone
50		IMG1RCDLX	Ilford Multigrade RC DLX

1		IMG1RCPDW	Ilford Multigrade RC Portfolio, Double Weight
2		IMG1RCR	Ilford Multigrade RC Rapid
3		IMG2FDW	Ilford Multigrade II Fiber, Double Weight
4		IMG2FW	Ilford Multigrade II Fiber Warmtone
5		IMG2RCDLX	Ilford Multigrade II RC
6		IMG1RCPDW	Ilford Multigrade II RC Portfolio, Double Weight
7		IMG2RCR	Ilford Multigrade II RC Rapid
8		IMG3FDW	Ilford Multigrade III Fiber, Double Weight
9		IMG3FW	Ilford Multigrade III Fiber Warmtone
10		IMG3RCDLX	Ilford Multigrade III RC DLX
11		IMG3RCPDW	Ilford Multigrade III RC Portfolio, Double Weight
12		IMG3RCR	Ilford Multigrade III RC Rapid
13		IMG4FDW	Ilford Multigrade IV Fiber, Double Weight
14		IMG4FW	Ilford Multigrade IV Fiber Warmtone
15		IMG4RCDLX	Ilford Multigrade IV RC DLX
16		IMG4RCPDW	Ilford Multigrade IV RC Portfolio, Double Weight
17		IMGFSWG	Ilford Multigrade Fiber, Single Weight, glossy
18		IPFP	Ilford PanF Plus
19		ISRCD	Ilfospeed RC, Deluxe
20	Kodak		B&W Selective Contrast Papers
21		KPC1RCE	Kodak Polycontrast RC, medium weight, fine-grained, lustre
22		KPC1RCF	Kodak Polycontrast RC, medium weight, smooth, glossy
23		KPC1RCN	Kodak Polycontrast RC, medium weight, smooth, semi-matt
24		KPC2RCE	Kodak Polycontrast II RC, medium weight, fine-grained, lustre
25		KPC2RCF	Kodak Polycontrast II RC, medium weight, smooth, glossy
26		KPC2RCN	Kodak Polycontrast II RC, medium weight, smooth, semi-matt
27		KPCRCE	Kodak Polycontrast III RC, medium weight, fine-grained,
28			lustre
29		KPC3RCF	Kodak Polycontrast III RC, medium weight, smooth, glossy
30		KPC3RCN	Kodak Polycontrast III RC, medium weight, smooth,
31			semi-matt
32		KPMFF	Kodak Polymax Fiber, single weight, smooth, glossy
33		KPMFN	Kodak Polymax Fiber, single weight, smooth, semi-matt
34		KPMFE	Kodak Polymax Fiber, single weight, fine-grained, lustre
35		KPM1RCF	Kodak Polymax RC, single weight, smooth, glossy
36		KPM1RCE	Kodak Polymax RC, single weight, fine-grained, lustre
37		KPM1RCN	Kodak Polymax RC, single weight, smooth, semi-matt
38		KPM2RCF	Kodak Polymax II RC, single weight, smooth, glossy
39		KPM2RCE	Kodak Polymax II RC, single weight, fine-grained, lustre
40		KPM2RCN	Kodak Polymax II RC, single weight, smooth, semi-matt
41		KPMFAF	Kodak Polymax Fine-Art, double weight, smooth, glossy
42		KPMFAN	Kodak Polymax Fine-Art, double weight, smooth, semi-matt
43		KPPFM	Kodak Polyprint RC, medium weight, smooth, glossy
44		KPPNM	Kodak Polyprint RC, medium weight, smooth, semi-matt
45		KPPEM	Kodak Polyprint RC, medium weight, fine-grained, lustre
46		KPFFS	Kodak Polyfiber, single weight, smooth, glossy
47		KPFND	Kodak Polyfiber, double weight, smooth, semi-matt
48		KPFGL	Kodak Polyfiber, light weight, smooth,lustre
49		KPFNS	Kodak Polyfiber, smooth, single weight, semi-matt
50		KPFND	Kodak Polyfiber, double weight, smooth, semi-matt

KPFGD	Kodak Polyfiber, double weight, fine-grained, lustre
	B&W Continuous Tone Papers
KAZOF	Kodak AZO, fine-grained, lustre
KB1RCF	Kodak Kodabrome RC Paper, smooth, glossy
KB1RCG1	Kodak Kodabrome RC, premium weight (extra heavy) 1, fine-grained, lustre
KB1RCN	Kodak_Kodabrome_RC_Paper,_smooth,_semi-matt
KB2RCF	Kodak Kodabrome II RC Paper, smooth, glossy
KB2RCG1	Kodak Kodabrome II RC, premium weight (extra heavy) 1, fine-grained, lustre
KB2RCN	Kodak Kodabrome II RC Paper, smooth, semi-matt
KBR	Kodak Kodabromide, single weight, smooth, glossy
KEKLG	Kodak Ektalure, double weight, fine-grained, lustre
KEKMSCF	Kodak Ektamatic SC single weight, smooth, glossy
KEKMSCN	Kodak Ektamatic SC, single weight, smooth, semi-matt
KEKMXRALF	Kodak Ektamax RA Professional L, smooth, glossy
KEKMXRALN	Kodak Ektamax RA Professional L, smooth, semi-matt
KEKMXRAMF	Kodak Ektamax RA Professional M, smooth, glossy
KEKMXRAMN	Kodak Ektamax RA Professional M, smooth, smooth, semi-matt
KELFA1	Kodak Elite Fine-Art, premium weight (extra heavy) 1, ultra-smooth, high-lustre
KELFA2	Kodak Elite Fine-Art, premium weight (xtra heavy) 2, ultra-smooth, high-lustre
KELFA3	Kodak Elite Fine-Art, premium weight (xtra heavy) 3, ultra-smooth, high-lustre
KELFA4	Kodak Elite Fine-Art, premium weight (xtra heavy) 4, ultra-smooth, high-lustre
KK1RCG1	Kodak Kodabrome RC, premium weight (extra heavy) 1, fine-grained, lustre
KK1RCG2	Kodak Kodabrome RC, premium weight (extra heavy) 2, fine-grained, lustre
KK1RCG3	Kodak Kodabrome RC, premium weight (extra heavy) 3, fine-grained, lustre
KK1RCG4	Kodak Kodabrome RC, premium weight (extra heavy) 4, fine-grained, lustre
KK1RCG5	Kodak Kodabrome RC, premium weight (extra heavy) 5, fine-grained, lustre
KK2RCG1	Kodak Kodabrome II RC, premium weight (extra heavy) 1, fine-grained, lustre
KK2RCG2	Kodak Kodabrome II RC, premium weight (extra heavy) 2, fine-grained, lustre
KK2RCG3	Kodak Kodabrome II RC, premium weight (extra heavy) 3, fine-grained, lustre
KK2RCG4	Kodak Kodabrome II RC, premium weight (extra heavy) 4, fine-grained, lustre
KK2RCG5	Kodak Kodabrome II RC, premium weight (extra

	heavy) 5, fine-grained, lustre
KPMARCW1	Kodak P-Max Art RC, double weight 1, suede double-matt
KPMARCW2	Kodak P-Max Art RC, double weight 2, suede double-matt
KPMARCW3	Kodak P-Max Art RC, double weight 3, suede double-matt
	B&W Panchromatic Papers
KPSRCH	Kodak Panalure Select RC, H grade, medium weight, smooth, glossy
KPSRCL	Kodak Panalure Select RC, L grade, medium weight, smooth, glossy
KPSRCM	Kodak Panalure Select RC, M grade, medium weight, smooth, glossy
	Color Reversal Papers
KER1F	Kodak Ektachrome Radiance Paper, smooth, glossy
KER1N	Kodak Ektachrome Radiance Paper, smooth, semi-matt
KER1SF	Kodak Ektachrome Radiance Select Material, smooth, glossy
KER2F	Kodak Ektachrome Radiance II Paper, smooth, glossy
KER2N	Kodak Ektachrome Radiance II Paper, smooth, semi-matt
KER2SF	Kodak Ektachrome Radiance II Select Material, smooth, glossy
KER3F	Kodak Ektachrome Radiance III Paper, smooth, glossy
KER3N	Kodak Ektachrome Radiance III Paper, smooth, semi-matt
KER3SF	Kodak Ektachrome Radiance III Select Material, smooth, glossy
KERCHCF	Kodak Ektachrome Radiance HC Copy Paper, smooth, glossy
KERCHCN	Kodak Ektachrome Radiance HC Copy Paper, smooth, semi-matt
KERCN	Kodak Ektachrome Radiance Copy Paper, smooth, semi-matt
KERCTF	Kodak Ektachrome Radiance Thin Copy Paper, smooth, glossy
KERCTN	Kodak Ektachrome Radiance Thin Copy Paper, smooth, semi-matt
KEROM	Kodak Ektachrome Radiance Overhead Material, transparent ESTAR Thick Base
	Color Negative Papers & Transparency Materials
KD2976E	Kodak Digital Paper, Type 2976, fine-grained, lustre
KD2976F	Kodak Digital Paper, Type 2976, smooth, glossy
KD2976N	Kodak Digital Paper, Type 2976, smooth, semi-matt
KDCRA	Kodak Duraclear RA Display Material, clear

	KDFRAF	Kodak Duraflex RA Print Material, smooth, glossy
	KDT2	Kodak Duratrans Display Material, translucent
	KDTRA	Kodak Duratrans RA Display Material, translucent
	KECC	Kodak Ektacolor, Type C
	KECE	Kodak Ektacolor Professional Paper, fine-graned, lustre
	KECF	Kodak Ektacolor Professional Paper, smooth, glossy
	KECN	Kodak Ektacolor Professional Paper, smooth, semi-matt
	KEC	Kodak Ektacolor
	KEP2E	Kodak Ektacolor Portra II Paper, Type 2839, fine-grained, lustre
	KEP2F	Kodak Ektacolor Portra II Paper, Type 2839, smooth, glossy
	KEP2N	Kodak Ektacolor Portra II Paper, Type 2839, smooth, semi-matt
	KEP3E	Kodak Ektacolor Portra III Paper, fine-grained, lustre
	KEP3F	Kodak Ektacolor Portra III Paper, smooth, glossy
	KEP3N	Kodak Ektacolor Portra III Paper, smooth, semi-matt
	KES2E	Kodak Ektacolor Supra II Paper, fine-grained, lustre
	KES2F	Kodak Ektacolor Supra II Paper, smooth, glossy
	KES2N	Kodak Ektacolor Supra II Paper, smooth, semi-matt
	KES3E	Kodak Ektacolor Supra III Paper, fine-grained, lustre
	KES3F	Kodak Ektacolor Supra III Paper, smooth, glossy
	KES3N	Kodak Ektacolor Supra III Paper, smooth, semi-matt
	KESE	Kodak Ektacolor Supra Paper, fine-grained, lustre
	KESF	Kodak Ektacolor Supra Paper, smooth, glossy
	KESN	Kodak Ektacolor Supra Paper, smooth, semi-matt
	KET1	Kodak Ektatrans RA Display Material, smooth, semi-matt
	KEU2E	Kodak Ektacolor Ultra II Paper, fine-grained, lustre
	KEU2F	Kodak Ektacolor Ultra II Paper, smooth, glossy
	KEU2N	Kodak Ektacolor Ultra II Paper, smooth, semi-matt
	KEU3E	Kodak Ektacolor Ultra III Paper, fine-grained, lustre
	KEU3F	Kodak Ektacolor Ultra III Paper, smooth, glossy
	KEU3N	Kodak Ektacolor Ultra III Paper, smooth, semi-matt
	KEUE	Kodak Ektacolor Ultra Paper, fine-grained, lustre
	KEUF	Kodak Ektacolor Ultra Paper, smooth, glossy
	KEUN	Kodak Ektacolor Ultra Paper, smooth, semi-matt
		Inkjet Papers & Films
	KEJFC50HG	Kodak Ektajet 50 Clear Film LW4, Polyester Base, clear
	KEJFLFSG	Kodak Ektajet Film, Type LF, semi-gloss
	KEJFW50HG	Kodak Ektajet 50 White Film, Polyester Base, high gloss
	KEJP50SG	Kodak Ektajet 50 Paper, RC Base, semi-gloss
	KEJPC	Kodak Ektajet Coated Paper
	KEJPCHW	Kodak Ektajet Heavy Weight Coated Paper
	KEJPEFSG	Kodak Ektajet Paper, Type EF, semi-gloss

	KEJPLFSG	Kodak Ektajet Paper, Type LF, semi-gloss
Polaroid	POCP	Polaroid OneFilm Color Print
	PPCP	Polaroid Professional High Contrast Polychrome
	PPGH	Polaroid Polygraph HC
	PPLB	Polaroid Polablue BN
	PPPN	Polapan CT
Reserved	--	See Table 20

Table 26: Digital Formats. Table 26 **Digital** lists supported file formats used in digital imaging. 159 default values are provided in the preferred embodiment although any number of digital media are permissible.

Table 27: Digital

Category	Literal	Description
Digital	ACAD	AutoCAD database or slide
	ASCI	ASCII graphics
	ATK	Andrew Toolkit raster object
	AVI	Microsoft video
	AVS	AVS X image
	BIO	Biorad confocal file
	BMP	Microsoft Windows bitmap image
	BMPM	Microsoft Windows bitmap image, monochrome
	BPGM	Bentleyized Portable Graymap Format
	BRUS	Doodle brush file
	CGM	CGM
	CDR	Corel Draw
	CIF	CIF file format for VLSI
	CGOG	Compressed GraphOn graphics
	CMUW	CMU window manager bitmap
	CMX	Corel Vector
	CMYK	Raw cyan, magenta, yellow, and black bytes
	CQT	Cinepak Quicktime
	DVI	Typesetter DeVice Independent format
	EPS	Adobe Encapsulated PostScript
	EPSF	Adobe Encapsulated PostScript file format
	EPSI	Adobe Encapsulated PostScript Interchange format

1	FIG	Xfig image format
2	FIT	Flexible Image Transport System
3	FLC	FLC movie file
4	FLI	FLI movie file
5	FST	Usenix FaceSaver(tm) file
6	G10X	Gemini 10X printer graphics
7	GEM	GEM image file
8	GIF	CompuServe Graphics image
9	GIF8	CompuServe Graphics image (version 87a)
10	GOUL	Gould scanner file
11	GRA	Raw gray bytes
12	HDF	Hierarchical Data Format
13	HIPS	HIPSIfile
14	HIS	Image Histogram
15	HPLJ	Hewlett Packard LaserJet format
16	HPPJ	Hewlett Packard PaintJet
17	HTM	Hypertext Markup Language
18	HTM2	Hypertext Markup Language, level 2
19	HTM3	Hypertext Markup Language, level 3
20	HTM4	Hypertext Markup Language, level 4
21	ICON	Sun icon
22	ICR	NCSA Telnet Interactive Color Raster graphic format
23	IFF	Electronic Arts
24	ILBM	Amiga ILBM file
25	IMG	Img-whatnot file
26	JBG	Joint Bi-level image experts Group file interchange format
27	JPG	Joint Photographic experts Group file interchange format
28	LISP	Lisp machine bitmap file
29	MACP	Apple MacPaint file
30	MAP	Colormap intensities and indices
31	MAT	Raw matt bytes
32	MCI	MCI format
33	MGR	MGR bitmap
34	MID	MID format
35	MIF	ImageMagick format
36	MITS	Mitsubishi S340-10 Color sublimation
37	MMM	MMM movie file
38	MOV	Movie format
39	MP2	Motion Picture Experts Group (MPEG) interchange format, level
40		2
41	MP3	Motion Picture Experts Group (MPEG) interchange format, level
42		3
43	MPG	Motion Picture Experts Group (MPEG) interchange format, level
44		1
45	MSP	Microsoft Paint
46	MTV	MTV ray tracer image
47	NKN	Nikon format
48	NUL	NULL image
49	PBM	Portable BitMap
50	PCD	Kodak Photo-CD

1	PCX	Zsoft IBM PC Paintbrush
2	PDF	Portable Document Format table
3	PGM	Portable GrayMap format
4	PGN	Portable GrayMap format
5	PI1	Atari Degas .pi1 Format
6	PI3	Atari Degas .pi3 Format
7	PIC	Apple Macintosh QuickDraw/PICT
8	PLOT	Unix Plot(5) format
9	PNG	Portable Network Graphics
10	PNM	Portable anymap
11	PPM	Portable pixmap
12	PPT	Powerpoint
13	PRT	PRT ray tracer image
14	PS1	Adobe PostScript, level 1
15	PS2	Adobe PostScript, level 2
16	PSD	Adobe Photoshop
17	QRT	QRT ray tracer
18	RAD	Radiance image
19	RAS	CMU raster image format
20	RGB	Raw red, green, and blue bytes
21	RGBA	Raw red, green, blue, and matt bytes
22	RLE	Utah Run length encoded image
23	SGI	Silicon Graphics
24	SIR	Solitaire file format
25	SIXL	DEC sixel color format
26	SLD	AutoCADA slide filea
27	SPC	Atari compressed Spectrum file
28	SPOT	SPOT satelite images
29	SUN	SUN Rasterfile
30	TGA	Targa True Vision
31	TIF	Tagged Image Format
32	TIL	Tile image with a texture
33	TXT	Raw text
34	UIL	Motif UIL icon file
35	UPC	Universal Product Code bitmap
36	UYVY	YUV bit/pixel interleaved (AccomWSD)
37	VIC	Video Image Communication and Retrieval (VICAR)
38	VID	Visual Image Directory
39	VIF	Khoros Visualization image
40	WRL	Virtual reality modeling language
41	X1BM	X10 bitmap
42	XBM	X11 bitmap
43	XCC	Constant image of X server color
44	XIM	XIM file
45	XPM	X11 pixmap
46	XWD	X Window system window Dump
47	XXX	Image from X server screen
48	YBM	Bennet Yee ``face'' file
49	YUV	Abekas Y- and U- and Y-file
50	YUV3	Abekas Y- and U- and Y-file, 3

		ZEIS	Zeiss confocal file
		ZINC	Zinc bitmap
	Facsimile	--	See Table 25
	Reserved	--	See Table 20

Conclusion

This invention supports an indefinite number of formal objects. At the current time, supported objects are parent-child encoding, 1D and 2D barcoding, and a reasonably sized schemata. The invention's means of classification and archive notation is sufficiently flexible to be used in a variety of imaging situations shown. The examples given are meant to provide illustrations only and not to be limiting with respect to the types of imaging situations to which the present invention might apply.

The rules and notations specified in the preceding tables provide a basis for universal image enumeration encoding, decoding, and processing suitable for development of diverse implementations of the invention.

ASIA

The present invention is implemented in a variety of hardware embodiments. Common to these embodiments is the ability of the equipment to process information(i.e. a CPU of some type is required, a means for entering data satisfying the require syntax is necessary (i.e. some form of user data entry in the form of a keyboard, optical reader, voice entry, point-and-click, or other data entry means), a built-in encoding mechanism or some form of data storage means to hold, at least

temporarily the data input by the user, a data recording means in order to process the information and output a barcode or other graphical representation of data.

Processing flow

Referring to Figure 7 the processing flow of ASIA is shown.

Command 701 is a function call that accesses the processing to be performed by ASIA

Input format 703 is the data format arriving to ASIA. For example, data formats from Nikon, Hewlett Packard, Xerox, Kodak, etc., are input formats.

ILF (705,707, and 709) are the Input Language Filter libraries that process input formats into ASIA-specific format, for further processing. For example, an ILF might convert a Nikon file format into an ASIA processing format. ASIA supports an unlimited number of ILFs.

Configuration 711 applies configuration to ILF results. Configuration represents specifications for an application, such as length parameters, syntax specifications, names of component tables, etc.

CPF (713,715, and 717) are Configuration Processing Filters which are libraries that specify finite bounds for processing, such pre-processing instructions applicable to implementations of specific devices. ASIA supports an unlimited number of CPFs. Processing 719 computes output, such as data converted into numbers.

Output format 721 is a structured output used to return

processing results.

OLF (723, 725, 727) are Output Language Filters which are libraries that produce formatted output, such as barcode symbols, DBF, Excel, HTML, LaTeX, tab delimited text, WordPerfect, etc. ASIA supports an unlimited number of OLFs.

Output format driver 729 produces and/or delivers data to an Output Format Filter. OFF (731, 733, 735) are Output Format Filters which are libraries that organize content and presentation of output, such as outputting camera shooting data, database key numbers, data and database key numbers, data dumps, device supported options, decoded number values, etc. ASIA supports an unlimited number of OLFs.

Numeric ranges

ASIA uses indefinite numeric ranges for all of its variables except date, which supports years 0000-9999. ASIA provides default values for the numeric ranges, which represent a preferred embodiment, and are not meant to be limiting. Indeed the present invention can accommodate additional values depending upon the implementation selected. And the current ranges and values can be easily extended, depending upong the needs of specific implementation.

Location numbers. Location numbers track any number of generation, any number of lots, and date to the day. Optionally, location numbers track time to any granularity of accuracy, any number of concurrent authors, any number of devices, any number of images in an archive, any number of

additional data for future extensibility, and any number of additional data for user customization.

Image numbers. Image numbers track any number of imaging categories (2 defaults), any number of media sizes (47 defaults); any number of push settings or any number of dynamic range ("bit depth") settings, keyed by format; any number of transparency media types (60 defaults), any number of negative media types (115 defaults), any number of print media types (209 defaults), any number of packages (90 defaults), and any number of digital formats (159 defaults); any unit of resolution; any number of stain (presentation) forms (9 defaults); and any number of image formats (12 defaults). Finally, image numbers optionally support any number of additional data for future extensibility, and any number of additional data for user customization.

Parent numbers. Parent numbers track parent conception date. Since an archive can have any number of images, an archive also contains any number of parents. Parent numbers optionally support any unit of additional data for future extensibility, and any unit of additional data for user customization.

All variables use unbounded value ranges except for the variable *date*, which supports years 0000-9999. Table 8 **Variables with unbounded ranges** specifically identifies unbounded variables, organized by type of number **(Number)**, category of functionality **(Category)**, and corresponding variable **(Variable)**.

Syntactic rules guarantee consistency across all implementations; see **Syntax: Tables 10-11** above. No matter how differently implementations are customized, all implementations that are compliant with the encoding scheme described herein will exchange data.

Number	Category	Variable
location	number of generations	*generation*
location	number of lots in an archive	*sequence*
location	number of units in a lot	*unit*
location	number of authors	*author*
location	number of devices	*device*
location	granularity of time accuracy	*time*
location	specification extensibility	*locationRes*
location	user customization	*locationCus*
image	number of categories	*category*
image	number of media	*media*
image	number of software packages	*set*
image	number of stains	*stain*
image	number of formats	*format*
image	range of push settings	*push*
image	range of bit depth	*bit*
image	range of size	*size*
image	range of resolution	*resolution*
image	specification extensibility	*imageRes*
image	user customization	*imageCus*
parent	granularity of time accuracy	*parent*
parent	specification extensibility	*parentRes*
parent	user customization	*parentCus*

Table 8: Variables with unbounded ranges

Examples. More specifically, 4 examples will illustrate ASIA's interoperability. All of these examples use a 4 digit *sequence* definition (i.e., supporting 9,999 lots), but each example adjusts the *unit* definition and employs the optional variables *device* and/or *author*. Values of *device* and *author* are adjusted irregularly across the examples.

Example. Using 36 unit lots, useful for traditional 35mm

photography, this creates an upper bound of 359,964 images per archive (or 7,199 images a year for 50 years). 1 digit device encoding is used supporting up to 10 concurrently used devices.

Example. Using 99 unit lots, useful for digital imaging, this creates an upper bound of 989,901 images per archive (or 19,798 images a year for 50 years). 2 digit device encoding is used supporting up to 100 concurrently used devices.

Example. Using 9,999 unit lots, useful for photocopy imaging, this creates an upper bound of 100 million (99,980,001) images per archive (or 2 million [1,999,600] images a year for 50 years). 3 character author encoding is used supporting up to 676 concurrent authors in the archive, device is unspecified.

Example. Using 999,999 unit lots, suitable for motion imaging, this creates an upper bound of 9,998,990,001 (10 trillion) images per archive (or 200 million [199,979,800] images a year for 50 years). 4 character author encoding is used supporting up to 456,976 concurrent authors; and 3 digit device encoding is used supporting up to 1000 concurrently used devices per author.

Data from all of the above example can be seamlessly shared using the encoding scheme of the present invention.

Parent-child Processing

Implementation. ASIA provides native support of parent

decoding and is written to support parent encoding. However, since parent-child encoding functionality must operate directly with resolvers (see Figure 3) multi-generation encoding is left to device specific implementations.

ASIA implements parent-child support through the 'schemata' and 'engine' components of the Figure 5 **Implementation** through extensive use of OLF's (See Figure 7 ASIA).

Barcode Processing

Implementation. ASIA natively supports 1D Code 39 and 2D Data Matrix barcodes. ASIA implements barcoding through the 'engine' component of the implementation.

Code Instantiation

The ASIA engine library specifically implements the invention's formal requirements for classification and archival notation and in this sense provides a reference implementation of the invention's relations.

ASIA is written in ANSI C++, with flexibility and performance improving extensions for Win32 and SVID compliant UNIXes. It has been developed to work as a library for inclusion into other software, or as a core engine to which interfaces are written. ASIA is modularized into small, convenient encoding and decoding filters (libraries): ILFs, CPFs, OLFs, and OFFs. To create a full implementation, a developer often needs only to write 1 filter of each variety. These filters are simple, sometimes a few lines of code each.

Such extensibility is designed to permit rapid porting of ASIA to diverse applications. For example, with minimal effort, a programmer may port ASIA to a new device or software package. With little or no customization, the ASIA engine library may plug into pre-existing applications, serve as a back-end for newly written interfaces, or be included directly into chips with tabular information maintained through Flash ROM upgrades, etc. ASIA illustrates all 3 layers of the invention, as characterized in Figure 1. Specifically, ASIA provides a robust set of native functionality in a core code offering. The core code has been developed for extreme, rapid, and convenient extensibility. ASIA's extensibility provides theoretically unlimited interoperability with devices, mechanisms, and software, while requiring absolutely minimal development effort and time.

It is expected that ASIA subsumes the functionality needed by most applications for which the Automated System for Image Archiving applies, but ASIA itself merely is one implementation of the invention's formal specifications presented in §4.2.

Utility

For the author, devices that implement this invention can provide a convenient, accurate, and flexible tracking system that builds cumulatively and automatically into a comprehensive, rationally organized archival system that required no archival knowledge whatsoever to use. This can

reduce many administrative needs facing those who use image-producing devices. Similarly, after a user initializes the systems, the system will work without user intervention.

For example, the need for photographic assistants could be curtailed in professional photography. Using a device constructs an archive without human intervention, and clicking a barcode reader on an image displays image data.

For the archivist, mechanisms implementing this invention can automate exact and rapid tacking of every image in a given archive, for inventory/sales, author identification, historical record, etc. For example, an advertising agency could recall client information and image production facts from a click of a barcode reader. A newspaper could process, identify, and track images from its photographic staff through automated slide sorting machines. Museums could automate collection and inventory services as a matter of course in receiving new materials.

For the manufacturer, implementations of this invention can provide devices with automated encoding, decoding, and processing systems, included in chips or accompanying software. A device can produce self-identifying enumeration which interoperates with other devices by the same manufacturer, or with other devices from other manufacturers.

For example, a manufacturer could provide consumers with a seamless mechanism to track image evolutions, from film developing to digital editing to paper production. Or

hospitals could automatically track patient x-rays and MRI scans as a matter of course in using the equipment. The equipment could be manufactured by one or different manufacturers, and the system would work seamlessly for the end-user.

I Claim:

1. A system for universal image tracking comprising:
An image forming apparatus;
A CPU integral to the image forming apparatus;
User input means connected to the CPU for receiving user input;
Logic stored in the CPU for receiving user input and creating archive data based upon the user input; and
A Graphic code producer responsive to the CPU for producing graphic codes representative of the archive data.

2. The system for universal image tracking of claim 1 wherein the image forming apparatus is a film based camera.

3. The system for universal image tracking of claim 1 wherein the image forming apparatus is a digital based camera.

4. The system for universal image tracking of claim 1 wherein the image forming apparatus is a video camera.

5. The system for universal image tracking of claim 1 wherein the image forming apparatus is a digital image processor.

6. The system for universal image tracking of claim 1 wherein the image forming apparatus is a medical image sensor.

7. The system for universal image tracking of claim 6 wherein the medical image sensor is a magnetic resonance imager.

8. The system for universal image tracking of claim 6 wherein the medical image sensor is an X-ray imager.

9. The system for universal image tracking of claim 6 wherein

the medical image sensor is a CAT scan imager.

10. The system for universal image tracking of claim 1 wherein the user input means is a push button input.

11. The system for universal image tracking of claim 1 wherein the user input means is a keyboard.

12. The system for universal image tracking of claim 1 wherein the user input means is voice recognition equipment.

13. The system for universal image tracking of claim 1 wherein the graphic codes are one-dimensional.

14. The system for universal image tracking of claim 1 wherein the graphic codes are two-dimensional.

15. The system for universal image tracking of claim 1 wherein the graphic codes are three-dimensional.

16. The system for universal image tracking of claim 1 wherein the logic comprises configuration input processing for determining bounds for the archive data generation based on configuration input;
a resolver for determining the correct value of archive data representing the image forming apparatus and the configuration input; and
a timer for creating date/time stamps.

17. The system for universal image tracking of claim 16 wherein the timer further comprises a filter for processing the time stamp according to configuration input rules.

18. The system for universal image tracking of claim 16

wherein the configuration input comprises at least generation, sequence, data, unit, and constants information.

19. The system for universal image tracking of claim 1 further comprising a graphic code reader connected to the CPU for reading a graphic code on an image representing archive information; and

A decoder for decoding the archive information represented by the graphic code.

20. The system for universal image tracking of claim 19 wherein the logic further comprises:

logic for receiving a second user input and creating lineage archive information relating to the image based upon the archive information and the second user input; and

logic for producing graphic code representative of the lineage archive data.

21. The system for universal image tracking of claim 1 wherein the archive data comprises location attributes of an image.

22. The system for universal image tracking of claim 1 wherein the archive data comprises physical attribute of an image.

23. The system for universal image tracking of claim 1 wherein each image in an image archive has unique archive data associated with each image.

24. The system for universal image tracking of claim 21

wherein the location data comprises at least:
image generation depth;
serial sequence of lot within an archive;
serial sequence of unit within a lot;
date location of a lot within an archive;
date location of an image within an archive;
author of the image; and
device producing the image.

25. The system for universal image tracking of claim 16 wherein the timer tracks year in the range of from 0000 to 9999.

26. The system for universal image tracking of claim 16 wherein the timer tracks all 12 months of the year.

27. The system for universal image tracking of claim 16 wherein the timer tracks time in at least hours and minutes.

28. The system for universal image tracking of claim 16 wherein the timer tracks time in fractions of a second.

29. The system for universal image tracking of claim 16 wherein the system is ISO 8601:1988 compliant.

30. The system for universal image tracking of claim 22 wherein the physical attributes comprise at least:
image category;
image size;
push status;
digital dynamic range;

image medium;

image resolution;

image stain; and

image format.

31. The system for universal image tracking of claim 20 wherein the lineage archive information comprises a parent number.

32. The system for universal image tracking of claim 31 wherein the parent number comprises at least:

a parent conception date; and

a parent conception time.

33. A method for universally tracking images comprising:

inputting raw image data to an image forming apparatus;

inputting image-related data; creating first archive data based upon the image-related data; and translating the first archive data into a form that can be attached to the raw image data.

34. The method for universally tracking images of claim 33 wherein the raw image data is from a film based camera.

35. The method for universally tracking images of claim 33 wherein the raw image data is from a digital camera.

36. The method for universally tracking images of claim 33 wherein the raw image data is from a video camera.

37. The method for universally tracking images of claim 33 wherein the raw image data is from a digital image processor.

38. The method for universally tracking images of claim 33 wherein the raw image data is from a medical image sensor.

39. The method for universally tracking images of claim 38 wherein the medical image sensor is a magnetic resonance imager.

40. The method for universally tracking images of claim 38 wherein the raw image data is from an X-ray imager.

41. The method for universally tracking images of claim 38 wherein the raw image data is from a CAT scan imager.

42. The method for universally tracking images of claim 33 wherein the inputting image related data occurs without user intervention.

43. The method for universally tracking images of claim 33 wherein the inputting of image related data occurs via push button input.

44. The method for universally tracking images of claim 33 wherein the inputting of image related data occurs via voice recognition equipment.

45. The method for universally tracking images of claim 33 wherein the inputting of image related data occurs via a keyboard.

46. The method for universally tracking images of claim 33 wherein the form of the translated archive data is an electronic file.

47. The method for universally tracking images of claim 33 wherein the form of the translated data is a graphic code.

48. The method for universally tracking images of claim 47 wherein the graphic code is one dimensional.

49. The method for universally tracking images of claim 47 wherein the graphic code is two dimensional.

50. The method for universally tracking images of claim 47 wherein the graphic code is three dimensional.

51. The method for universally tracking images of claim 33 wherein the image data comprises image data and second archive data.

52. The method for universally tracking images of claim 33 further comprising reading the second archive data; and creating lineage archive information relating to the image based upon the first archive information and second archive information.

53. The method for universally tracking images of claim 33 wherein the inputting of image related data comprises configuration input processing for determining bounds for the archive data generation based upon configured input; determining the correct value of archive data representing the image forming apparatus and configuration input; and date/time stamping the image related data.

54. The method for universally tracking images of claim 53 wherein date/time stamping is filtered according to configuration input rules.

55. The method for universally tracking images of claim 33 wherein the configuration input comprises at least

generation, sequence, data, unit, and constants information.

56. The method for universally tracking images of claim 33 wherein the first archive data comprises location attributes of an image.

57. The method for universally tracking images of claim 33 wherein the first archive data comprises physical attributes of an image.

58. The method for universally tracking images of claim 56 wherein the location attributes comprise at least:
image generation depth;
serial sequence of lot within an archive;
serial sequence of unit within a lot;
date location of a lot within an archive;
date location of an image within an archive;
author of the image; and
device producing the image.

59. The method for universally tracking images of claim 57 wherein the physical attributes of an image comprise at least:
image category;
image size;
push status;
digital dynamic range;
image medium;
software set;

image resolution;
image stain; and
image format.

60. The method for universally tracking images of claim 52 wherein the lineage archive information comprises a parent number.

61. The method for universally tracking images of claim 52 wherein the parent number comprises at least:
a parent conception date; and
a parent conception time.

62. The system for universal image tracking of claim 1 wherein the input means comprises a magnetic card reader.

63. The system for universal image tracking of claim 1 wherein the input means comprises a laser scanner.

64. The system for universal image tracking of claim 31 wherein the physical attributes further comprise;
imageRes; and
imageCus.

65. The method for universally tracking images of claim 33 wherein the inputting image related data is via a magnetic card reader.

66. The method for universally tracking images of claim 33 wherein the inputting of image related data is via a laser scanner.

67. The method of universally tracking images of claim 33 wherein the inputting of image related data is via an

optical reader.

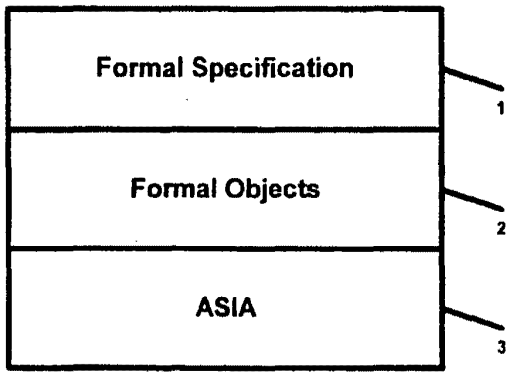


Figure 1

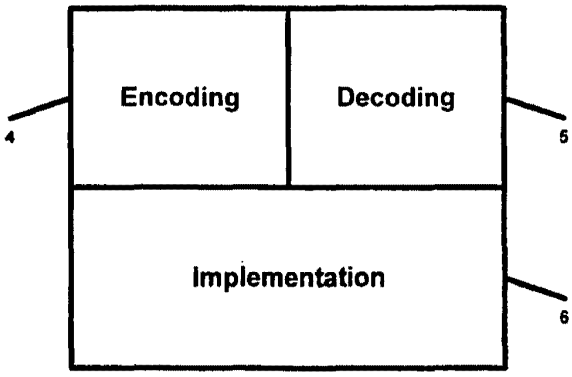


Figure 2

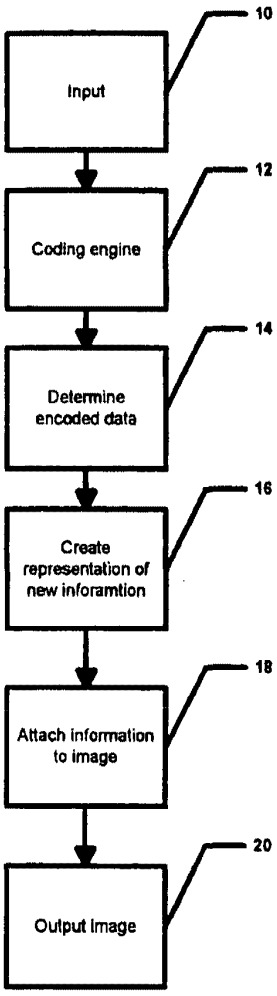


Figure 1A

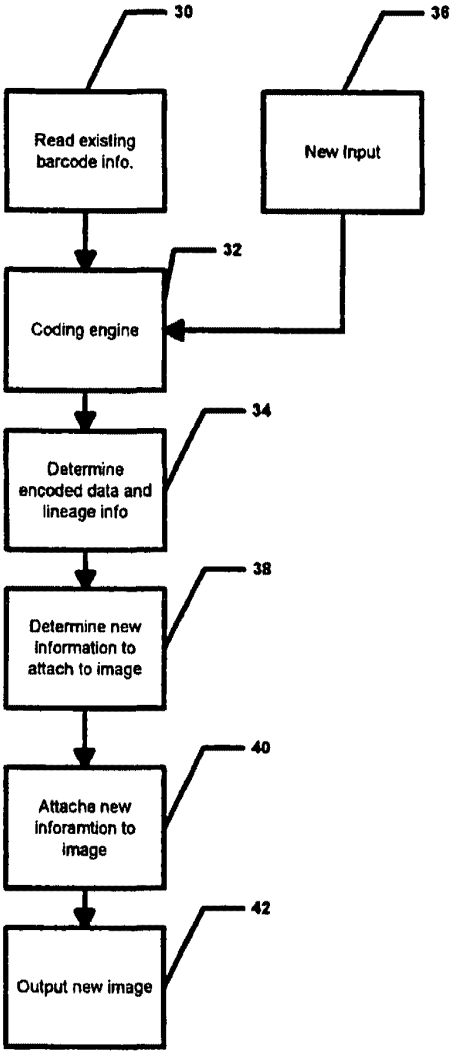


Figure 1B

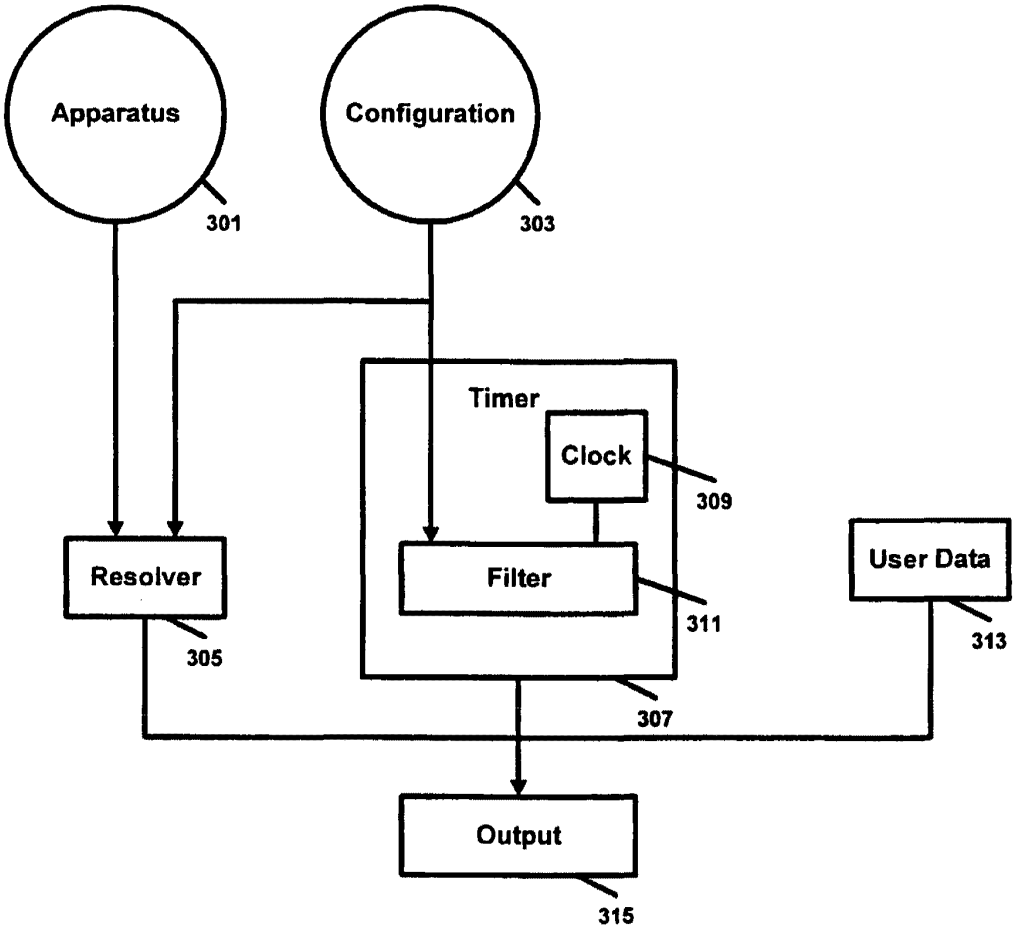

Apparatus
301
Configuration
303
Timer
Clock
309
Resolver
305
Filter
311
User Data
313
307
Output
315

Figure 3

```
// Location identifying information
location      ➔   generation sequence time-stamp author device locationRes locationCus

// Physical attribute information
image         ➔   category size bit-or-push media set resolution stain format imageRes imageCus

// Parent identifying information
parent        ➔   time-stamp parentRes parentCus
```

Figure 4

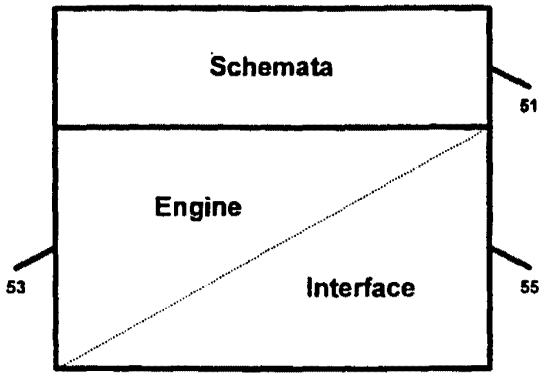


Figure 5

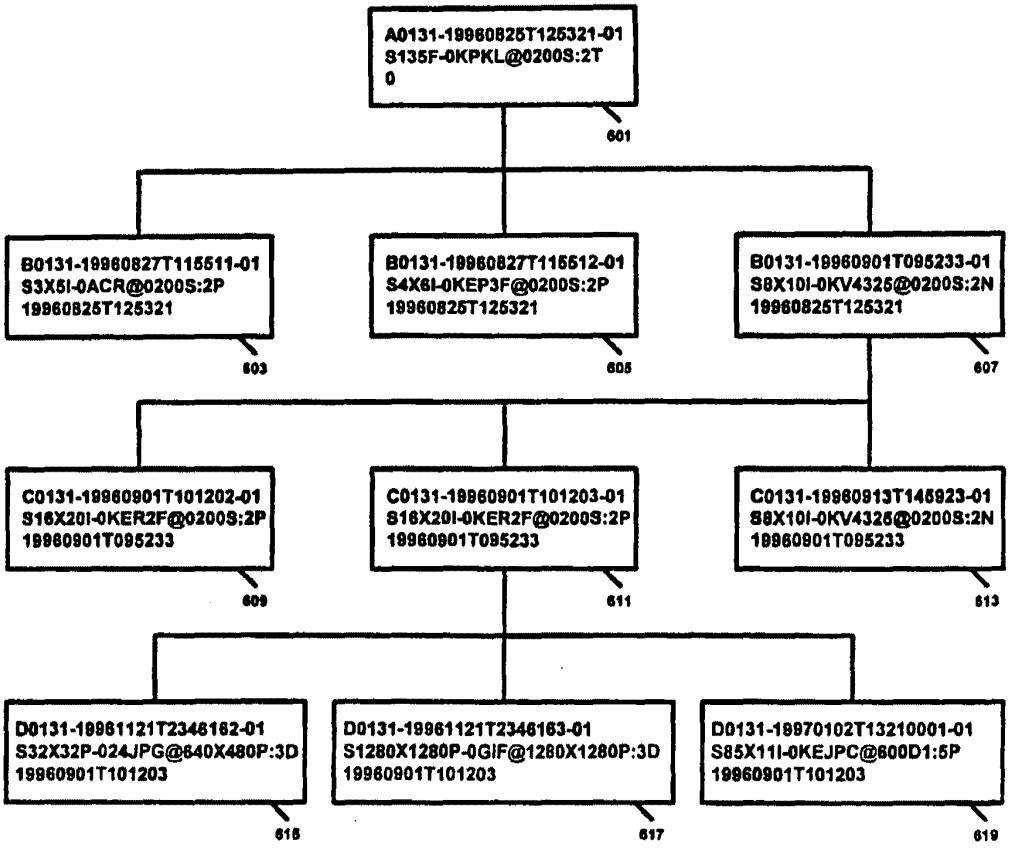

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619

Figure 6

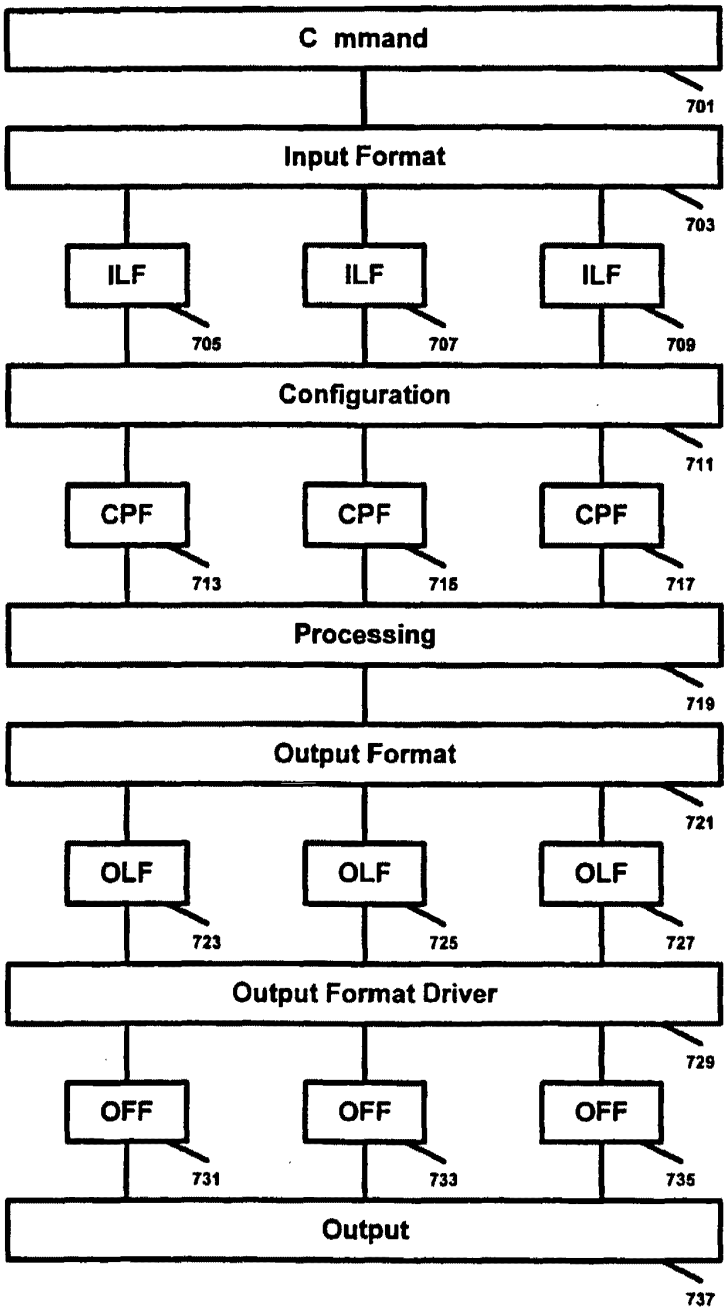

C mmand
701
Input Format
703
ILF
ILF
ILF
705
707
709
Configuration
711
CPF
CPF
CPF
713
715
717
Processing
719
Output Format
721
OLF
OLF
OLF
723
725
727
Output Format Driver
729
OFF
OFF
OFF
731
733
735
Output
737

Figure 7

INTERNATIONAL SEARCH REPORT

Ir ational Application No
PCT/US 98/00624

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04N1/21

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)
IPC 6 H04N

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 practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 568 161 A (XEROX CORP) 3 November 1993	1,33
A	see the whole document	1,16,23, 53

Y	US 5 008 700 A (OKAMOTO TSUGIO) 16 April 1991 cited in the application	1,33
A	see abstract	47

A	US 5 193 185 A (LANTER DAVID) 9 March 1993 cited in the application see abstract	1,33

	-/--	

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in 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 document but 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	Date of mailing of the international search report
12 May 1998	25/05/1998

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Hazel, J

1

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 98/00624

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication,where appropriate. of the relevant passages	Relevant to claim No.
A	CALLAGHAN V L ET AL: "STRUCTURES AND METRICS FOR IMAGE STORAGE AND INTERCHANGE" JOURNAL OF ELECTRONIC IMAGING, vol. 2, no. 2, 1 April 1993, pages 126-137, XP000369378 see Section 2.2 ---	1,22,23, 30,33, 46,53, 57,59
A	WO 86 05610 A (ALPHAREL INC) 25 September 1986 see abstract -----	1,23,33

1

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Ir ational Application No
PCT/US 98/00624

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0568161 A	03-11-1993	EP 0495622 A	22-07-1992
		JP 6110755 A	22-04-1994
US 5008700 A	16-04-1991	NONE	
US 5193185 A	09-03-1993	NONE	
WO 8605610 A	25-09-1986	US 4665555 A	12-05-1987
		AU 577451 B	22-09-1988
		AU 5458486 A	13-10-1986
		EP 0217825 A	15-04-1987
		JP 62502638 T	08-10-1987

Form PCT/ISA/210 (patent family annex) (July 1992)

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Date: October 31, 2001

To: Miss Stokes, USPTO
Filing Receipt Corrections Branch

Fax No: 703-308-7751

From: Kent E. Genin, Esq.

Tel. No: 312-321-7732
Fax No. 312-321-4299

Client No: 10406/49
Applicants: J. Overton et al.
U.S. Serial No. 09/872,736

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Intellectual Property Attorneys

NBC Tower - Suite 3600
455 N. Cityfront Plaza Drive
Chicago, Illinois 60611-5599
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No. of Pages
(inc. this page): 8

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October 31, 2001
Date of Deposit

Kent Genin
Name of applicant, assignee or Registered Representative

Signature

10/31/2001
Date of Signature

Our Case No. 10406/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
John K. Overton et al.
Serial No. 09/872,736
Filing Date: June 1, 2001
For METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK

Examiner: Unknown
Group Art Unit No. 2152

REQUEST FOR CORRECTION OF FILING RECEIPT

Commissioner for Patents
Washington, D.C. 20231

Attention: Patent Application Filing Receipt Corrections
Customer Correction Branch
Miss Stokes - Fax 703-308-7751

Madam:

Applicant requests the issuance of a corrected filing receipt (copy enclosed) for the above-referenced patent application, and in support of this request respectfully states:

Domestic Pri rity Data As Claimed By Applicant:

Please delete the following:

"THIS APPLICATION IS A CIP OF 09/661,222 09/13/2000 WHICH CLAIMS BENEFIT OF 60/153,709 09/14/1999
THIS APPLICATION 09/872,736 CLAIMS BENEFIT OF 60/209,070 06/02/2000"

Please insert the following:

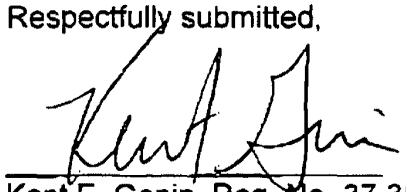
--THIS APPLICATION IS A CIP OF 09/661,222 FILED 09/13/00, A CIP OF 09/503,441 FILED 02/14/00, A CIP OF 09/367,461 FILED 08/13/99, AND A CIP OF 09/111,896 FILED 07/08/98.

THIS APPLICATION CLAIMS THE BENEFIT OF 60/209,070 FILED 06/02/00 AND 60/277,408 FILED 03/19/01.--

Applicants' attorney states that on September 10, 2001 a Preliminary Amendment was filed requesting the first paragraph of the specification be amended for the captioned application to correct the priority claim language. A copy of the Preliminary Amendment as filed is enclosed for the convenience of the Filing Receipt Corrections branch.

Applicants respectfully request a Corrected Filing Receipt be issued for U.S. Serial No. 09/872,736 reflecting the above-referenced priority data. If any fees are required with regard to these corrections The Commissioner is hereby authorized to charge applicants' attorneys Deposit Account No. 23-1925. A duplicate copy of this sheet is enclosed.

Respectfully submitted,



Kent E. Genin, Reg. No. 37,384
Attorney for Applicants

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200

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October 31, 2001
Date of Deposit

Kent Genin
Name of applicant, assignee or Registered Representative

Signature

10/31/2001
Date of Signature

Our Case No. 10406/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
John K. Overton et al.
Serial No. 09/872,736
Filing Date: June 1, 2001
For METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK

Examiner: Unknown
Group Art Unit No. 2152

REQUEST FOR CORRECTION OF FILING RECEIPT

Commissioner for Patents
Washington, D.C. 20231

Attention: Patent Application Filing Receipt Corrections
Customer Correction Branch
Miss Stokes - Fax 703-308-7751

Madam:

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Domestic Priority Data As Claimed By Applicant:

Please delete the following:

"THIS APPLICATION IS A CIP OF 09/661,222 09/13/2000 WHICH CLAIMS BENEFIT OF 60/153,709 09/14/1999
THIS APPLICATION 09/872,736 CLAIMS BENEFIT OF 60/209,070 06/02/2000"

Please insert the following:

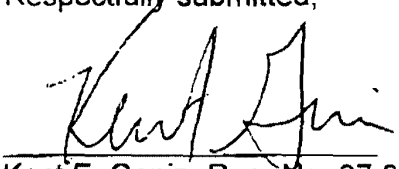
--THIS APPLICATION IS A CIP OF 09/661,222 FILED 09/13/00, A CIP OF 09/503,441 FILED 02/14/00, A CIP OF 09/367,461 FILED 08/13/99, AND A CIP OF 09/111,896 FILED 07/08/98.

THIS APPLICATION CLAIMS THE BENEFIT OF 60/209,070 FILED 06/02/00 AND 60/277,408 FILED 03/19/01.--

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Respectfully submitted,



Kent E. Genin, Reg. No. 37,384
Attorney for Applicants

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200

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WASHINGTON, D.C. 20231
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APPLICATION NUMBER	FILING DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	DRAWINGS	TOT CLAIMS	IND CLAIMS
09/872,736	06/01/2001	2152	765	10406/49	15	45	6

CONFIRMATION NO. 3927

UPDATED FILING RECEIPT

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CHICAGO, IL 60610

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Applicant(s)

John K. Overton, Chicago, IL;
Stephen W. Bailey, Andover, MA;

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Domestic Priority data as claimed by applicant

THIS APPLICATION IS A CIP OF 09/661,222 09/13/2000
WHICH CLAIMS BENEFIT OF 60/153,709 09/14/1999
THIS APPLICATION 09/872,736
CLAIMS BENEFIT OF 60/209,070 06/02/2000

Foreign Applications

If Required, Foreign Filing License Granted 08/02/2001

Projected Publication Date: 01/24/2002

Non-Publication Request: No

Early Publication Request: No

** **SMALL ENTITY** **

Title

Method and apparatus for managing location information in a network

Preliminary Class

UNITED STATES PATENT AND TRADEMARK OFFICE

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UNITED STATES PATENT AND TRADEMARK OFFICE
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Bib Data Sheet

CONFIRMATION NO. 3927

SERIAL NUMBER	FILING DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/872,736	06/01/2001 RULE	709	2153	10406/49

APPLICANTS

John K. Overton, Chicago, IL;
Stephen W. Bailey, Andover, MA;

** CONTINUING DATA **********

THIS APPLICATION IS A CIP OF 09/661,222 09/13/2000
AND A CIP OF 09/503,441 02/14/2000
AND A CIP OF 09/367,461 08/13/1999
AND A CIP OF 09/111,896 07/08/1998
AND CLAIMS BENEFIT OF 60/209,070 06/02/2000
AND CLAIMS BENEFIT OF 60/277,408 03/19/2001

** FOREIGN APPLICATIONS **********

IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** SMALL ENTITY **
** 08/02/2001

		STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
Foreign Priority claimed	☐ yes ☐ no	IL	15	45	6
35 USC 119 (a-d) conditions met	☐ yes ☐ no ☐ Met after Allowance				
Verified and Acknowledged	Examiner's Signature Initials				

ADDRESS

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO ,IL 60610

TITLE

Method and apparatus for managing location information in a network

FILING FEE RECEIVED	FEES: Authority has been given in Paper 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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9/10/2001

Date of Signature

Our Case No.10406/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

J. Overton et al.

Serial No. 09/872,736

Filing Date: June 1, 2001

For METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK

Group Art Unit No. 2152

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Please enter the following amendment prior to examination of the above-identified U.S. patent application.

IN THE SPECIFICATION

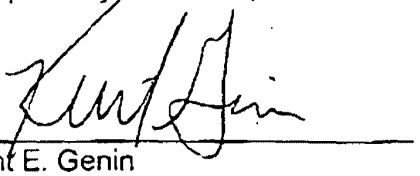
On page 1, please amend the paragraph beginning on line 4 to read as follows:

This application claims the benefit of provisional patent application serial no. 60/209,070 filed June 2, 2000 and provisional application serial no. 60/277,408 filed March 19, 2001; and this application is a continuation-in-part of each of the following non-provisional U.S. patent applications: application serial no. 09/661,222 entitled NETWORK DISTRIBUTED TRACKING WIRE TRANSFER PROTOCOL, filed on September 13, 2000; application serial no. 09/503,441 entitled AUTOMATED SYSTEM FOR IMAGE ARCHIVING, filed February 14, 2000; application serial no. 09/367,461 entitled AUTOMATED SYSTEM FOR IMAGING ARCHIVING, filed August 13, 1999; and application serial no. 09/111,896 entitled SYSTEM AND METHOD FOR ESTABLISHING AND RETRIEVING DATA BASED ON GLOBAL INDICES, filed on July 8, 1998, wherein the entirety of each of these provisional and non-provisional applications is incorporated herein by reference.

REMARKS

Applicants have amended the Specification to restate its original claim of priority in a single, continuous sentence. Applicants respectfully request that the Examiner verify that the priority claim properly includes the cited two provisional applications and four non-provisional applications originally identified. No new matter has been added with this amendment. Applicants note that both the original six priority claims, and the enclosed amendments to those priority claims are timely submitted pursuant to 37 C.F.R. §1.78. Pursuant to 37 C.F.R. §1.121, a marked-up copy of the amended portion of the specification is attached at Appendix A. Entry of the above amendment is respectfully requested.

Respectfully submitted,



Kent E. Genin
Registration No. 37,834
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200

2152

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TRANSMITTAL LETTER			Case No. 10406/49
Serial No. 09/872,736	Filing Date June 1, 2001	Examiner	Group Art Unit 2152
Inventor(s) J. Overton et al.			
Title of Invention Method And Apparatus For Managing Location Information In A Network			

TO THE COMMISSIONER FOR PATENTS

Transmitted herewith is Transmittal Letter (in duplicate); Supplemental Information Disclosure Statement; PTO Form 1449; One Copy of References B1-B6.

☐ Small entity status of this application under 37 CFR § 1.27 has been established by verified statement previously submitted.

☐ A verified statement to establish small entity status under 37 CFR §§ 1.9 and 1.27 is enclosed.

☐ Petition for a _____ month extension of time.

☐ Small Entity status is claimed.

☐ The fee has been calculated as shown below:

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Indep.		Minus			x 40=			x $80=	
First Presentation of Multiple Dep. Claim					+$135=			+ $270=	
					Total add'l fee	$		Total add'l fee	$

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☒ The Commissioner is hereby authorized to charge payment of any additional filing fees required under 37 CFR § 1.16 and any patent application processing fees under 37 CFR § 1.17 associated with this communication or credit any overpayment to Deposit Account No. 23-1925. A duplicate copy of this sheet is enclosed.

☐ I hereby petition under 37 CFR § 1.136(a) for any extension of time required to ensure that this paper is timely filed. Please charge any associated fees which have not otherwise been paid to Deposit Account No. 23-1925. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

Kent E. Genin
Registration No. 37,834
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200

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Date: May 3, 2002 Signature:

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Kent E. Genin
Name of Applicant, Assignee or Registered Representative

Signature

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PATENT
CASE NO. 10406/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Group Art Unit: 2152
John K. Overton et al.	
Serial No. 09/872,736	
Filed: June 1, 2001	
For: METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK	

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Pursuant to the obligation under 37 C.F.R. § 1.56 and in conformance with 37 C.F.R. § 1.97-1.99, Applicant hereby submits the following references for consideration by the Examiner. Copies of each have been enclosed along with the form PTO-1449.

U.S PATENTS

Patent No.	Date	Inventor
5,724,575	03/03/98	Hoover et al.
5,913,210	06/15/99	Call
5,950,173	09/07/99	Perkowski
5,974,409	10/26/99	Sanu et al.

FOREIGN PATENT DOCUMENTS

Document No.	Date	Country
EP 0 919 912 A2	06/02/99	EPO

OTHER ART

Copy of Communication relating to the results of the Partial International Search Report for PCT Application No. PCT/US01/18013 dated April 15, 2002.

EXPLANATION OF THE REFERENCES

Each item of information contained herein was first cited in a communication from a foreign patent office in a counterpart application not more than three months prior hereto. Accordingly, no fee is required.

Applicant requests to have these references included in the record of this application. Applicant further requests that the Examiner review the entire disclosure of each reference. Applicant does not represent any of these references to be prior art and Applicant reserves the right to disqualify any references by the showing of an earlier date of invention, if appropriate.

Respectfully Submitted,

Kent E. Genin
Reg. No. 37,834
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
P.O. Box 10395
Chicago, IL 60610
(312) 321-7732

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FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 10406/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): John K. Overton et al.	

REFERENCE DESIGNATION **U.S. PATENT DOCUMENTS**

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS/ SUBCLASS	FILING DATE
	B1	5,724,575	03/03/98	Hoover et al.		
	B2	5,913,210	06/15/99	Call		
	B3	5,950,173	09/07/99	Perkowski		
	B4	5,974,409	10/26/99	Sanu et al.		

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS/ SUBCLASS	TRANSLATION YES	NO
	B5	EP 0 919 912 A2	06/02/99	EPO			

EXAMINER INITIAL		OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)
	B6	Copy of Communication relating to the results of the Partial International Search Report for PCT Application No. PCT/US01/18013 dated April 15, 2002

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EXAMINER	DATE CONSIDERED

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.06.1999 Bulletin 1999/22

(51) Int. Cl.[6]: **G06F 9/46**, G06F 11/00, H04L 12/24

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(30) Priority: **28.11.1997 JP 343929/97**

(71) Applicant: **Hitachi, Ltd.**
Chiyoda-ku, Tokyo 101-8010 (JP)

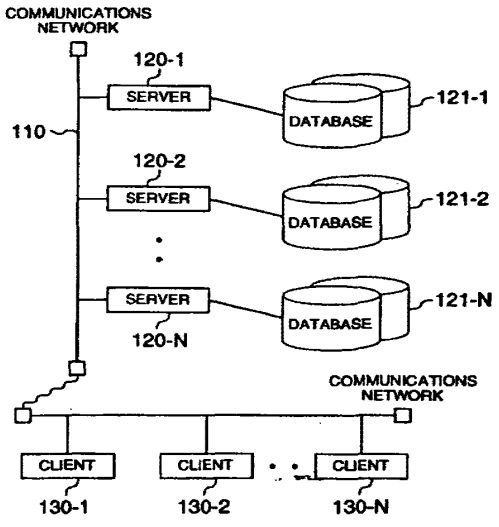
(72) Inventors:
- **Kondo, Takaaki**
  Yokohama-shi (JP)
- **Watanabe, Tetsuya**
  Yokohama-shi (JP)
- **Oono, Hisashi**
  Yokohama-shi (JP)

(74) Representative:
Strehl Schübel-Hopf & Partner
Maximilianstrasse 54
80538 München (DE)

(54) Multiserver workflow system

(57) A multiserver workflow system in which each server and the users who use clients construct one subsystem includes: a plurality of servers (120-1, 120-2, 120-N); a plurality of clients (130-1, 130-2, 130-N); and a network (110) to which the servers and the clients are connected. All of the servers have address information (310) of the servers constructing all of the subsystems and correspondence information (340) on all of the users and the subsystem which can be used by respective users. When each client connects to any one of the servers, the client downloads a list of the subsystems which can be used by the user who uses the client and addresses of the servers constructing the usable subsystems from the connection server and stores the list as a connectable server list (420).

FIG. 1



EP 0 919 912 A2

Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The invention relates to a server/client system and, more particularly, to a multiserver workflow system comprising a plurality of subsystems.

Description of the Related Art

[0002] There is a process for circulating a document to concerned departments or concerned persons and obtaining approvals of those circulation destinations. A workflow system realizes such a process on a computer network. Specifically speaking, there is an example as disclosed in U.S. Patent No. 5,634,127.

[0003] Generally, a server has business process definition information as definition information of a document flow (business process). The document (case) inputted by the user on a client is controlled in accordance with the definition information.

[0004] Hitherto, as a workflow system, there is a workflow system with a single server construction in which one server and a plurality of clients are connected via a network.

[0005] There is also a workflow system having a multiserver construction such that a plurality of servers and a plurality of clients are connected via a network and a control is made so that the plurality of servers have the same business process definition information and all of the plurality of servers have the newest status information of a case which is being processed.

[0006] There is also a workflow system having a multiserver construction such that a plurality of workflow systems each having the single server construction as mentioned above are connected to the same network.

[0007] In case of the conventional workflow system of the single server construction, since all of the businesses depend on one server, if the server causes a malfunction, all of the businesses are stopped. The number of businesses of which the server is in charge increases, a use frequency of the businesses rises, and a load which is applied to the server increases, so that a business executing speed decreases.

[0008] In case of the workflow system of the multiserver construction which holds the same information, an amount of information which is stored into each server increases and traffics among the servers for keeping the information identical among the servers occur. There is a case where unless the backup and restoring operations are executed in a lump in all of the servers, a mismatch among the servers occurs in the information recovered from the backup.

[0009] In case of the workflow system of the multiserver construction in which a plurality of workflow systems of the single server construction are connected to the same network, since the users cannot be collectively managed, the user management is troublesome. Further, when a change in construction (the number) of servers occurs, it is necessary to change information in all clients using the target system.

SUMMARY OF THE INVENTION

[0010] It is an object of the invention to provide a multiserver workflow system in which even when a server to be connected does not work, the client can try to connect with another server.

[0011] Another object of the invention is to provide a multiserver workflow system which can execute businesses on servers other than a fault occurring server.

[0012] Still another object of the invention is to make it easy to manage and change information on servers and users in a multiserver workflow system.

[0013] To accomplish those objects, a workflow system according to the invention has the following construction.

[0014] A multiserver workflow system in which each server and the users who use clients construct one subsystem comprises: a plurality of servers; a plurality of clients; and a network to which the servers and clients are connected. All of the servers have: address information of the servers belonging to all subsystems; and correspondence information of all users and the subsystems which can be used by the users. When each client is connected to any one of the servers, the client downloads a list of the subsystems which can be used by the user who use the client and addresses of the servers constructing the usable subsystem from the connecting server and stores them as a connectable server list for each login user.

[0015] Further, each client tries to connect to the server by using the stored connectable server list and, when the connection to the server fails, the client tries to connect to another server in the connectable server list.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

Fig. 1 is a block diagram showing an outline of a structure of a multiserver workflow system according to the invention;

Fig. 2 is a block diagram showing a more specific structual example of the multiserver workflow system and a user interface on a client;

Fig. 3 is a diagram for explaining structures of information which is formed by a management server and information which is distributed to each subsystem and for explaining the information forming method;

Fig. 4 is a diagram for explaining a method of distributing a connectable server list from a server to clients; and

Fig. 5 is a diagram for explaining processes when a client connects to a server.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

(1) System construction

[0017] Fig. 1 is a block diagram showing an outline of a construction of a multiserver workflow system.

[0018] A plurality of servers 120-1 to 120-N and a plurality of clients 130-1 to 130-N are connected to a communications network 110 and databases 121-1 to 121-N are connected to the respective servers.

[0019] The communications network 110 is an LAN (Local Area Network), a WAN (Wide Area Network), a public telephone line, an Internet, or the like. The server 120 and client 130 are computers such as personal computers, workstations, or the like each having a CPU, a memory, input/output devices, and an interface to the communications network. The database 121 can be also included in the server 120. Communications between the server 120 and client 130 and between the servers are executed using a protocol depending on the communications network 110, for example, TCP/IP. One server and a plurality of users who use the clients construct one subsystem.

(2) Operation of the user

[0020] Fig. 2 is a block diagram showing a more specific structural example of the multiserver workflow system and a user interface on the client.

[0021] In this example, server 1 (120-1), server 2 (120-2), and server 3 (120-3) are connected as servers to the network (110). The server 1 belongs to an accounting business subsystem. The server 2 belongs to a personnel business subsystem. The server 3 belongs to a materials business subsystem.

[0022] It is now assumed that a user who uses a client X (130-1) is permitted to use all of the subsystems. A basic screen 200 is displayed on a display device of the client X.

[0023] Buttons of case input 201, INBOXes 211 to 214, and OUTBOXes 221 to 224 are displayed on the basic screen 200.

[0024] In case of inputting a new case, the user selects the case input button 201 by a mouse click or the like. After that, a list of subsystems which can be used by the user is shown. By further selecting a desired subsystem, a business process in the selected subsystem is displayed. The subsequent operation is the same as that of the conventional workflow system of the single server construction.

[0025] The user selects the INBOX button in order to access a case which is not processed yet and has to be processed from now on. The user selects the OUTBOX button in order to see a status of a case which has already been inputted or processed. When the user selects the INBOX and OUTBOX buttons (211, 221) of all of the systems, titles of the cases relating to the user in all of the subsystems are displayed together with the additional information. When the user selects the INBOX and OUTBOX buttons (212 - 214, 222 - 224) of each system, a title of the cases relating to the user in the selected subsystem are displayed together with the additional information.

[0026] When the INBOX button is selected, a person who made the case, making time, a name of the using business process, time when the case arrived at his INBOX, and the like are displayed together with the case title. By selecting the case title, the user performs the referring or approving operation of the contents of the case. When the user selects the OUTBOX button, a person who made the case, making time, a name of the using business process, a processing status, and the like are displayed together with the case title. The operation after the user accessed each subsystem is the same as that of the conventional workflow system of the single server construction.

(3) Information making and setting method

[0027] Fig. 3 is a diagram for explaining information which is distributed to the servers of each subsystem.

[0028] The information is made by one server and the information is distributed to each server. To make the information, a dedicated server may be provided or any one of the servers 1, 2, and 3 constructing the business subsystems as shown in Fig. 2 may be used. The server which makes the information to be distributed to each server is called a management server.

[0029] The information is made in the management server by the following procedure.

① Making of the subsystem list

[0030] A managing program on the management server makes a subsystem list table 310 in accordance with the input of a manager and stores the table into a memory in the management server. The subsystem list table 310 includes a name of the server constructing each subsystem and an address (for example, IP address) on the communications network of the server.

② Making of the user information

[0031] The managing program on the management server makes a user information table 320 in accordance with the input of the manager and stores the table into the memory in the management server. The user informationtable 320 includes user IDs of all of the users who use the system, sections to which they belong, names, and posts. The table 320 can also further include items such as passwords, nicknames, and the like. The user information table may be made by the

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server of each subsystem and collected to the management server.

③ Making of the subsystem user information

[0032] The managing program on the management server makes a subsystem user information table 330 in accordance with the input of the manager and on the basis of the subsystem list table 310 and stores the table into the memory in the management server. The manager designates the users who use each subsystem by indicating a condition. For example, as shown in the table 330 in Fig. 3, the users in an operation section are designated for the subsystem of the server 1. All of the users are designated for the subsystem of the server 2. The users in the operation section and group leaders of all sections are designated for the subsystem of the server 3. The table 330 includes the server names and inputted conditions.

④ Making of the user connection information

[0033] The managing program on the management server compares the items in the user information table 320 which has already been made with the conditions in the subsystem user information table 330, determines the connectable servers for respective users, and makes a user connection information table 340. The user connection information has a list of the connectable servers in addition to the same items as those in the user information table 330.

⑤ Distribution of the subsystem list and the user connection information

[0034] The managing program on the management server distributes the subsystem list table 310 and the user connection information table 340 to all of the servers via the communications network. Therefore, all of the servers 1 to 3 have the same information.

[0035] The managing program is software which is executed by the CPU of the management server.

⑥ Distribution of the connectable server list to each client

[0036] A method of distributing the connectable server list from the server to each client will now be described by using Fig. 4.

[0037] For each client, the server to be connected in default is determined and the client has its address as default connection server information 410. The client connects to the default connection server and transmits a login request (430) to the connection server together with the user ID of the user who uses the client. The client can transmit a server information updating request or a login request to the server being connected together with the user ID at another arbitrary timings.

[0038] When the login request or server information updating request is received, the server extracts the user ID included in those requests. The server extracts the connectable server names of the user ID from the user connection information table 340 and, further, extracts the addresses of the connectable servers from the subsystem list table 310. After that, the server transmits the connectable server names and the addresses as a connectable server list to a sending source of the login request or the server information updating request (440). The client stores the received connectable server list as a table 420. In some systems, a plurality of users share one client. In such system, the client may store the connectable server lists for the respective users.

[0039] The foregoing procedure of ① to ⑥ is also applied to the cases of an addition of the server, an address change of the server, an addition or deletion of the user, and a change in user information.

(4) Process of the client

[0040] Process of the client when the user starts a workflow business in the client device will now be described with reference to Fig. 5.

[0041] When the client receives the login request from the user, the client obtains information on the server which has previously been designated as a default server on own client machine (step 500) and tries to connect to the default server.

[0042] When the connection tried server is working (YES in step 501) and the user is authenticated by the server (OK in step 508), the connectable server list table 420 is downloaded onto the own client machine (step 509). Even when the server list has already existed on the client, by again downloading, the client can obtain the new connectable server list corresponding to the login user. After that, the client starts the workflow business (step 510).

[0043] When the connection tried server is not working (NO in step 501) or the user fails to be authenticated by the server (NG in step 508), the client checks whether the connectable server list table 420 for the user exists on the own client machine or not (step 502).

[0044] When the table 420 exists (YES in step 502), the client tries to connect to one of the servers in the list (step 505).

[0045] When the connection cannot be performed (NG in step 506) due to a reason such that the connection tried server is in a down state or the like, the client checks if another server exists in the list (step 507). When there is another server (YES in step 507), the client tries to connect to the server (step 505).

[0046] When the client cannot connect to all servers in the list (NO in step 507), the client finishes the processes.

[0047] When the connection tried server is working (OK in step 506) and the user is authenticated by the server (OK in step 508), the connectable server list

Page 256 of 470

table 420 is downloaded onto the own client machine (step 509).

[0048] When the table 420 for the user doesn't exist, the client finishes the processes (NO in step 502).

[0049] The above process is realized by software which is executed by the CPU of the client.

[0050] The order of selecting the connection trying server in the server list table 420 by the client can be determined by the client or can be merely the topdown order of in the table.

[0051] The basic screen 200 which is displayed on the display device of the client is shown in the paragraph (2) mentioned above and Fig. 2. The INBOX and OUTBOX buttons of all of the subsystems and each subsystem which can be used by the user are displayed in the above screen. This display is performed on the basis of the connectable server list table 420 on the client. When the INBOX or OUTBOX button of a certain subsystem (server) is designated, the client obtains the address of the designated server from the server list table 420. When the client is at present connected to the server, the process corresponding to the designated button is started. When the client is not connected to the server, the connecting process is executed by using the obtained address and, after completion of the user authentication, the process corresponding to the designated button is started. In the basic screen 200, when the case input button 201 and the INBOX and OUTBOX buttons 211 and 221 of all of the subsystems are designated, the client sequentially connects to all of the servers in the connectable server list table 420, receives the user authentication, and executes the transmission and reception of the information and the processes. During the process, if there is a server which is not working, the process for this server is skipped.

(5) Effects

[0052] By constructing the system and the table arrangement as mentioned above, the client can obtain the list of the servers which can be used by the user from any server.

[0053] A service for accessing a plurality of servers can be provided to the user with a simple user interface.

[0054] It is sufficient to perform the change of the server, server address, and user in only the management server and the maintenance becomes simple.

(6) Modifications

[0055] Although the embodiment has been described with respect to the workflow system as an example, the defining method and distributing method of the information on the servers and users can be also applied to another multiserver systems.

[0056] The numbers of items in the tables of the subsystem list, user information, subsystem user information, user connection information, and connectable server list can be increased or decreased as necessary.

Claims

1. A multiserver workflow system comprising:

   a plurality of servers (120-1, 120-2, 120-N);
   a plurality of clients (130-1, 130-2, 130-N); and
   a network (110) to which said servers and said clients are connected,
   wherein each of said servers and users who use the clients construct a subsystem,
   all of the servers have address information (310) of the servers constructing all subsystems and correspondence information (340) of all users and the subsystems which can be used by respective users, and
   when each client connects to any one of said servers, said client downloads a list of the subsystems which can be used by the user who uses said client and addresses of the servers constructing said usable subsystems from the connected server and stores the list as a connectable server list (420).

2. A system according to claim 1, wherein each client provides a user interface (200) to access all of the usable subsystems with reference to said connection server list (420) and connects to the server constructing the subsystem selected by the user by using the addresses in the connectable server list.

3. A system according to claim 1, wherein each client connects to the server by using the stored connectable server list (420) and, when the connection to said server fails, said client tries to connect to another server in the connectable server list.

4. A method of managing information on servers and users in a multiserver workflow system including a plurality of subsystems, comprising the steps of:

   deciding an information management server;
   on said information management server, defining subsystem/server address information (310) including addresses of servers constructing all of the subsystems and user/subsystem correspondence information (340) indicating a correspondence between all of the users and the subsystems which can be used by respective users and storing the information;
   distributing said subsystem/server address information (310) and said user/subsystem correspondence information (340) from said information management server to all of th servers; and
   in each of the servers constructing the subsystems, storing said subsystem/server addr ss

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information and said user/subsystem correspondence information being distributed, extracting a list of the subsystems which can be used by the user who uses said client and the addresses of the servers constructing said usable subsystems from said stored information in response to a request from the client, and transmitting the list (420) to said client.

5. A method according to claim 4, wherein in said management server,

information (320) on all of the users is collected,
a condition (330) of the user constructing the subsystem is inputted, and
said information on every user is compared with the condition of the user constructing said subsystem, the usable subsystem is determined for every user, and said user/subsystem correspondence information (340) is made.

6. A method of connecting to a server by a client, comprising the steps of:

having an address (410) of a default connection server;
connecting to said default connection server at first, downloading a list of subsystems which can be used by a user who uses said client and addresses of the servers constructing said usable subsystems from the connection server, and storing the list as a connectable server list (420); and
performing the connection to the server by using the stored connectable server list at second and subsequent times, and when the connection to said server fails, the client tries to connect to another server in said connectable server list.

7. A method according to claim 6, further comprising the step of:

when the connection to the server succeeds, downloading the connectable server list (420) from the connection server in order to obtain latest information.

8. A program storage device readable by a client machine, tangibly embodying a program of instructions executable by the client machine to perform method steps for connecting with a server machine, said method comprising the steps of:

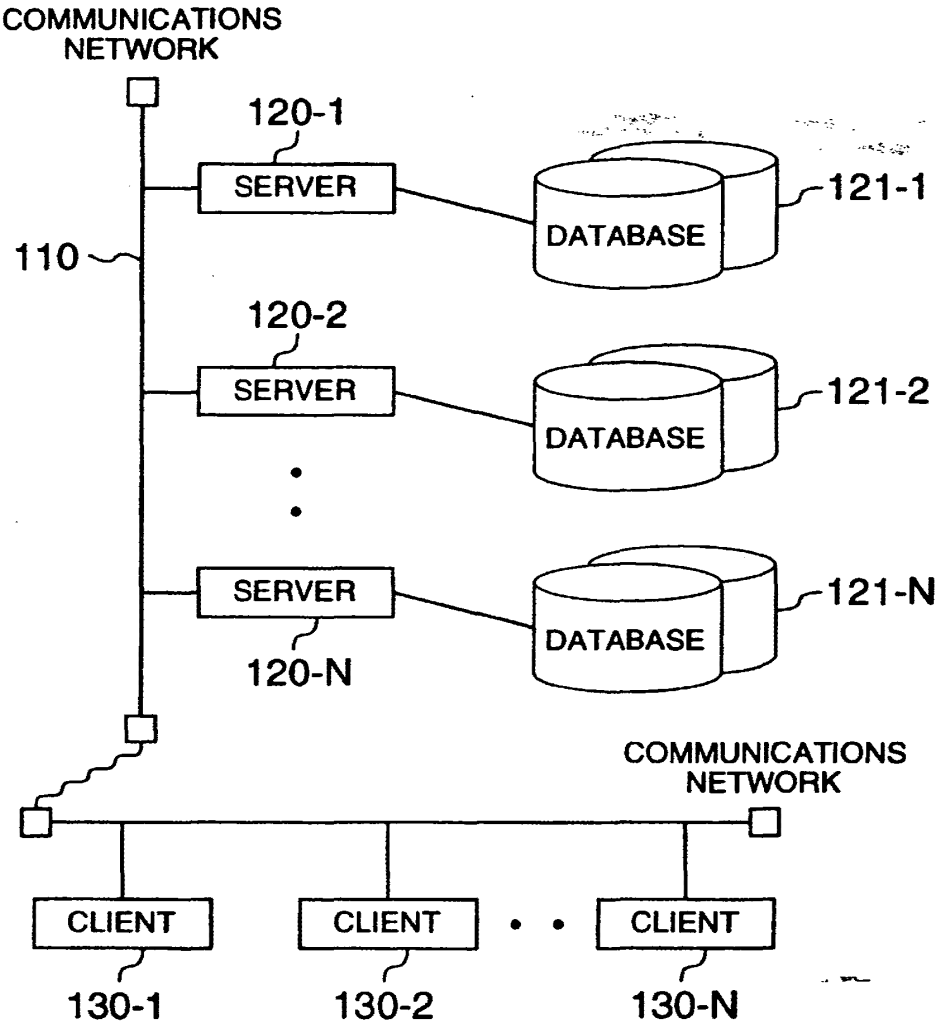
connecting to a predetermined default connection server at first, downloading a list of subsystems which can be used by a user who uses said client and addresses of servers constructing said usable subsystems from the connection server, and storing the list as a connectable server list; and
connecting to the server by using the stored connectable server list at second and subsequent times, and when the connection to said server fails, trying to connect to another server in said connectable server list.

9. A server/client system comprising:

a plurality of servers (120);
a plurality of clients (130); and
a network (110) to which said servers and said clients are connected,
wherein all of the servers have address information (310) on all servers and correspondence information (340) of all users and the servers which can be used by respective users, and
when each client is connected to any one of said servers, said client downloads a list of the servers which can be used by the user who uses said client and addresses of the servers from the connection server and stores the list as a connectable server list (420).

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FIG. 1



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FIG. 2

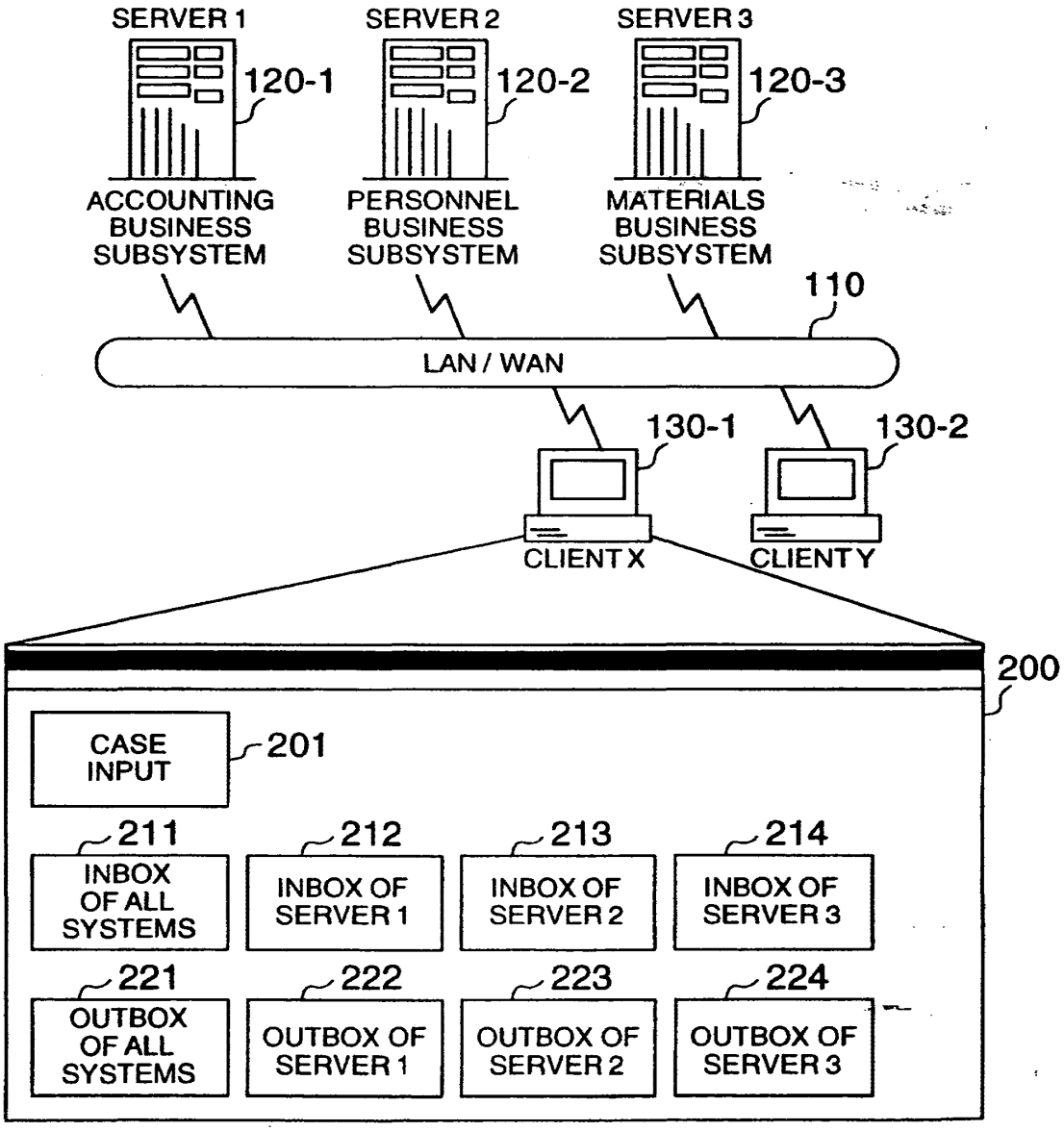
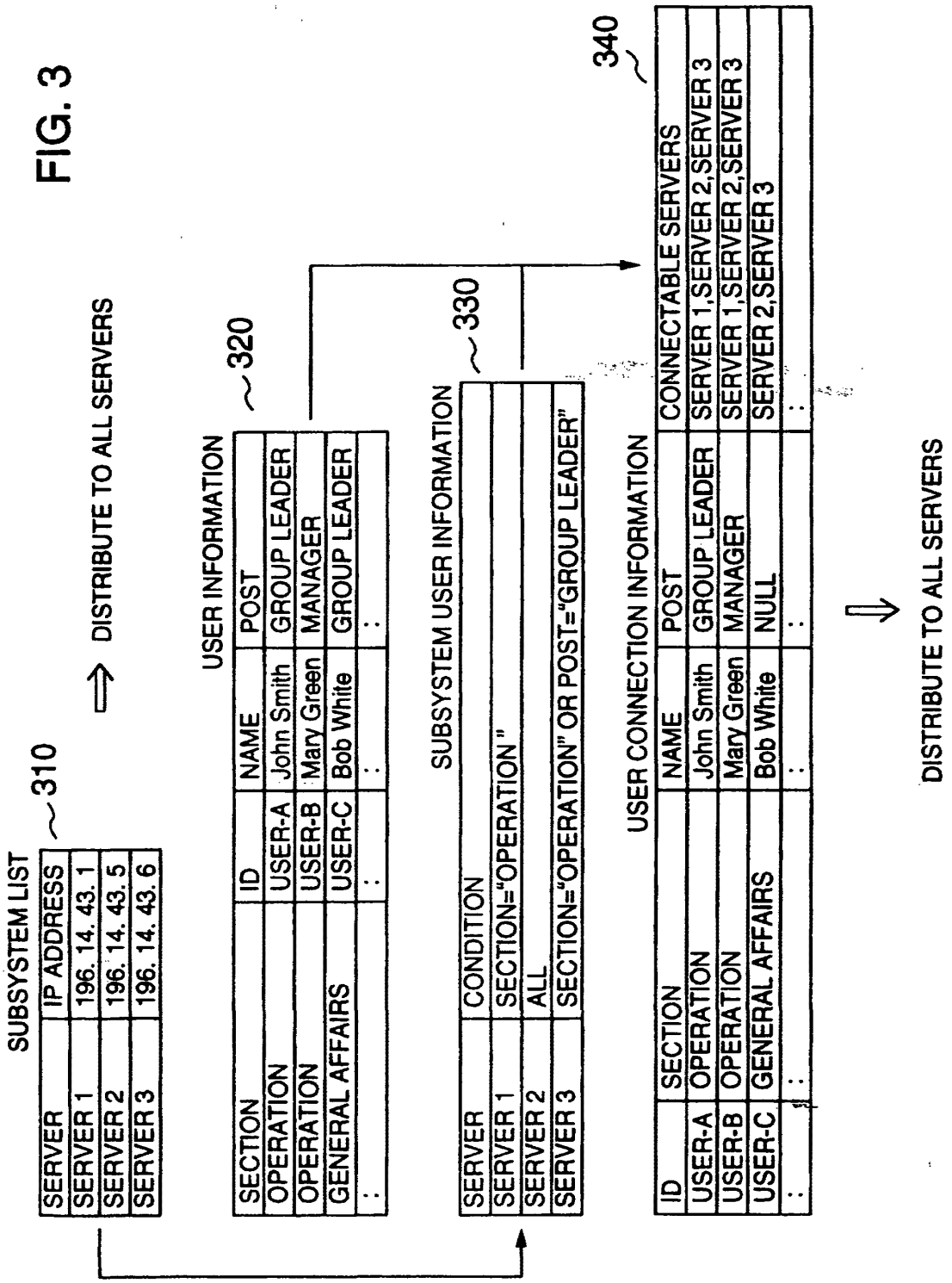
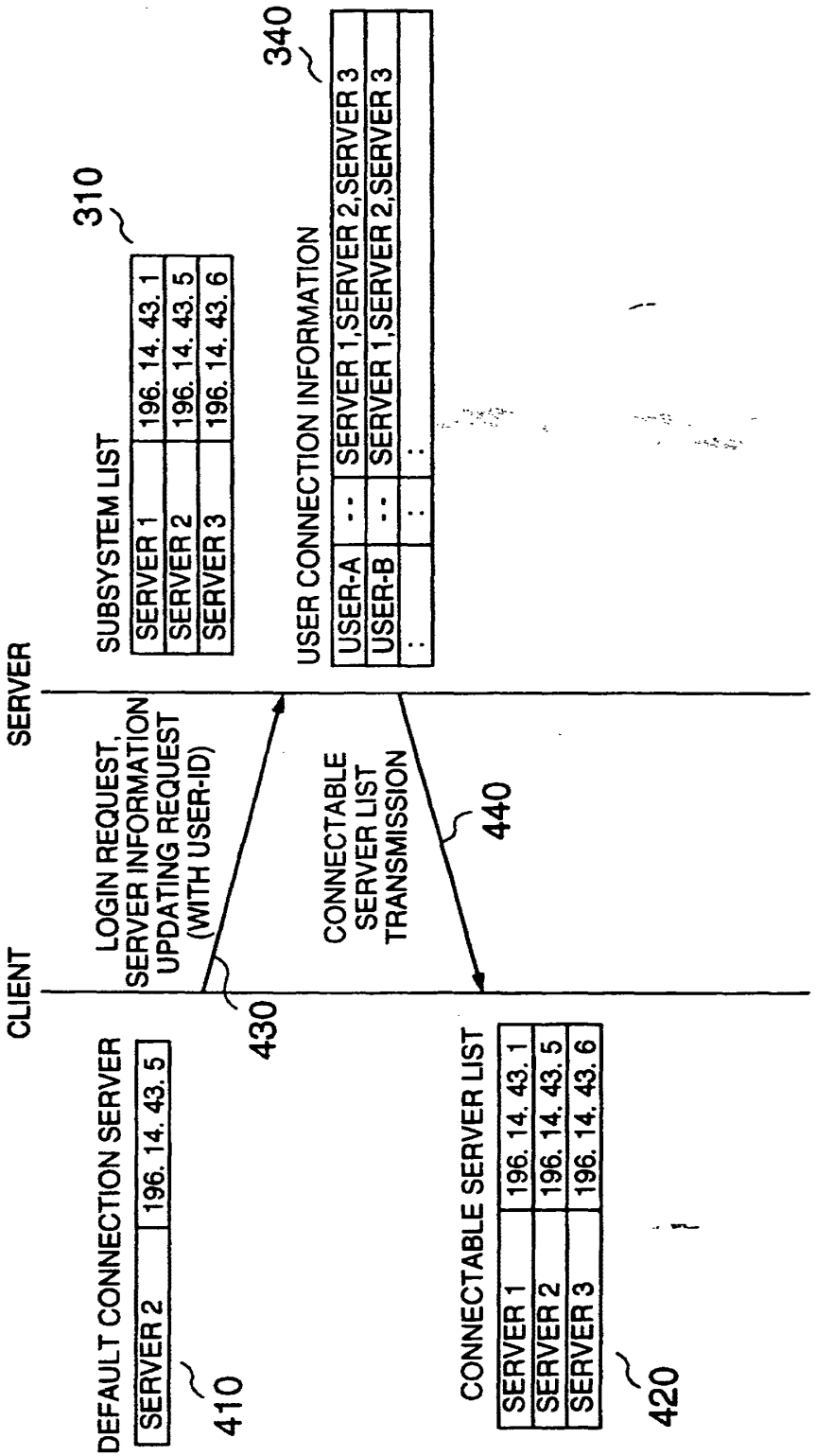

SERVER 1
120-1
ACCOUNTING BUSINESS SUBSYSTEM
SERVER 2
120-2
PERSONNEL BUSINESS SUBSYSTEM
SERVER 3
120-3
MATERIALS BUSINESS SUBSYSTEM
110
LAN / WAN
130-1
CLIENT X
130-2
CLIENT Y
200
CASE INPUT
201
211
INBOX OF ALL SYSTEMS
212
INBOX OF SERVER 1
213
INBOX OF SERVER 2
214
INBOX OF SERVER 3
221
OUTBOX OF ALL SYSTEMS
222
OUTBOX OF SERVER 1
223
OUTBOX OF SERVER 2
224
OUTBOX OF SERVER 3

FIG. 3



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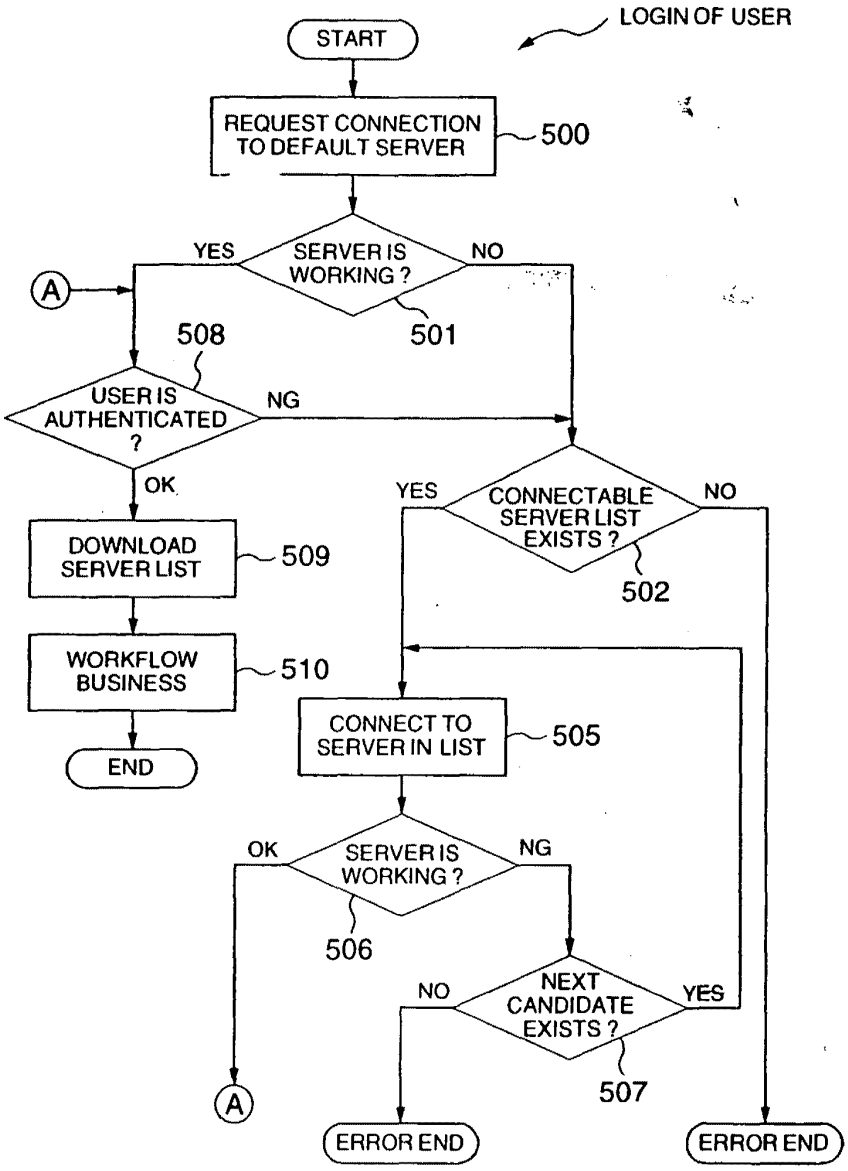
FIG. 4



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FIG. 5



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TRANSMITTAL LETTER			Case No. 10406/49
Serial No. 09/872,736	Filing Date June 1, 2001	Examiner	Group Art Unit 2152
Inventor(s) J. Overton et al.			
Title of Invention Method And Apparatus For Managing Location Information In A Network			

TO THE COMMISSIONER FOR PATENTS

Transmitted herewith is Transmittal Letter (in duplicate); Supplemental Information Disclosure Statement; PTO Form 1449; One Copy of References C1-C5.

☐ Small entity status of this application under 37 CFR § 1.27 has been established by verified statement previously submitted.

☐ A verified statement to establish small entity status under 37 CFR §§ 1.9 and 1.27 is enclosed.

☐ Petition for a ____ month extension of time.

☐ Small Entity status is claimed.

☐ The fee has been calculated as shown below:

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Indep.		Minus			x 40=			x $80=	
First Presentation of Multiple Dep. Claim					+$135=			+ $270=	
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☐ A check in the amount of $_____ to cover the filing fee is enclosed.

☒ The Commissioner is hereby authorized to charge payment of any additional filing fees required under 37 CFR § 1.16 and any patent application processing fees under 37 CFR § 1.17 associated with this communication or credit any overpayment to Deposit Account No. 23-1925. A duplicate copy of this sheet is enclosed.

☐ I hereby petition under 37 CFR § 1.136(a) for any extension of time required to ensure that this paper is timely filed. Please charge any associated fees which have not otherwise been paid to Deposit Account No. 23-1925. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

Kent E. Genin
Registration No. 37,834
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200

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Kent E. Genin
Name of Applicant, Assignee or Registered Representative

Signature

8/9/2002
Date of Signature

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PATENT
CASE NO. 10406/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Group Art Unit: 2152
J. Overton et al.	
Serial No. 09/872,736	
Filed: June 1, 2001	
For: METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK	

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Pursuant to the obligation under 37 C.F.R. § 1.56 and in conformance with 37 C.F.R. § 1.97-1.99, Applicant hereby submits the following references for consideration by the Examiner. Copies of each have been enclosed along with the form PTO-1449.

U.S. PATENTS

Patent No.	Date	Inventor
5,724,575	03/03/98	Hoover et al.
5,913,210	06/15/99	Call
5,950,173	09/07/99	Perkowski
5,974,409	10/26/99	Sanu et al.

FOREIGN PATENT DOCUMENTS

Document No.	Date	County
EP 0 919 912 A2	06/02/99	EPO

EXPLANATION OF THE REFERENCES

Each item of information contained herein was first cited in a communication from a foreign patent office in a counterpart application not more than three months prior hereto.

Accordingly, no fee for consideration of the information provided with this disclosure statement is included herewith. However, if an office action on the merits is mailed on a date prior hereto, Applicant hereby requests and authorizes the Commissioner to charge Deposit Account 23-1925 for the appropriate fee of $180 as set forth in 37 C.F.R. § 1.97(c) for consideration of the information set forth in this disclosure statement.

Applicant requests to have these references included in the record of this application. Applicant further requests that the Examiner review the entire disclosure of each reference. Applicant does not represent any of these references to be prior art and Applicant reserves the right to disqualify any references by the showing of an earlier date of invention, if appropriate.

Respectfully Submitted,

BRINKS HOFER GILSON & LIONE
P.O. Box 10395
Chicago, IL 60610
(312) 321-7732

Kent E. Genin
Reg. No. 37,834
Attorney for Applicant

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FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 10406/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

REFERENCE DESIGNATION **U.S. PATENT DOCUMENTS**

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS/ SUBCLASS	FILING DATE
	C1	5,724,575	03/03/98	Hoover et al.		
	C2	5,913,210	06/15/99	Call		
	C3	5,950,173	09/07/99	Perkowski		
	C4	5,974,409	10/26/99	Sanu et al.		

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS/ SUBCLASS	TRANSLATION YES	NO
	C5	EP 0 919 912 A2	06/02/99	EPO			

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EXAMINER	DATE CONSIDERED

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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(71) Applicant: **Hitachi, Ltd.**
Chiyoda-ku, Tokyo 101-8010 (JP)

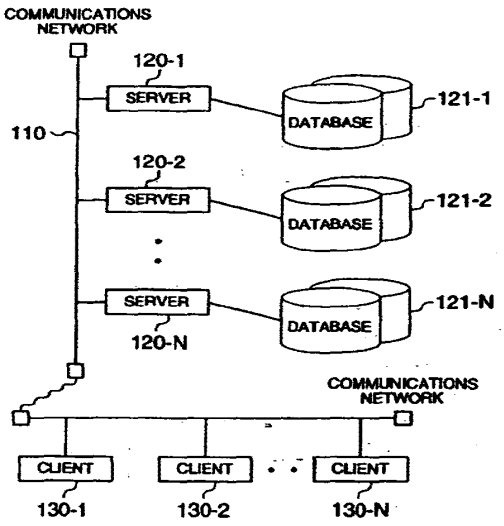
(72) Inventors:
- **Kondo, Takaaki**
  Yokohama-shi (JP)
- **Watanabe, Tetsuya**
  Yokohama-shi (JP)
- **Oono, Hisashi**
  Yokohama-shi (JP)

(74) Representative:
Strehl Schübel-Hopf & Partner
Maximilianstrasse 54
80538 München (DE)

(54) Multiserver workflow system

(57) A multiserver workflow system in which each server and the users who use clients construct one subsystem includes: a plurality of servers (120-1, 120-2, 120-N); a plurality of clients (130-1, 130-2, 130-N); and a network (110) to which the servers and the clients are connected. All of the servers have address information (310) of the servers constructing all of the subsystems and correspondence information (340) on all of the users and the subsystem which can be used by respective users. When each client connects to any one of the servers, the client downloads a list of the subsystems which can be used by the user who uses the client and addresses of the servers constructing the usable subsystems from the connection server and stores the list as a connectable server list (420).

FIG. 1



EP 0 919 912 A2

Descripti n

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The invention relates to a server/client system and, more particularly, to a multiserver workflow system comprising a plurality of subsystems.

Description of the Related Art

[0002] There is a process for circulating a document to concerned departments or concerned persons and obtaining approvals of those circulation destinations. A workflow system realizes such a process on a computer network. Specifically speaking, there is an example as disclosed in U.S. Patent No. 5,634,127.

[0003] Generally, a server has business process definition information as definition information of a document flow (business process). The document (case) inputted by the user on a client is controlled in accordance with the definition information.

[0004] Hitherto, as a workflow system, there is a workflow system with a single server construction in which one server and a plurality of clients are connected via a network.

[0005] There is also a workflow system having a multiserver construction such that a plurality of servers and a plurality of clients are connected via a network and a control is made so that the plurality of servers have the same business process definition information and all of the plurality of servers have the newest status information of a case which is being processed.

[0006] There is also a workflow system having a multiserver construction such that a plurality of workflow systems each having the single server construction as mentioned above are connected to the same network.

[0007] In case of the conventional workflow system of the single server construction, since all of the businesses depend on one server, if the server causes a malfunction, all of the businesses are stopped. The number of businesses of which the server is in charge increases, a use frequency of the businesses rises, and a load which is applied to the server increases, so that a business executing speed decreases.

[0008] In case of the workflow system of the multiserver construction which holds the same information, an amount of information which is stored into each server increases and traffics among the servers for keeping the information identical among the servers occur. There is a case where unless the backup and restoring operations are executed in a lump in all of the servers, a mismatch among the servers occurs in the information recovered from the backup.

[0009] In case of the workflow system of the multiserver construction in which a plurality of workflow systems of the single server construction are connected to the same network, since the users cannot be collectively managed, the user management is troublesome. Further, when a change in construction (the number) of servers occurs, it is necessary to change information in all clients using the target system.

SUMMARY OF THE INVENTION

[0010] It is an object of the invention to provide a multiserver workflow system in which even when a server to be connected does not work, the client can try to connect with another server.

[0011] Another object of the invention is to provide a multiserver workflow system which can execute businesses on servers other than a fault occurring server.

[0012] Still another object of the invention is to make it easy to manage and change information on servers and users in a multiserver workflow system.

[0013] To accomplish those objects, a workflow system according to the invention has the following construction.

[0014] A multiserver workflow system in which each server and the users who use clients construct one subsystem comprises: a plurality of servers; a plurality of clients; and a network to which the servers and clients are connected. All of the servers have: address information of the servers belonging to all subsystems; and correspondence information of all users and the subsystems which can be used by the users. When each client is connected to any one of the servers, the client downloads a list of the subsystems which can be used by the user who use the client and addresses of the servers constructing the usable subsystem from the connecting server and stores them as a connectable server list for each login user.

[0015] Further, each client tries to connect to the server by using the stored connectable server list and, when the connection to the server fails, the client tries to connect to another server in the connectable server list.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

Fig. 1 is a block diagram showing an outline of a structure of a multiserver workflow system according to the invention;

Fig. 2 is a block diagram showing a more specific structual example of the multiserver workflow system and a user interface on a client;

Fig. 3 is a diagram for explaining structures of information which is formed by a management server and information which is distributed to each subsystem and for explaining the information forming method;

Fig. 4 is a diagram for explaining a method of distributing a connectable server list from a server to clients; and

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Fig. 5 is a diagram for explaining processes when a client connects to a server.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

(1) System construction

[0017] Fig. 1 is a block diagram showing an outline of a construction of a multiserver workflow system.

[0018] A plurality of servers 120-1 to 120-N and a plurality of clients 130-1 to 130-N are connected to a communications network 110 and databases 121-1 to 121-N are connected to the respective servers.

[0019] The communications network 110 is an LAN (Local Area Network), a WAN (Wide Area Network), a public telephone line, an Internet, or the like. The server 120 and client 130 are computers such as personal computers, workstations, or the like each having a CPU, a memory, input/output devices, and an interface to the communications network. The database 121 can be also included in the server 120. Communications between the server 120 and client 130 and between the servers are executed using a protocol depending on the communications network 110, for example, TCP/IP. One server and a plurality of users who use the clients construct one subsystem.

(2) Operation of the user

[0020] Fig. 2 is a block diagram showing a more specific structural example of the multiserver workflow system and a user interface on the client.

[0021] In this example, server 1 (120-1), server 2 (120-2), and server 3 (120-3) are connected as servers to the network (110). The server 1 belongs to an accounting business subsystem. The server 2 belongs to a personnel business subsystem. The server 3 belongs to a materials business subsystem.

[0022] It is now assumed that a user who uses a client X (130-1) is permitted to use all of the subsystems. A basic screen 200 is displayed on a display device of the client X.

[0023] Buttons of case input 201, INBOXes 211 to 214, and OUTBOXes 221 to 224 are displayed on the basic screen 200.

[0024] In case of inputting a new case, the user selects the case input button 201 by a mouse click or the like. After that, a list of subsystems which can be used by the user is shown. By further selecting a desired subsystem, a business process in the selected subsystem is displayed. The subsequent operation is the same as that of the conventional workflow system of the single server construction.

[0025] The user selects the INBOX button in order to access a case which is not processed yet and has to be processed from now on. The user selects the OUTBOX button in order to see a status of a case which has already been inputted or processed. When the user selects the INBOX and OUTBOX buttons (211, 221) of all of the systems, titles of the cases relating to the user in all of the subsystems are displayed together with th additional information. When the user selects the INBOX and OUTBOX buttons (212 - 214, 222 - 224) of each system, a title of the cases relating to the user in the selected subsystem are displayed together with the additional information.

[0026] When the INBOX button is selected, a person who made the case, making time, a name of the using business process, time when the case arrived at his INBOX, and the like are displayed together with the case title. By selecting the case title, the user performs the referring or approving operation of the contents of the case. When the user selects the OUTBOX button, a person who made the case, making time, a name of the using business process, a processing status, and the like are displayed together with the case title. The operation after the user accessed each subsystem is th same as that of the conventional workflow system of the single server construction.

(3) Information making and setting method

[0027] Fig. 3 is a diagram for explaining information which is distributed to the servers of each subsystem.

[0028] The information is made by one server and the information is distributed to each server. To make the information, a dedicated server may be provided or any one of the servers 1, 2, and 3 constructing the business subsystems as shown in Fig. 2 may be used. The server which makes the information to be distributed to each server is called a management server.

[0029] The information is made in the management server by the following procedure.

① Making of the subsystem list

[0030] A managing program on the management server makes a subsystem list table 310 in accordance with the input of a manager and stores the table into a memory in the management server. The subsystem list table 310 includes a name of the server constructing each subsystem and an address (for example, IP address) on the communications network of the server.

② Making of the user information

[0031] The managing program on the management server makes a user information table 320 in accordance with the input of the manager and stores the table into the memory in the management server. The user informationtable 320 includes user IDs of all of the users who use the system, sections to which they belong, names, and posts. The table 320 can also further include items such as passwords, nicknames, and the like. The user information table may be made by the

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server of each subsystem and collected to the management serv r.

③ Making of the subsystem user information

[0032] The managing program on the management server makes a subsystem user information table 330 in accordance with the input of the manager and on the basis of the subsystem list table 310 and stores the tabl into the memory in the management server. The manager designates the users who use each subsystem by indicating a condition. For example, as shown in the table 330 in Fig. 3, the users in an operation section are designated for the subsystem of the server 1. All of the users are designated for the subsystem of the server 2. The users in the operation section and group leaders of all sections are designated for the subsystem of the server 3. The table 330 includes the server names and inputted conditions.

④ Making of the user connection information

[0033] The managing program on the management server compares the items in the user information table 320 which has already been made with the conditions in the subsystem user information table 330, determines the connectable servers for respective users, and makes a user connection information table 340. The user connection information has a list of the connectable servers in addition to the same items as those in the user information table 330.

⑤ Distribution of the subsystem list and the user connection information

[0034] The managing program on the management server distributes the subsystem list table 310 and the user connection information table 340 to all of the servers via the communications network. Therefore, all of the servers 1 to 3 have the same information.

[0035] The managing program is software which is executed by the CPU of the management server.

⑥ Distribution of the connectable server list to each client

[0036] A method of distributing the connectable server list from the server to each client will now be described by using Fig. 4.

[0037] For each client, the server to be connected in default is determined and the client has its address as default connection server information 410. The client connects to the default connection server and transmits a login request (430) to the connection server together with the user ID of the user who uses the client. The client can transmit a server information updating request or a login request to the server being connected together with the user ID at anoth r arbitrary timings.

[0038] When the login request or server information updating request is received, the server extracts the user ID included in those requests. The server extracts the connectable server names of the user ID from the user connection information table 340 and, further, extracts the addresses of the connectable servers from the subsystem list table 310. After that, the server transmits the connectable server names and the addresses as a connectable server list to a sending source of the login request or the server information updating request (440). The client stores the received connectable server list as a table 420. In some systems, a plurality of users share one client. In such system, the client may store the connectable server lists for the respective users.

[0039] The foregoing procedure of ① to ⑥ is also applied to the cases of an addition of the server, an address change of the server, an addition or deletion of the user, and a change in user information.

(4) Process of the client

[0040] Process of the client when the user starts a workflow business in the client device will now be described with reference to Fig. 5.

[0041] When the client receives the login request from the user, the client obtains information on the server which has previously been designated as a default server on own client machine (step 500) and tries to connect to the default server.

[0042] When the connection tried server is working (YES in step 501) and the user is authenticated by the server (OK in step 508), the connectable server list table 420 is downloaded onto the own client machine (step 509). Even when the server list has already existed on the client, by again downloading, the client can obtain the new connectable server list corresponding to the login user. After that, the client starts the workflow business (step 510).

[0043] When the connection tried server is not working (NO in step 501) or the user fails to be authenticated by the server (NG in step 508), the client checks whether the connectable server list table 420 for the user exists on the own client machine or not (step 502).

[0044] When the table 420 exists (YES in step 502), the client tries to connect to one of the servers in the list (step 505).

[0045] When the connection cannot be performed (NG in step 506) due to a reason such that the connection tried server is in a down state or the like, the client checks if another server exists in the list (step 507). When there is another server (YES in step 507), the client tries to connect to the server (step 505).

[0046] When the client cannot connect to all servers in the list (NO in step 507), the client finishes the processes.

[0047] When the connection tried server is working (OK in step 506) and the user is authenticated by the server (OK in step 508), the connectable server list

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table 420 is downloaded onto the own client machine (step 509).

[0048] When the table 420 for the user doesn't exist, the client finishes the processes (NO in step 502).

[0049] The above process is realized by software which is executed by the CPU of the client.

[0050] The order of selecting the connection trying server in the server list table 420 by the client can be determined by the client or can be merely the topdown order of in the table.

[0051] The basic screen 200 which is displayed on the display device of the client is shown in the paragraph (2) mentioned above and Fig. 2. The INBOX and OUTBOX buttons of all of the subsystems and each subsystem which can be used by the user are displayed in the above screen. This display is performed on the basis of the connectable server list table 420 on the client. When the INBOX or OUTBOX button of a certain subsystem (server) is designated, the client obtains the address of the designated server from the server list table 420. When the client is at present connected to the server, the process corresponding to the designated button is started. When the client is not connected to the server, the connecting process is executed by using the obtained address and, after completion of the user authentication, the process corresponding to the designated button is started. In the basic screen 200, when the case input button 201 and the INBOX and OUTBOX buttons 211 and 221 of all of the subsystems are designated, the client sequentially connects to all of the servers in the connectable server list table 420, receives the user authentication, and executes the transmission and reception of the information and the processes. During the process, if there is a server which is not working, the process for this server is skipped.

(5) Effects

[0052] By constructing the system and the table arrangement as mentioned above, the client can obtain the list of the servers which can be used by the user from any server.

[0053] A service for accessing a plurality of servers can be provided to the user with a simple user interface.

[0054] It is sufficient to perform the change of the server, server address, and user in only the management server and the maintenance becomes simple.

(6) Modifications

[0055] Although the embodiment has been described with respect to the workflow system as an example, the defining method and distributing method of the information on the servers and users can be also applied to another multiserver systems.

[0056] The numbers of items in the tables of the subsystem list, user information, subsystem user information, user connection information, and connectable server list can be increased or decreased as necessary.

Claims

1. A multiserver workflow system comprising:

   a plurality of servers (120-1, 120-2, 120-N);
   a plurality of clients (130-1, 130-2, 130-N); and
   a network (110) to which said servers and said clients are connected,
   wherein each of said servers and users who use the clients construct a subsystem,
   all of the servers have address information (310) of the servers constructing all subsystems and correspondence information (340) of all users and the subsystems which can be used by respective users, and
   when each client connects to any one of said servers, said client downloads a list of the subsystems which can be used by the user who uses said client and addresses of the servers constructing said usable subsystems from the connected server and stores the list as a connectable server list (420).

2. A system according to claim 1, wherein each client provides a user interface (200) to access all of the usable subsystems with reference to said connection server list (420) and connects to the server constructing the subsystem selected by the user by using the addresses in the connectable server list.

3. A system according to claim 1, wherein each client connects to the server by using the stored connectable server list (420) and, when the connection to said server fails, said client tries to connect to another server in the connectable server list.

4. A method of managing information on servers and users in a multiserver workflow system including a plurality of subsystems, comprising the steps of:

   deciding an information management server;
   on said information management server, defining subsystem/server address information (310) including addresses of servers constructing all of the subsystems and user/subsystem correspondence information (340) indicating a correspondence between all of the users and the subsystems which can be used by respective users and storing the information;
   distributing said subsystem/server address information (310) and said user/subsystem correspondence information (340) from said information management server to all of the servers; and
   in each of the servers constructing the subsystems, storing said subsystem/server address

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information and said user/subsystem correspondence information being distributed, extracting a list of the subsystems which can be used by the user who uses said client and the addresses of the servers constructing said usable subsystems from said stored information in response to a request from the client, and transmitting the list (420) to said client.

5. A method according to claim 4, wherein in said management server,

information (320) on all of the users is collected,
a condition (330) of the user constructing the subsystem is inputted, and
said information on every user is compared with the condition of the user constructing said subsystem, the usable subsystem is determined for every user, and said user/subsystem correspondence information (340) is made.

6. A method of connecting to a server by a client, comprising the steps of:

having an address (410) of a default connection server;
connecting to said default connection server at first, downloading a list of subsystems which can be used by a user who uses said client and addresses of the servers constructing said usable subsystems from the connection server, and storing the list as a connectable server list (420); and
performing the connection to the server by using the stored connectable server list at second and subsequent times, and when the connection to said server fails, the client tries to connect to another server in said connectable server list.

7. A method according to claim 6, further comprising the step of:

when the connection to the server succeeds, downloading the connectable server list (420) from the connection server in order to obtain latest information.

8. A program storage device readable by a client machine, tangibly embodying a program of instructions executable by the client machine to perform method steps for connecting with a server machine, said method comprising the steps of:

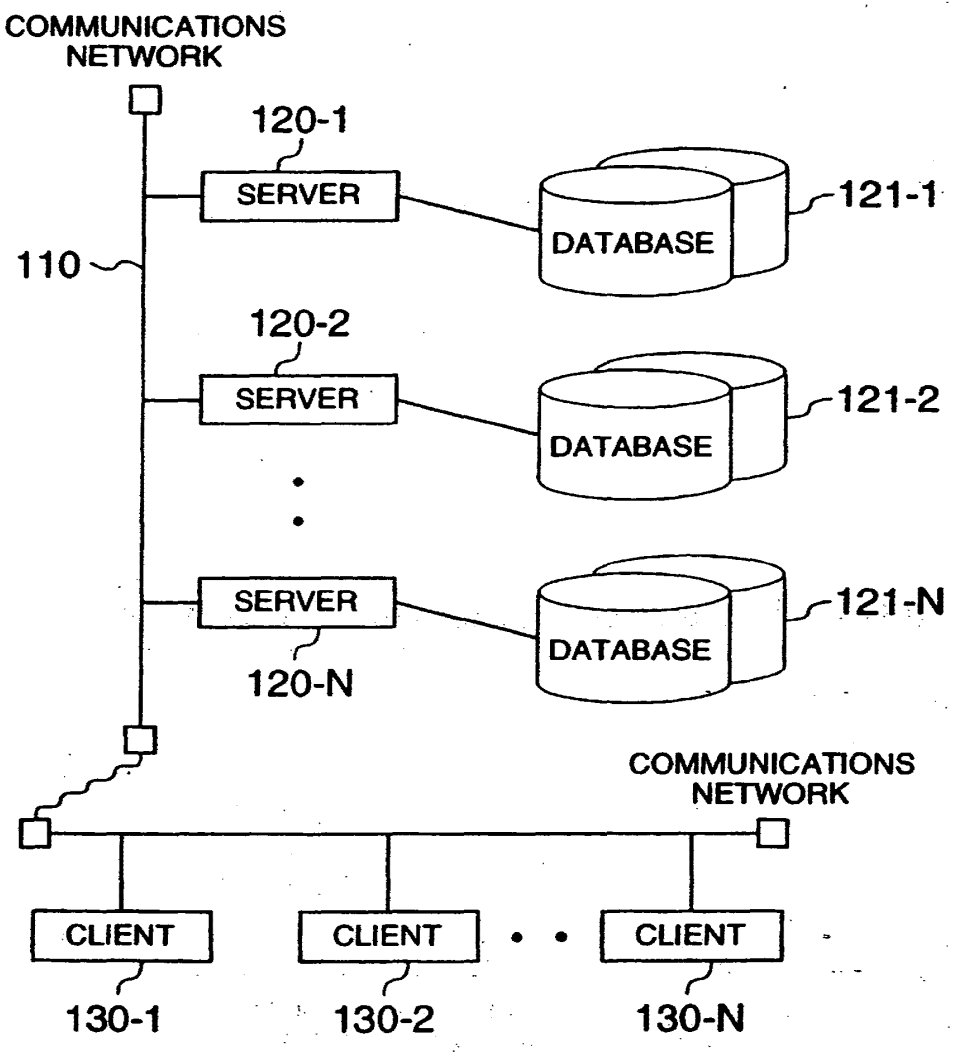
connecting to a predetermined default connection server at first, downloading a list of subsystems which can be used by a user who uses said client and addresses of servers constructing said usable subsystems from the connection server, and storing the list as a connectable server list; and
connecting to the server by using the stored connectable server list at second and subsequent times, and when the connection to said server fails, trying to connect to another server in said connectable server list.

9. A server/client system comprising:

a plurality of servers (120);
a plurality of clients (130); and
a network (110) to which said servers and said clients are connected,
wherein all of the servers have address information (310) on all servers and correspondence information (340) of all users and the servers which can be used by respective users, and
when each client is connected to any one of said servers, said client downloads a list of the servers which can be used by the user who uses said client and addresses of the servers from the connection server and stores the list as a connectable server list (420).

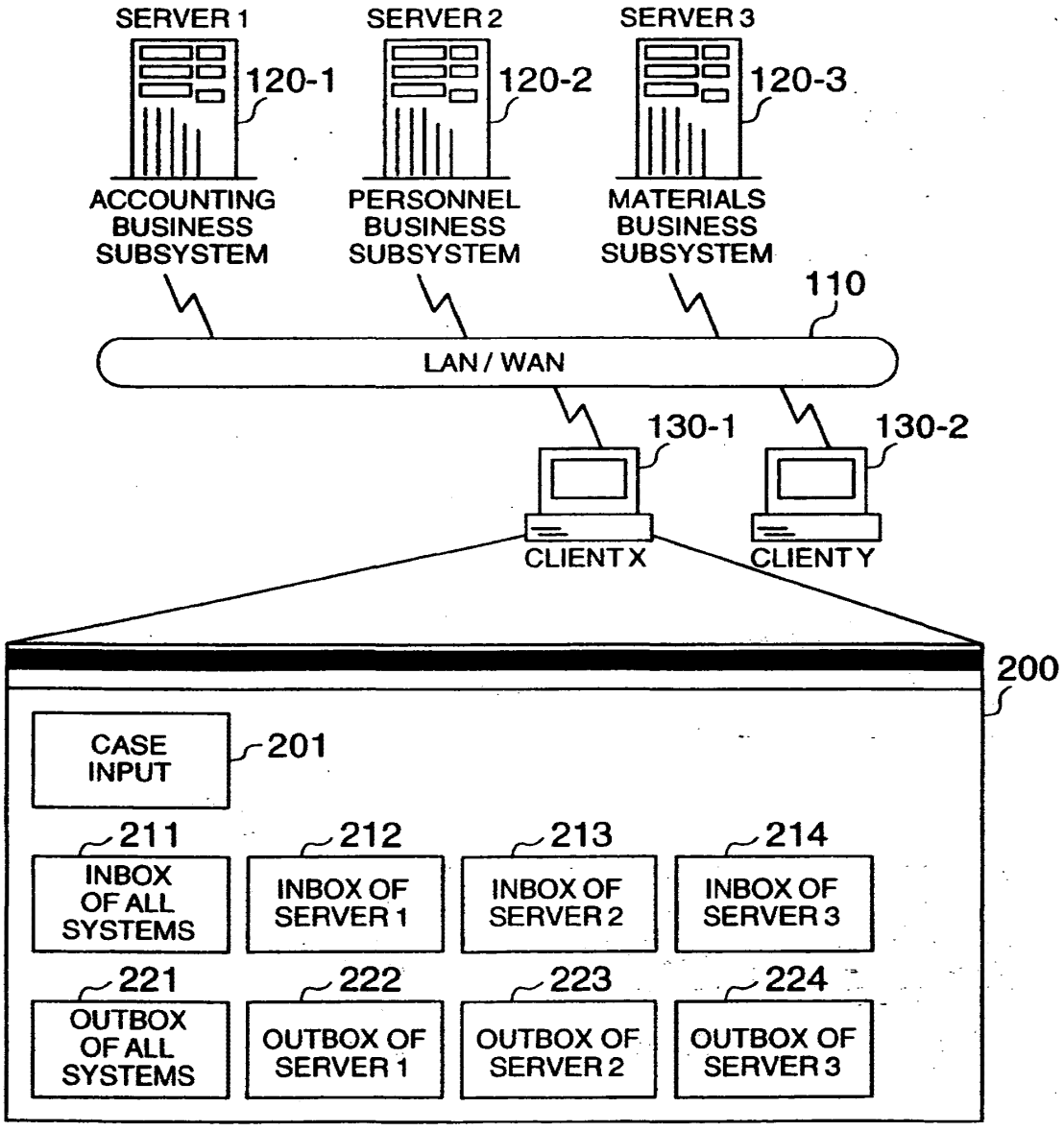
Page 276 of 470

FIG. 1



Page 277 of 470

FIG. 2



ISDOCID: <EP 0919912A2 I >

FIG. 3

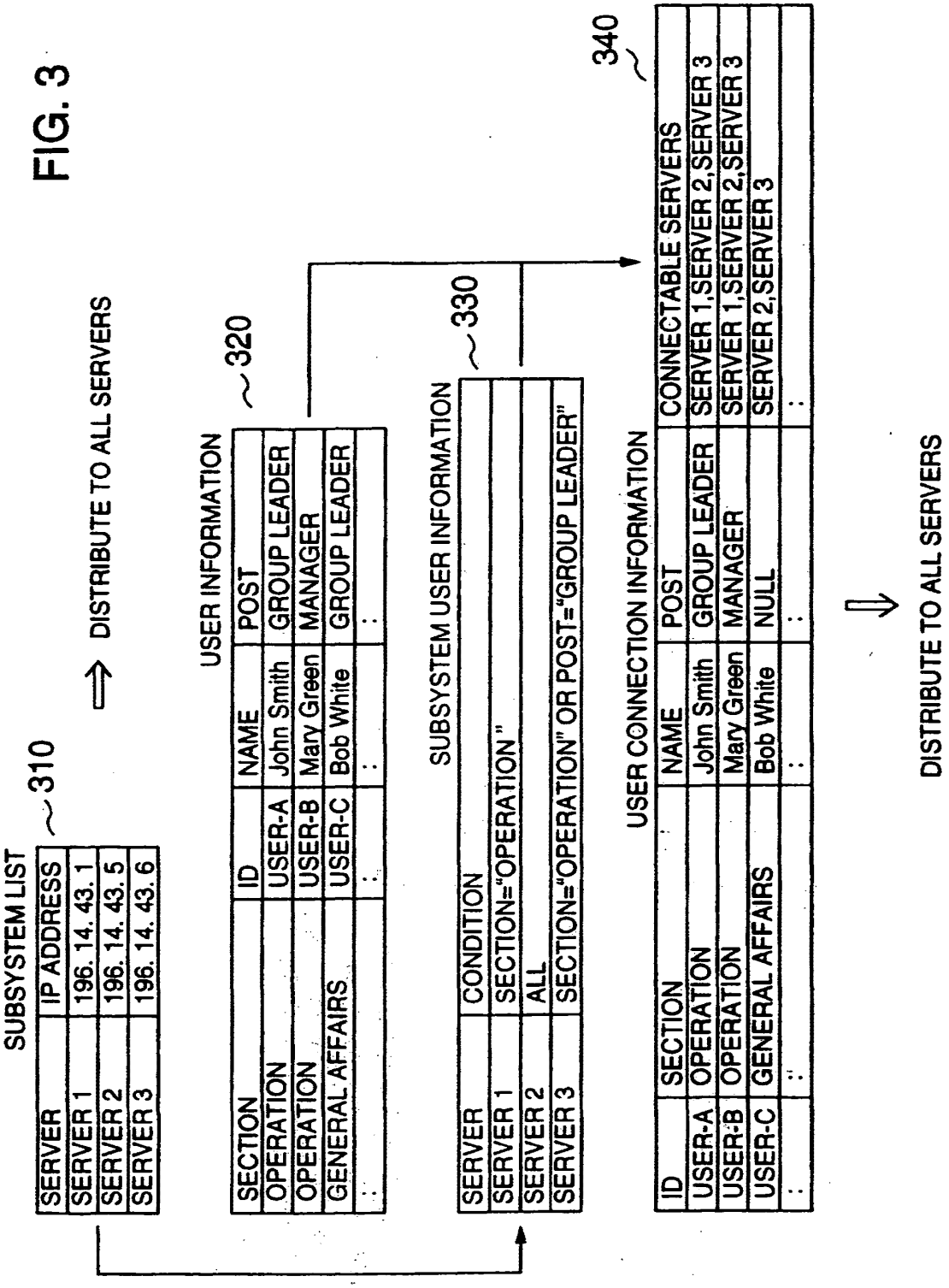

SUBSYSTEM LIST
310
SERVER | IP ADDRESS
SERVER 1 | 196. 14. 43. 1
SERVER 2 | 196. 14. 43. 5
SERVER 3 | 196. 14. 43. 6
DISTRIBUTE TO ALL SERVERS
USER INFORMATION
320
SECTION | ID | NAME | POST
OPERATION | USER-A | John Smith | GROUP LEADER
OPERATION | USER-B | Mary Green | MANAGER
GENERAL AFFAIRS | USER-C | Bob White | GROUP LEADER
SUBSYSTEM USER INFORMATION
330
SERVER | CONDITION
SERVER 1 | SECTION="OPERATION"
SERVER 2 | ALL
SERVER 3 | SECTION="OPERATION" OR POST="GROUP LEADER"
USER CONNECTION INFORMATION
340
ID | SECTION | NAME | POST | CONNECTABLE SERVERS
USER-A | OPERATION | John Smith | GROUP LEADER | SERVER 1,SERVER 2,SERVER 3
USER-B | OPERATION | Mary Green | MANAGER | SERVER 1,SERVER 2,SERVER 3
USER-C | GENERAL AFFAIRS | Bob White | NULL | SERVER 2,SERVER 3
DISTRIBUTE TO ALL SERVERS

FIG. 4

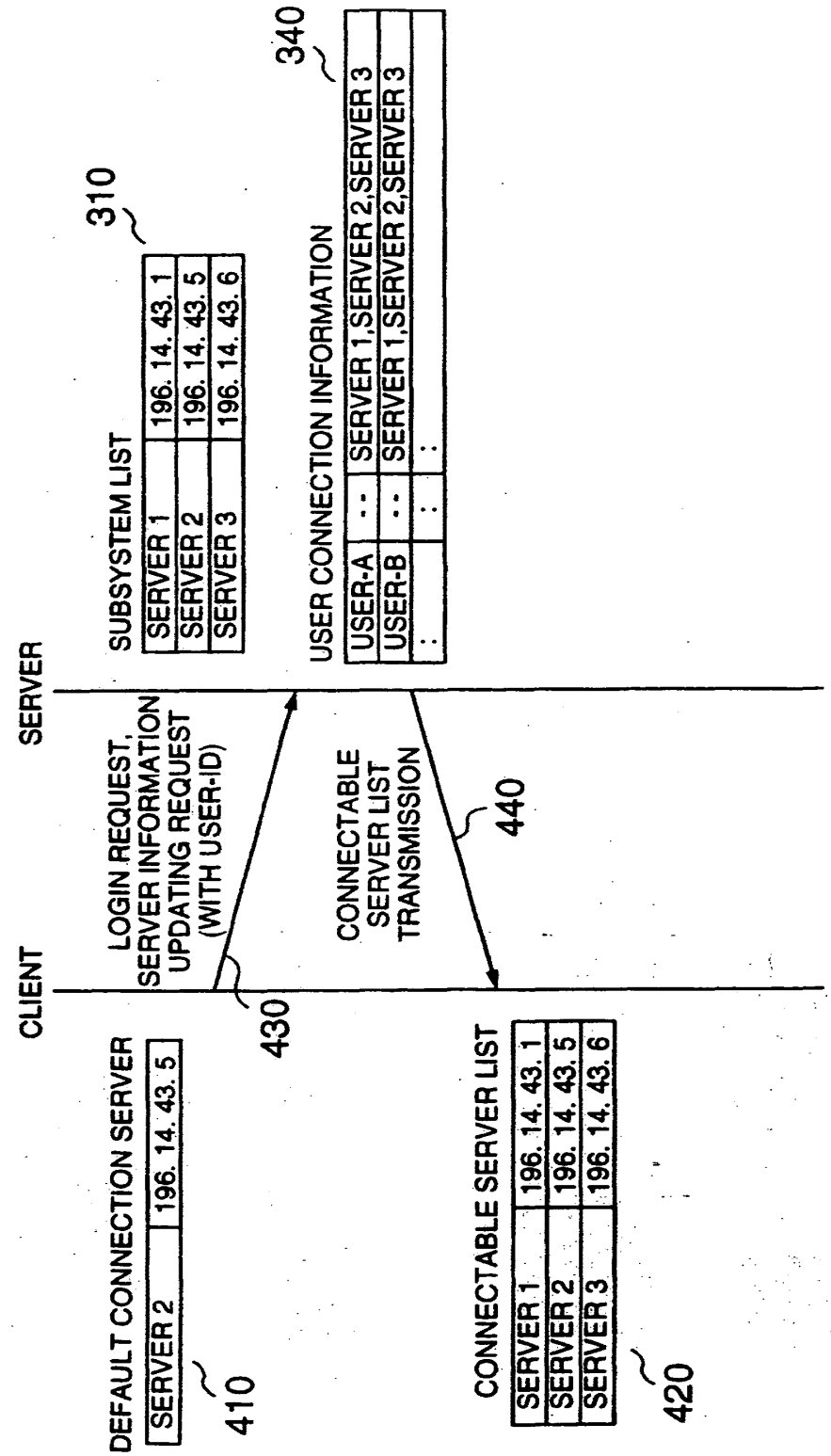
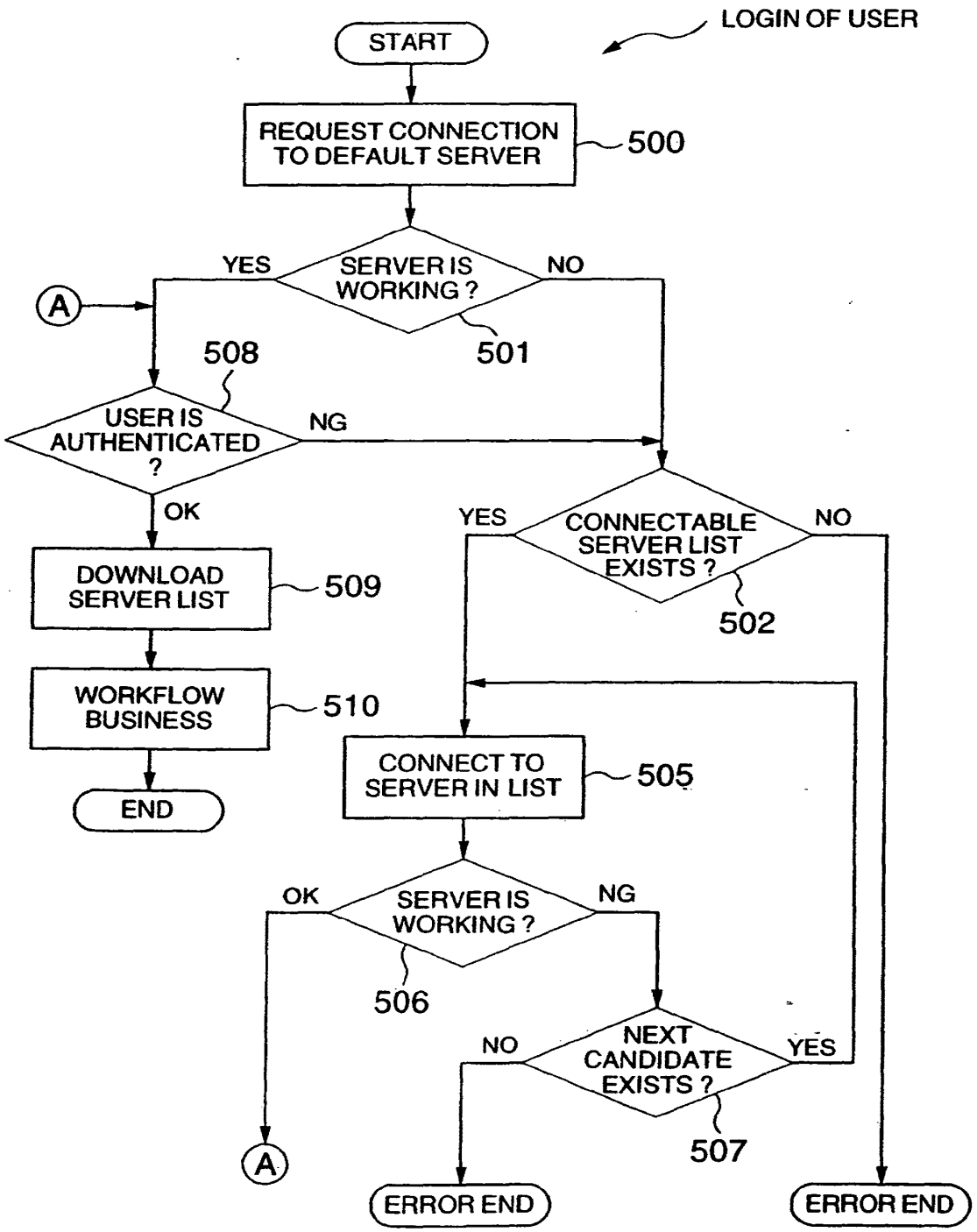

CLIENT
SERVER
LOGIN REQUEST, SERVER INFORMATION UPDATING REQUEST (WITH USER-ID)
CONNECTABLE SERVER LIST TRANSMISSION
430
440
DEFAULT CONNECTION SERVER
SERVER 2
196. 14. 43. 5
410
SUBSYSTEM LIST
310
SERVER 1
196. 14. 43. 1
SERVER 2
196. 14. 43. 5
SERVER 3
196. 14. 43. 6
USER CONNECTION INFORMATION
340
USER-A
SERVER 1,SERVER 2,SERVER 3
USER-B
SERVER 1,SERVER 2,SERVER 3
CONNECTABLE SERVER LIST
SERVER 1
196. 14. 43. 1
SERVER 2
196. 14. 43. 5
SERVER 3
196. 14. 43. 6
420

FIG. 5



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BRINKS HOFER GILSON &LIONE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	J. Overton et al.	
Appln. No.:	09/872,736	Examiner: Unknown
Filed:	June 1, 2001	Art Unit: 2152
For:	Method And Apparatus For Managing Location Information In A Network	

Attorney Docket No: 11958-49

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL

Sir:

Attached is/are:

☒ Transmittal Letter (in duplicate); Third Supplemental Information Disclosure Statement; PTO Form 1449; One Copy of References D1-D17

☒ Return Receipt Postcard

Fee calculation:

☐ No additional fee is required.

☐ Small Entity.

☐ An extension fee in an amount of $_____ for a _____-month extension of time under 37 C.F.R. § 1.136(a).

☐ A petition or processing fee in an amount of $_____ under 37 C.F.R. § 1.17(_____).

☐ An additional filing fee has been calculated as shown below:

						Small Entity			Not a Small Entity	
	Claims Remaining After Amendment		Highest No. Previously Paid For	Present Extra		Rate	Add'l Fee	or	Rate	Add'l Fee
Total		Minus				x $9=			x $18=	
Indep.		Minus				x 43=			x $86=	
First Presentation of Multiple Dep. Claim						+$145=			+ $290=	
						Total	$		Total	$

Fee payment:

☐ A check in the amount of $_____ is enclosed.

☐ Please charge Deposit Account No. 23-1925 in the amount of $. A copy of this Transmittal is enclosed for this purpose.

☐ Payment by credit card in the amount of $_____ (Form PTO-2038 is attached).

☒ The Director is hereby authorized to charge payment of any additional filing fees required under 37 CFR § 1.16 and any patent application processing fees under 37 CFR § 1.17 associated with this paper (including any extension fee required to ensure that this paper is timely filed), or to credit any overpayment, to Deposit Account No. 23-1925.

9/14/2004
Date

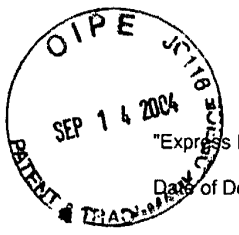
Respectfully submitted,

Kent E. Genin (Reg. No. 37,834)

9-16-04

2152

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"Express Mail" mailing label number EV 325 994 102 US

Date of Deposit: September 14, 2004

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	John K. Overton et al.		
Appln. No.:	09/872,736	Examiner:	Unknown
Filed:	June 1, 2001	Art Unit:	2152
For:	METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK		
Attorney Docket No:	11958-49		

THIRD SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

In accordance with the duty of disclosure under 37 C.F.R. §1.56 and §§1.97-1.98, and more particularly in accordance with 37 C.F.R. §1.97(b), Applicant hereby cites the following reference(s):

U.S. PATENTS

Patent No.	Date	Inventor
4,835,372	05/1989	Gombrich et al.
5,291,399	03/1994	Chaco
5,475,817	12/1995	Waldo et al.
5,479,654	12/1995	Squibb
5,740,428	04/1998	Mortimore et al.
5,903,889	05/1999	de la Huerga et al.
5,918,241	06/1999	Perkowski
6,108,787	08/2000	Anderson et al.
6,131,095	10/2000	Low et al.
6,154,873	11/2000	Call
6,377,986	04/2002	Philyaw et al.
6,418,441	07/2002	Call
2002/0112048	08/2002	Gruyer et al.

OTHER ART

Callaghan V L et al., "Structures and Metrics for Image Storage and Interchange" Journal of Electronic Imaging, Vol. 2, No. 2, 1 April 1993, pp. 126-137

"Method for Network Naming and Routing" IBM Technical Disclosure Bulletin, Vol. 37, No. 9, 1 September 1994, page 255

"Service Location in an Open Distributed Environment," Beitz et al., Second International Workshop on Services in Distributed and Networked Environments, IEEE Comput. Soc., June, 1995, pp. 28-34

Baer, Tony, "Tales from the Network", Computerworld Healthcare Journal, www.computerworld.com/news/1996/story/0,11280,14557,00.html, pp. 1-9, October 1, 1996

For the Examiner's convenience, Applicant is enclosing Form PTO-1449 (one sheet), along with a copy of each listed reference for which a copy is required under 37 C.F.R. §1.98(a)(2). As each of the listed references is in English, no further commentary is believed to be necessary, 37 C.F.R §1.98(a)(3). Applicant respectfully requests the Examiner's consideration of the above reference(s) and entry thereof into the record of this application.

By submitting this Statement, Applicant is attempting to fully comply with the duty of candor and good faith mandated by 37 C.F.R. §1.56. As such, this Statement is not intended to constitute an admission that any of the enclosed references, or other information referred to therein, constitutes "prior art" or is otherwise "material to patentability," as that phrase is defined in 37 C.F.R. §1.56(a).

Applicant also notes for the Examiner's consideration co-pending U.S. Application Serial Nos. 10/646,350, filed August 22, 2003 and 09/661,222, filed September 13, 2000. These applications share at least one common inventor with the present application and generally related subject matter.

Applicant has calculated no fee to be due in connection with the filing of this Statement. However, the Director is authorized to charge any fee deficiency associated with the filing of this Statement to a deposit account, as authorized in the Transmittal accompanying this Statement.

Respectfully submitted,

9/14/2004
Date

Kent E. Genin (Reg. No.37,834)

OIPE
SEP 14 2004
PATENT & TRADEMARK OFFICE

FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 11958/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

REFERENCE DESIGNATION U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER Number-Kind Code (if known)	DATE	NAME	CLASS/ SUBCLASS	FILING DATE
	D1	4,835,372	05/1989	Gombrich et al.		
	D2	5,291,399	03/1994	Chaco		
	D3	5,475,817	12/1995	Waldo et al.		
	D4	5,479,654	12/1995	Squibb		
	D5	5,740,428	04/1998	Mortimore et al.		
	D6	5,903,889	05/1999	de la Huerga et al.		
	D7	5,918,241	06/1999	Perkowski		
	D8	6,108,787	08/2000	Anderson et al.		
	D9	6,131,095	10/2000	Low et al.		
	D10	6,154,873	11/2000	Call		
	D11	6,377,986	04/2002	Philyaw et al.		
	D12	6,418,441	07/2002	Call		
	D13	2002/0112048	08/2002	Gruyer et al.		

EXAMINER INITIAL	OTHER ART – NON PATENT LITERATURE DOCUMENTS (Include name of author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date page(s), volume-issue number(s), publisher, city and/or country where published.	
	D14	Callaghan V L et al., "Structures and Metrics for Image Storage and Interchange" Journal of Electronic Imaging, Vol. 2, No. 2, 1 April 1993, pp. 126-137
	D15	"Method for Network Naming and Routing" IBM Technical Disclosure Bulletin, Vol. 37, No. 9, 1 September 1994, page 255
	D16	"Service Location in an Open Distributed Environment," Beitz et al., Second International Workshop on Services in Distributed and Networked Environments, IEEE Comput. Soc., June, 1995, pp. 28-34
	D17	Baer, Tony, "Tales from the Network", Computerworld Healthcare Journal, www.computerworld.com/news/1996/story/0,11280,14557,00.html, pp. 1-9, October 1, 1996

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Rev. Dec.-99
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,736	06/01/2001	John K. Overton	10406/49	3927

7590 12/06/2004

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

EXAMINER	
DELGADO, MICHAEL A	
ART UNIT	PAPER NUMBER
2144	

DATE MAILED: 12/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	09/872,736	OVERTON ET AL.	
	Examiner	Art Unit	
	Michael S. A. Delgado	2144	

-- 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) 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 the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- 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 *14 September 2004*.

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) 1-45 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) *1-45* 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-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-23 and 45 drawn to computer-to-computer data addressing classified in class 709, subclass 245.

II. Claims 24-44, drawn to generating database or data structure, classified in class 707, subclass 102.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention I has separate utility such as the using of an identifier to locate an address in a network environment. Invention II has separate utility such as the step taken in creating a database See MPEP § 806.05(d).

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael S. A. Delgado whose telephone number is (571) 272-3926. The examiner can normally be reached on 7.30 AM - 5.30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, WILLIAM A CUCHLINSKI JR can be reached on (571) 272-3925

. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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).

MD

WILLIAM A. CUCHLINSKI, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

1-10-05

2144

O.I.P.E. JC99 JAN 06 2005 PATENT & TRADEMARK OFFICE

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BRINKS HOFER GILSON &LIONE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of: J. Overton et al.

Appln. No.: 09/872,736

Filed: June 1, 2001

For: Method And Apparatus For Managing Location Information In A Network

Examiner: M. Delgado

Art Unit: 2144

Attorney Docket No: 11958/49

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL

Sir:

Attached is/are:

☒ Transmittal Letter (in duplicate); Response to Election/Restriction Requirement

☒ Return Receipt Postcard

Fee calculation:

☐ No additional fee is required.

☐ Small Entity.

☐ An extension fee in an amount of $_____ for a _____-month extension of time under 37 C.F.R. § 1.136(a).

☐ A petition or processing fee in an amount of $_____ under 37 C.F.R. § 1.17(_____).

☐ An additional filing fee has been calculated as shown below:

						Small Entity			Not a Small Entity	
	Claims Remaining After Amendment		Highest No. Previously Paid For	Present Extra		Rate	Add'l Fee	or	Rate	Add'l Fee
Total		Minus				x $25=			x $50=	
Indep.		Minus				X100=			x $200=	
First Presentation of Multiple Dep. Claim						+$180=			+ $360=	
						Total	$		Total	$

Fee payment:

☐ A check in the amount of $_____ is enclosed.

☐ Please charge Deposit Account No. 23-1925 in the amount of $. A copy of this Transmittal is enclosed for this purpose.

☐ Payment by credit card in the amount of $_____ (Form PTO-2038 is attached).

☒ The Director is hereby authorized to charge payment of any additional filing fees required under 37 CFR § 1.16 and any patent application processing fees under 37 CFR § 1.17 associated with this paper (including any extension fee required to ensure that this paper is timely filed), or to credit any overpayment, to Deposit Account No. 23-1925.

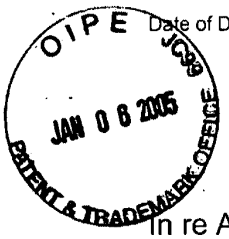
Respectfully submitted,

January 6, 2005
Date

Kent E. Genin (Reg. No. 37,834)

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Date of Deposit: January 6, 2005



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	John K. Overton et al.	
Appln. No.:	09/872,736	Examiner: M. Delgado
Filed:	June 1, 2001	Art Unit: 2144
For:	METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK	
Attorney Docket No:	11958-49	

RESPONSE TO ELECTION/RESTRICTION REQUIREMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Restriction/Election Requirement in the Action mailed December 6, 2004, please consider the following:

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) A system for managing location information and providing location information to location queries, the system comprising:

a transfer protocol comprising an identifier and at least one location associated with the identifier, wherein the identifier uniquely specifies an entity and wherein each location specifies a location of data in a network pertaining to the entity;

a location server containing location information corresponding to at least one entity, the location information formatted according to the transfer protocol, and wherein the location of data for the location comprises an application server in communication with the network; and

programming logic stored on the location server responsive to a location query identifying a desired entity to return a location message, the location message comprising all locations associated with the desired entity, wherein the location server returns the location message if the location server contains location information for the desired entity.

2. (Original) The system of claim 1, wherein the entity comprises a physical object and wherein the at least one location comprises a geographic location.

3. (Original) The system of claim 2, wherein the geographic location comprises at least one of a latitude, a longitude and an altitude.

4. (Original) The system of claim 1, wherein the at least one location comprises a plurality of geographic locations, each of the geographic locations representing a position of an object at a different time.

5. (Original) The system of claim 1, wherein the location server comprises a plurality of location servers, each of the plurality of location servers comprising at least a portion of a total amount of location information residing on the plurality of location servers, and wherein the location information is formatted according to the transfer protocol; and

wherein the programming logic is stored on each of the plurality of location servers.

6. (Original) The system of claim 5, wherein the programming logic stored at each of the location servers further comprises logic responsive to the location query to return one of a location message and a redirect message, wherein the location server returns the location message if the queried location server contains location information for the desired entity, and wherein the location server returns a redirect message if the queried location server lacks location information for the desired entity, the redirect message comprising a list of at least one other location server known to have location information relevant to the location query.

7. (Original) The system of claim 6, wherein the list of at least one other location server comprises a list of all location servers in the plurality of location servers and a corresponding list of each of the entities having location information on the respective location servers.

8. (Original) The system of claim 5, wherein each of the location servers stores at least a portion of the total amount of location information on a persistent storage device.

9. (Original) The system of claim 8, wherein the persistent storage device comprises one of a hard disk drive, tape drive, optical storage device and removable storage media.

10. (Original) The system of claim 1, wherein the location information in the location server is maintained in an indexed location store.

11. (Original) The system of claim 10, wherein the location store comprises a string store indexed by a hash table.

12. (Original) The system of claim 10, wherein the location query identifying the desired entity comprises a unique identifier for the desired entity, and wherein the programming logic stored on the location server further comprises programming logic for applying an index function to the unique identifier to retrieve at least a portion of the locations associated with the unique identifier in the location store.

13. (Original) The method of claim 12, wherein the programming logic further comprises logic for applying the index function to retrieve all of the locations associated with the unique identifier in the location store.

14. (Original) The system of claim 12, wherein the location store comprises a string store and the index function comprises a hash function.

15. (Original) The system of claim 6, wherein the plurality of location servers are arranged in a network topology having a plurality of nodes organized in a tree-structure, wherein each node comprises at least one location server and wherein each node is connected to at least one other node in the tree structure.

16. (Original) The system of claim 12, wherein the data location query is received at a data location server in a first node and wherein the redirect message comprises a list of at least one other location server in a node other than the first node that is known to have data location information relevant to the location query.

17. (Original) A system for managing location information and providing data location information to location queries, the system comprising:

a transfer protocol comprising an identifier and at least one location association, wherein the identifier uniquely specifies an entity and wherein each location specifies a location pertaining to the entity;

a plurality of location servers containing location information corresponding to a plurality of entities, the location information formatted according to the transfer protocol, and comprising at least one application server address, wherein the plurality of location servers are arranged in a server cluster topology such that each location server contains a unique portion of the location information; and

programming logic stored on each of the location servers responsive to a location query for a desired identifier to return one of a location message, wherein a queried location server returns a location message if the queried location server contains location information for the desired identifier, and a redirect message if the queried location server does not contain location information relevant to the desired identifier, wherein the redirect message comprises a list of all of the plurality of location servers containing location information related to the desired identifier.

18. (Original) The system of claim 17, wherein the location information comprises geographic location information.

19. (Original) The system of claim 17, wherein the location information comprises network address information.

20. (Original) The system of claim 19, wherein the network address information comprises a network address of a data repository containing data pertaining to the desired identifier.

21. (Original) A method of handling location queries in a network, the network comprising a plurality of location servers containing location information correlating each of a plurality of identifiers with at least one location, the method comprising:

receiving a location query from a client at one of the plurality of location servers, the location query requesting an identifier's location;

sending a location response message to the client if the queried location server contains location information relevant to an entity identified in the query, the location response message comprising location information identifying at least one

application server containing information relevant to the entity identified in the query; and

sending a redirect message to the client if the queried location server does not contain data location information relevant to the entity identified in the query, the redirect message comprising a list of location servers containing location information relevant to the entity identified in the query.

22. (Original) The method of claim 21, further comprising applying information in the location query from the client to an indexing function to determine if the queried location server contains location information relevant to the entity identified in the query.

23. (Original) The method of claim 22, wherein each of the plurality of location servers comprises an indexed table of identifiers and associated locations, and wherein applying information in the location query comprises applying an identifier in the location query to a hash function.

24. (Original) A method of scaling at least one of location server capacity and transaction rate capability in a system for storing and retrieving location information, the method comprising:

providing a transfer protocol configured to transport identifier and location information, the location information specifying the location of information relevant to the identifier;

providing a first location server storing location information formatted according to the transfer protocol;

receiving an identifier and a location relevant to the identifier at the first location server;

storing the received location in a location store at the first data location server, the location store comprising a plurality of identifiers, each identifier associated with at least one location, wherein the received location is associated with the received identifier in the location store; and

transferring a portion of the identifiers and associated locations to a second data location server when a performance criterion of the first location server reaches a predetermined performance limit.

25. (Original) The method of claim 24, wherein receiving an identifier and a location comprises receiving the identifier and the location at the first location server from an application server, wherein the location comprises an address for the application server.

26. (Original) The method of claim 24, wherein receiving an identifier and a location comprises receiving the identifier and the location at the first location server from a physical object, wherein the identifier identifies the physical object and wherein the location comprises a geographic location for the physical object.

27. (Original) The method of claim 26, wherein the physical object comprises a vehicle.

28. (Original) The method of claim 26, wherein the physical object comprises a portable telecommunications device.

29. (Original) The method of claim 24, wherein transferring a portion of the identifier and location associations comprises:

identifying a portion of identifier and location associations on the first location server to be transferred to the second location server and identifying a data set state of the identified portion at an initial time;

copying a data set for the identified portion corresponding to the identified data set state from the first location server to the second location server and maintaining a second data set containing changes to the identified portion since the initial time;

identifying a data set state for the second data set;

ceasing operation of the first location server with respect to the identified portion and copying the second data set to the second location server, wherein the second data set corresponds to the identified data set state for the second data set; and

initiating operation of the second location server for the identified portion of identifiers and location associations.

30. (Original) The method of claim 24, wherein the performance criterion comprises an amount of available persistent storage space in the first location server.

31. (Original) The method of claim 24, wherein the performance criterion comprises a transaction rate limit.

32. (Original) The method of claim 24, wherein the transaction rate limit comprises a processor speed limit.

33. (Original) The method of claim 24, wherein the transaction rate limit comprises a network connection bandwidth limit.

34. (Original) The method of claim 24, further comprising transmitting a location server map from the first location server, the location server map comprising information identifying the second location server and a list of identifiers associated with the second location server.

35. (Original) The method of claim 34, wherein the first and second location servers are part of a location server cluster comprising a plurality of location servers, and wherein transmitting the location server map comprises transmitting the location server map to each of the plurality of data location servers asynchronously.

36. (Original) The method of claim 34, wherein transmitting a location server map comprises transmitting the location server map to a client in response to query received at the first location server from the client regarding an identifier that is not resident on the first location server.

37. (Original) The method of claim 24, wherein transferring a portion of the identifiers and associated locations to a second location server when a performance criterion of the first data location server reaches a predetermined performance limit further comprises monitoring the performance criterion and automatically transferring the portion of identifiers and associated locations when the first location server reaches the predetermined limit.

38. (Original) A database comprising:

a computer readable medium;

a plurality of index designations, each index designation representative of one of a plurality of identifiers, wherein each identifier uniquely identifies an entity;

a plurality of locations, wherein each of the locations is associated with at least one of the plurality of index designations and represents a location of information relevant to an identifier represented by an index designation;

a location store stored in the computer readable medium, the location store comprising a table containing the plurality of index designations and associated locations; and

an indexing function stored in the computer readable medium, the indexing function operative to map each of the plurality of identifiers to a respective one of the plurality of index designations.

39. (Original) The database of claim 38, wherein the indexing function comprises one of a hash function, a b-tree function, and a t-tree function.

40. (Original) The database of claim 39, further comprising a front end in communication with the location store and indexing function, the front end operative to transport identifiers and associated locations via a transport protocol.

41. (Original) The database of claim 40, further comprising a buffer in communication with the front end, the buffer configured to maintain a log of each of a plurality of location store update transactions.

42. (Original) The database of claim 38, wherein the computer readable medium comprises at least one of RAM and a persistent storage device.

43. (Original) The database of claim 38, wherein the location store comprises a string store and wherein the plurality of locations comprise network address strings.

44. (Original) The database of claim 43, wherein at least one of the network address strings comprises an address of a database in a network.

45. (Original) A system for managing location information and providing location information to location queries, the system comprising:

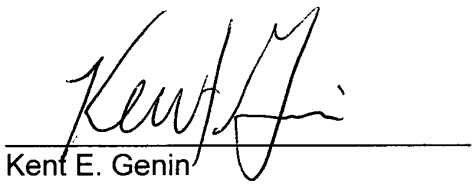
a location server operating in accordance with a transfer protocol, the transfer protocol comprising instructions for manipulating an identifier and at least one location associated with the identifier, wherein the identifier uniquely specifies an entity and wherein each location specifies a location of data in a network pertaining to the entity, the location server containing location information corresponding to at least one entity and formatted according to the transfer protocol, and wherein the location of data for the location comprises an application server in communication with the network; and

programming logic stored on the location server responsive to a location query identifying a desired entity to return a location message, the location message comprising all locations associated with the desired entity, wherein the location server returns the location message if the location server contains location information for the desired entity.

REMARKS

In response to the restriction requirement of the Office Action dated December 6, 2004, Applicants elect Group II (claims 24-44) with traverse. This election is being made with traverse on the grounds that the invention of both Groups I and II can be efficiently searched together.

Respectfully submitted,



Kent E. Genin
Registration No. 37,834
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,736	06/01/2001	John K. Overton	10406/49	3927

7590 08/22/2005

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

EXAMINER	
DELGADO, MICHAEL A	

ART UNIT	PAPER NUMBER
2144	

DATE MAILED: 08/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	09/872,736	OVERTON ET AL.	
	Examiner	Art Unit	
	Michael S. A. Delgado	2144	

-- 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) 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 the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- 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 *06 January 2005*.

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) *1-45* is/are pending in the application.

4a) Of the above claim(s) *1-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24-45* 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 *14 September 2001* 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-1449 or PTO/SB/08) Paper No(s)/Mail Date 9/04, 8/02, 05/02 09/01
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. 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.

2. Claims 24-26, 29-38 and 40-45 rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6,466,980 by Lumelsky et al.

In claim 24, Lumelsky teaches about a method of scaling at least one of location server capacity and transaction rate capability in a system for storing and retrieving location information, the method comprising (Fig 4) (abstract) :

providing a transfer protocol configured to transport identifier and location information, the location information specifying the location of information relevant to the identifier (Col 9, lines 15-20) (Col 9, lines 20-30);

providing a first location server storing location information formatted according to the transfer protocol (Col 9, lines 20-25);

receiving an identifier and a location relevant to the identifier at the first location server (Col 9, lines 20-25);

storing the received location in a location store at the first data location server, the location store comprising a plurality of identifiers, each identifier associated with at least one

location, wherein the received location is associated with the received identifier in the location store (Fig 6) (Col 9, lines 35-45); and

transferring a portion of the identifiers and associated locations to a second data location server when a performance criterion of the first location server reaches a predetermined performance limit (Col 6, lines 33-43).

In claim 25, Lumelsky teaches about a method of claim 24, wherein receiving an identifier and a location comprises receiving the identifier and the location at the first location server from an application server, wherein the location comprises an address for the application server (Col 9, lines 50-60).

In claim 26, Lumelsky teaches about a method of claim 24, wherein receiving an identifier and a location comprises receiving the identifier and the location at the first location server from a physical object, wherein the identifier identifies the physical object and wherein the location comprises a geographic location for the physical object (Col 10, lines 10-30).

In claim 29, Lumelsky teaches about a method of claim 24, wherein transferring a portion of the identifier and location associations comprises:

identifying a portion of identifier and location associations on the first location server to be transferred to the second location server and identifying a data set state of the identified portion at an initial time (Col 24, lines 10-20);

copying a data set for the identified portion corresponding to the identified

data set state from the first location server to the second location server and maintaining a second data set containing changes to the identified portion since the initial time (Col 24, lines 10-20);

identifying a data set state for the second data set (Col 24, lines 19-23);

ceasing operation of the first location server with respect to the identified portion and copying the second data set to the second location server, wherein the second data set corresponds to the identified data set state for the second data set (Col 20, lines 20-30) (Col 24, lines 10-20); and

initiating operation of the second location server for the identified portion of identifiers and location associations (Col 24, lines 10-20).

In claim 30, Lumelsky teaches about a method of claim 24, wherein the performance criterion comprises an amount of available persistent storage space in the first location server (Col 19, lines 40-45).

In claim 31, Lumelsky teaches about a method of claim 24, wherein the performance criterion comprises a transaction rate limit (Col 1, lines 45-55) (Col 10, lines 47-56).

In claim 32, Lumelsky teaches about a method of claim 24, wherein the transaction rate limit comprises a processor speed limit (Col 1, lines 45-55) (Col 10, lines 47-56).

In claim 33, Lumelsky teaches about a method of claim 24, wherein the transaction rate limit comprises a network connection bandwidth limit (Col 1, lines 45-55) (Col 10, lines 47-56).

In claim 34, Lumelsky teaches about a method of claim 24, further comprising transmitting a location server map from the first location server, the location server map comprising information identifying the second location server and a list of identifiers associated with the second location server (Fig 6) (Col 10, lines 20-30).

In claim 35, Lumelsky teaches about a method of claim 34, wherein the first and second location servers are part of a location server cluster comprising a plurality of location servers, and wherein transmitting the location server map comprises transmitting the location server map to each of the plurality of data location servers asynchronously (Fig 4) (Col 10, lines 35-45).

In claim 36, Lumelsky teaches about a method of claim 34, wherein transmitting a location server map comprises transmitting the location server map to a client in response to query received at the first location server from the client regarding an identifier that is not resident on the first location server (Col 24, lines 1-10).

In claim 37, Lumelsky teaches about a method of claim 24, wherein transferring a portion of the identifiers and associated locations to a second location server when a performance criterion of the first data location server reaches a predetermined performance limit further comprises monitoring the performance criterion and automatically transferring the portion of identifiers and associated locations when the first location server reaches the predetermined limit (Col 24, lines 10-20).

In claim 38, Lumelsky teaches about a database comprising;

a computer readable medium (Col 28, lines 20-25);

a plurality of index designations, each index designation representative of one of a plurality of identifiers, wherein each identifier uniquely identifies an entity (Fig 6) (Col 9, lines 35-45);

a plurality of locations, wherein each of the locations is associated with at least one of the plurality of index designations and represents a location of information relevant to an identifier represented by an index designation (Col 9, lines 35-45);

a location store stored in the computer readable medium, the location store comprising a table containing the plurality of index designations and associated locations (Fig 6); and

an indexing function stored in the computer readable medium, the indexing function operative to map each of the plurality of identifiers to a respective one of the plurality of index designations (Col 9, lines 35-45).

In claim 40, Lumelsky teaches about a database of claim 39, further comprising a front end in communication with the location store and indexing function, the front end operative to transport identifiers and associated locations via a transport protocol (Col 9, lines 15-25).

In claim 41, Lumelsky teaches about a database of claim 40, further comprising a buffer in communication with the front end, the buffer configured to maintain a log of each of a plurality of location store update transactions (Col 10, lines 20-30).

In claim 42, Lumelsky teaches about a database of claim 38, wherein the computer readable medium comprises at least one of RAM and a persistent storage device (Col 28, lines 20-30).

In claim 43, Lumelsky teaches about a database of claim 38, wherein the location store comprises a string store and wherein the plurality of locations comprise network address strings (Fig 6a).

In claim 44, Lumelsky teaches about a database of claim 43, wherein at least one of the network address strings comprises an address of a database in a network (Fig 6b).

In claim 45, Lumelsky teaches about a system for managing location information and providing location information to location queries, the system comprising (Fig 4):

a location server operating in accordance with a transfer protocol, the transfer protocol comprising instructions for manipulating an identifier and at least one location associated with the identifier, wherein the identifier uniquely specifies an entity and wherein each location specifies a location of data in a network pertaining to the entity, the location server containing location information corresponding to at least one entity and formatted according to the transfer protocol, and wherein the location of data for the location comprises an application server in communication with the network (Col 9, lines 15-20) (Col 9, lines 20-30); and

programming logic stored on the location server responsive to a location query identifying a desired entity to return a location message, the location message comprising all locations associated with the desired entity, wherein the location server returns the location message if the location server contains location information for the desired entity (Col 10, lines 20-30).

Claim Rejections - 35 USC § 103

3. 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.

4. Claim 27-28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,466,980 by Lumelsky et al in view of US Patent No. 6,578,068 by Bowman-Amuah.

In claim 27 Lumelsky teaches all the limitation but fails to explicitly teach that the physical object comprises a vehicle. In Bowman-Amuah, the advantage of a delivery vehicle is used in the association of end-user (object) to applications (Col 23, lines 50-65).

The vehicle approach combined with the object method of Lumelsky (Col 9, lines 20-30) would improve the portability of the software thus makes it reusable.

It would have been obvious for some one of ordinary skill at the time of the invention to use an object comprising of a vehicle in order to take advantage of the portable feature

In claim 28, the use of a physical object comprises a portable telecommunications device is well known in the art as disclosed by Bowman-Amuah (Col 29, lines 44-50)

In claim 39, the use of an indexing function comprises a hash function is commonly used in object search and is well known in the art as disclosed by Bowman-Amuah (Col 191, lines 50-60).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6,438,652 by Jordan et al , teaches about load balancing cooperating cache servers by shifting forwarded request.

US 6,711,408 by Raith, teaches about position assisted handoff within a wireless communications network.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael S. A. Delgado whose telephone number is (571) 272-3926. The examiner can normally be reached on 7.30 AM - 5.30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David A. Wiley can be reached on (571) 272-3923

. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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).

MD

DAVID WILEY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

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FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 11958/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

REFERENCE DESIGNATION U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER Number-Kind Code (If known)	DATE	NAME	CLASS/ SUBCLASS	FILING DATE
MM	D1	4,835,372	05/1989	Gombrich et al.		
	D2	5,291,399	03/1994	Chaco		
	D3	5,475,817	12/1995	Waldo et al.		
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	D13	2002/0112048	08/2002	Gruyer et al.		

EXAMINER INITIAL		OTHER ART – NON PATENT LITERATURE DOCUMENTS (Include name of author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date page(s), volume-issue number(s), publisher, city and/or country where published.)
MM	D14	Callaghan V L et al., "Structures and Metrics for Image Storage and Interchange" Journal of Electronic Imaging, Vol. 2, No. 2, 1 April 1993, pp. 126-137
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EXAMINER	DATE CONSIDERED
	8/12/05

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 10406/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

REFERENCE DESIGNATION U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS/ SUBCLASS	FILING DATE
MM	C1	5,724,575	03/03/98	Hoover et al.		
	C2	5,913,210	06/15/99	Call		
	C3	5,950,173	09/07/99	Perkowski		
	C4	5,974,409	10/26/99	Sanu et al.		

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS/ SUBCLASS	TRANSLATION YES	NO
MM	C5	EP 0 919 912 A2	06/02/99	EPO			

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FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 10406/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): John K. Overton et al.	

REFERENCE DESIGNATION U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS/ SUBCLASS	FILING DATE
M. P	B1	5,724,575	03/03/98	Hoover et al.		
	B2	5,913,210	06/15/99	Call		
	B3	5,950,173	09/07/99	Perkowski		
	B4	5,974,409	10/26/99	Sanu et al.		

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EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS/ SUBCLASS	TRANSLATION YES	NO
MM	B5	EP 0 919 912 A2	06/02/99	EPO			

EXAMINER INITIAL	OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)	
MM	B6	Copy of Communication relating to the results of the Partial International Search Report for PCT Application No. PCT/US01/18013 dated April 15, 2002

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EXAMINER M. Pelaez	DATE CONSIDERED 8/12/05

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FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 10406/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

REFERENCE DESIGNATION U.S. PATENT DOCUMENTS

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EXAMINER M. Delgado	DATE CONSIDERED 8/12/05

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FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 10406/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

REFERENCE DESIGNATION **U.S. PATENT DOCUMENTS**

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	A67	WO 86/05610	09/1986	PCT			
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EXAMINER M. Delgado	DATE CONSIDERED 8/12/05

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FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 10406/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

EXAMINER INITIAL	OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)	
MD	A72	Bourke D G et al: "Programmable Module and Circuit for Machine-Readable Unique Serial Number" IBM Technical Disclosure Bulletin, vol. 27, no. 4A, 1 September 1984 pages 1942-1944.
	A73	Kleinholz L et al: "Supporting Cooperative Medicine: The Bermed Project" IEEE Multimedia, vol. 1, no. 4, 21 December 1994 pages 44-53.
	A74	"Method for Network Naming and Routing" IBM Technical Disclosure Bulletin, vol. 37, no. 9, 1 September 1994 page 255.
	A75	"Minimizing Locking To Access Global Shared Data", IBM Technical Disclosure Bulletin, pp 619-622, February 1995.
	A76	"A robust software barcode reader using the Hough transform", Muniz, R., Junco, L.; Otero, A., Abstract, 1999 Int'l Conf. On Information Intelligence and Systems (10-31 to 11-3/1999).
	A77	"In-Fab identification of silicon wafers with clean, laser marked barcodes", Fresonke, D., Abstract, 1994 IEEE/Semi Advanced Semiconductor Manufacturing Conference and Workshop (11-14 to 11-16/1994).
	A78	"Applications of barcode technology in automated storage and retrieval systems", Sriram, T.; Vishwanatha Rao, K.; Biswas, S.; Ahmed, Abstract, Proceedings of the 1996 IEEE IECON 22nd Int'l Conf. On Industrial Electrodes (8-5 to 8-10/1996).
•	A79	Copy of claims for U.S. Application Serial No. 09/111,896 filed July 8, 1998 entitled System And Method For Establishing And Retrieving Data Based On Global Indices.
•	A80	Copy of claims for U.S. Application Serial No. 09/503,441 filed February 14, 2000 entitled Automated Image Archiving System.
•	A81	Copy of claims for U.S. Application Serial No. 09/367,461 filed August 13, 1999 entitled Automated Image Archiving System.
•	A82	Copy of claims for U.S. Application Serial No. 09/661,222 filed September 13, 2000 entitled Network Distributed Tracking Wire Transfer Protocol.

EXAMINER M. Rolgado	DATE CONSIDERED 8/12/05

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Notice of References Cited	Application/Control No. 09/872,736	Applicant(s)/Patent Under Reexamination OVERTON ET AL.	
	Examiner Michael S. A. Delgado	Art Unit 2144	Page 1 of 1

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-6,463,454	10-2002	Lumelsky et al.	718/105
	B	US-6,466,980	10-2002	Lumelsky et al.	709/226
	C	US-6,578,068	06-2003	Bowman-Amuah, Michel K.	709/203
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	F	US-			
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
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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.

Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
09/872,736	OVERTON ET AL.
Examiner	**Art Unit**
Michael S. A. Delgado	2144

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
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Claim		Date
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Search Notes

Application/Control No.	Applicant(s)/Patent under Reexamination
09/872,736	OVERTON ET AL.
Examiner	**Art Unit**
Michael S. A. Delgado	2144

SEARCHED			
Class	Subclass	Date	Examiner
718	105	8/12/2005	MD
709	203		
709	206		
709	217		

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
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"Express Mail" mailing label number EV 655 031 233 US

Date of Deposit: February 22, 2006

Our Case No. 11958/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	
JOHN OVERTON et al.	
Serial No. 09/872,736	Examiner: Delgado, Michael A.
Filing Date: June 6, 2001	Group Art Unit: 2144
For METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A	

AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the non-final Office Action dated August 22, 2005, please consider the following:

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Withdrawn) A system for managing location information and providing location information to location queries, the system comprising:

a transfer protocol comprising an identifier and at least one location associated with the identifier, wherein the identifier uniquely specifies an entity and wherein each location specifies a location of data in a network pertaining to the entity;

a location server containing location information corresponding to at least one entity, the location information formatted according to the transfer protocol, and wherein the location of data for the location comprises an application server in communication with the network; and

programming logic stored on the location server responsive to a location query identifying a desired entity to return a location message, the location message comprising all locations associated with the desired entity, wherein the location server returns the location message if the location server contains location information for the desired entity.

2. (Withdrawn) The system of claim 1, wherein the entity comprises a physical object and wherein the at least one location comprises a geographic location.

3. (Withdrawn) The system of claim 2, wherein the geographic location comprises at least one of a latitude, a longitude and an altitude.

4. (Withdrawn) The system of claim 1, wherein the at least one location comprises a plurality of geographic locations, each of the geographic locations representing a position of an object at a different time.

5. (Withdrawn) The system of claim 1, wherein the location server comprises a plurality of location servers, each of the plurality of location servers comprising at least a portion of a total amount of location information residing on the plurality of location servers, and wherein the location information is formatted according to the transfer protocol; and

wherein the programming logic is stored on each of the plurality of location servers.

6. (Withdrawn) The system of claim 5, wherein the programming logic stored at each of the location servers further comprises logic responsive to the location query to return one of a location message and a redirect message, wherein the location server returns the location message if the queried location server contains location information for the desired entity, and wherein the location server returns a redirect message if the queried location server lacks location information for the desired entity, the redirect message comprising a list of at least one other location server known to have location information relevant to the location query.

7. (Withdrawn) The system of claim 6, wherein the list of at least one other location server comprises a list of all location servers in the plurality of location servers and a corresponding list of each of the entities having location information on the respective location servers.

8. (Withdrawn) The system of claim 5, wherein each of the location servers stores at least a portion of the total amount of location information on a persistent storage device.

9. (Withdrawn) The system of claim 8, wherein the persistent storage device comprises one of a hard disk drive, tape drive, optical storage device and removable storage media.

10. (Withdrawn) The system of claim 1, wherein the location information in the location server is maintained in an indexed location store.

11. (Withdrawn) The system of claim 10, wherein the location store comprises a string store indexed by a hash table.

12. (Withdrawn) The system of claim 10, wherein the location query identifying the desired entity comprises a unique identifier for the desired entity, and wherein the programming logic stored on the location server further comprises programming logic for applying an index function to the unique identifier to retrieve at least a portion of the locations associated with the unique identifier in the location store.

13. (Withdrawn) The method of claim 12, wherein the programming logic further comprises logic for applying the index function to retrieve all of the locations associated with the unique identifier in the location store.

14. (Withdrawn) The system of claim 12, wherein the location store comprises a string store and the index function comprises a hash function.

15. (Withdrawn) The system of claim 6, wherein the plurality of location servers are arranged in a network topology having a plurality of nodes organized in a tree-structure, wherein each node comprises at least one location server and wherein each node is connected to at least one other node in the tree structure.

16. (Withdrawn) The system of claim 12, wherein the data location query is received at a data location server in a first node and wherein the redirect message comprises a list of at least one other location server in a node other than the first node that is known to have data location information relevant to the location query.

17. (Withdrawn) A system for managing location information and providing data location information to location queries, the system comprising:

a transfer protocol comprising an identifier and at least one location association, wherein the identifier uniquely specifies an entity and wherein each location specifies a location pertaining to the entity;

a plurality of location servers containing location information corresponding to a plurality of entities, the location information formatted according to the transfer protocol, and comprising at least one application server address, wherein

the plurality of location servers are arranged in a server cluster topology such that each location server contains a unique portion of the location information; and

programming logic stored on each of the location servers responsive to a location query for a desired identifier to return one of a location message, wherein a queried location server returns a location message if the queried location server contains location information for the desired identifier, and a redirect message if the queried location server does not contain location information relevant to the desired identifier, wherein the redirect message comprises a list of all of the plurality of location servers containing location information related to the desired identifier.

18. (Withdrawn) The system of claim 17, wherein the location information comprises geographic location information.

19. (Withdrawn) The system of claim 17, wherein the location information comprises network address information.

20. (Withdrawn) The system of claim 19, wherein the network address information comprises a network address of a data repository containing data pertaining to the desired identifier.

21. (Withdrawn) A method of handling location queries in a network, the network comprising a plurality of location servers containing location information correlating each of a plurality of identifiers with at least one location, the method comprising:

receiving a location query from a client at one of the plurality of location servers, the location query requesting an identifier's location;

sending a location response message to the client if the queried location server contains location information relevant to an entity identified in the query, the location response message comprising location information identifying at least one application server containing information relevant to the entity identified in the query; and

sending a redirect message to the client if the queried location server does not contain data location information relevant to the entity identified in the query, the

redirect message comprising a list of location servers containing location information relevant to the entity identified in the query.

22. (Withdrawn) The method of claim 21, further comprising applying information in the location query from the client to an indexing function to determine if the queried location server contains location information relevant to the entity identified in the query.

23. (Withdrawn) The method of claim 22, wherein each of the plurality of location servers comprises an indexed table of identifiers and associated locations, and wherein applying information in the location query comprises applying an identifier in the location query to a hash function.

24. (Original) A method of scaling at least one of location server capacity and transaction rate capability in a system for storing and retrieving location information, the method comprising:

providing a transfer protocol configured to transport identifier and location information, the location information specifying the location of information relevant to the identifier;

providing a first location server storing location information formatted according to the transfer protocol;

receiving an identifier and a location relevant to the identifier at the first location server;

storing the received location in a location store at the first data location server, the location store comprising a plurality of identifiers, each identifier associated with at least one location, wherein the received location is associated with the received identifier in the location store; and

transferring a portion of the identifiers and associated locations to a second data location server when a performance criterion of the first location server reaches a predetermined performance limit.

25. (Original) The method of claim 24, wherein receiving an identifier and a location comprises receiving the identifier and the location at the first location server

from an application server, wherein the location comprises an address for the application server.

26. (Original) The method of claim 24, wherein receiving an identifier and a location comprises receiving the identifier and the location at the first location server from a physical object, wherein the identifier identifies the physical object and wherein the location comprises a geographic location for the physical object.

27. (Original) The method of claim 26, wherein the physical object comprises a vehicle.

28. (Original) The method of claim 26, wherein the physical object comprises a portable telecommunications device.

29. (Original) The method of claim 24, wherein transferring a portion of the identifier and location associations comprises:

identifying a portion of identifier and location associations on the first location server to be transferred to the second location server and identifying a data set state of the identified portion at an initial time;

copying a data set for the identified portion corresponding to the identified data set state from the first location server to the second location server and maintaining a second data set containing changes to the identified portion since the initial time;

identifying a data set state for the second data set;

ceasing operation of the first location server with respect to the identified portion and copying the second data set to the second location server, wherein the second data set corresponds to the identified data set state for the second data set; and

initiating operation of the second location server for the identified portion of identifiers and location associations.

30. (Original) The method of claim 24, wherein the performance criterion comprises an amount of available persistent storage space in the first location server.

31. (Original) The method of claim 24, wherein the performance criterion comprises a transaction rate limit.

32. (Original) The method of claim 24, wherein the transaction rate limit comprises a processor speed limit.

33. (Original) The method of claim 24, wherein the transaction rate limit comprises a network connection bandwidth limit.

34. (Original) The method of claim 24, further comprising transmitting a location server map from the first location server, the location server map comprising information identifying the second location server and a list of identifiers associated with the second location server.

35. (Original) The method of claim 34, wherein the first and second location servers are part of a location server cluster comprising a plurality of location servers, and wherein transmitting the location server map comprises transmitting the location server map to each of the plurality of data location servers asynchronously.

36. (Original) The method of claim 34, wherein transmitting a location server map comprises transmitting the location server map to a client in response to query received at the first location server from the client regarding an identifier that is not resident on the first location server.

37. (Original) The method of claim 24, wherein transferring a portion of the identifiers and associated locations to a second location server when a performance criterion of the first data location server reaches a predetermined performance limit further comprises monitoring the performance criterion and automatically transferring the portion of identifiers and associated locations when the first location server reaches the predetermined limit.

38. (Original) A database comprising:
a computer readable medium;

a plurality of index designations, each index designation representative of one of a plurality of identifiers, wherein each identifier uniquely identifies an entity;

a plurality of locations, wherein each of the locations is associated with at least one of the plurality of index designations and represents a location of information relevant to an identifier represented by an index designation;

a location store stored in the computer readable medium, the location store comprising a table containing the plurality of index designations and associated locations; and

an indexing function stored in the computer readable medium, the indexing function operative to map each of the plurality of identifiers to a respective one of the plurality of index designations.

39. (Original) The database of claim 38, wherein the indexing function comprises one of a hash function, a b-tree function, and a t-tree function.

40. (Original) The database of claim 39, further comprising a front end in communication with the location store and indexing function, the front end operative to transport identifiers and associated locations via a transport protocol.

41. (Original) The database of claim 40, further comprising a buffer in communication with the front end, the buffer configured to maintain a log of each of a plurality of location store update transactions.

42. (Original) The database of claim 38, wherein the computer readable medium comprises at least one of RAM and a persistent storage device.

43. (Original) The database of claim 38, wherein the location store comprises a string store and wherein the plurality of locations comprise network address strings.

44. (Original) The database of claim 43, wherein at least one of the network address strings comprises an address of a database in a network.

45. (Original) A system for managing location information and providing location information to location queries, the system comprising:

a location server operating in accordance with a transfer protocol, the transfer protocol comprising instructions for manipulating an identifier and at least one location associated with the identifier, wherein the identifier uniquely specifies an entity and wherein each location specifies a location of data in a network pertaining to the entity, the location server containing location information corresponding to at least one entity and formatted according to the transfer protocol, and wherein the location of data for the location comprises an application server in communication with the network; and

programming logic stored on the location server responsive to a location query identifying a desired entity to return a location message, the location message comprising all locations associated with the desired entity, wherein the location server returns the location message if the location server contains location information for the desired entity.

REMARKS

I. Office Action Summary

Claims 24, 38 and 45 are the pending independent claims. In the Office Action dated August 22, 2005, the Examiner rejected claims 24-26, 29-38, and 40-45, under 35 U.S.C. §102(e) as being anticipated by Lumelsky et al (U.S. Patent No. 6,466,980). The Examiner also rejected claims 27-28 and 39 under 35 U.S.C. §103(a) as obvious over the combination of Lumelsky et al. in view of Bowman-Amuah (U.S. Patent No. 6,578,068).

II. Rejections Under 35 U.S.C. § 102(e)

Applicants respectfully disagree with the Examiner's rejections of claims 24-26, 29-38 and 40-45 over U.S. Patent No. 6,466,980 (Lumelsky). As discussed in greater detail below, Lumelsky discloses using location information in service of optimizing **distribution of multimedia objects**[1], whereas Applicants' specification **manages location information** separately from the data to which the location information pertains[2].

CLAIM 24

Claim 24 relates to a method of scaling at least one of location server capacity and transaction rate capability in a system for storing and retrieving location information. Claim 24 includes, *inter alia,* the step of:

---

[1] See: "A system and method for dynamically shaping available capacity of **multimedia objects** based on aggregated demand across **distributed media/world-wide-web servers**" (Abstract; **bold** added). See also: "Thus, unlike the prior art system **10**, the various **collections of objects** (**130**, **131**, **132**) found at each independent server (**1201**, 1211, **1221**) aggregate now into a **distributed collection** (**130**, **131**, **132**) **of objects** and **object replicas** which model a **multimedia object** as a **scalable** and relocatable resource **in accordance with demand and capacity conditions**" (col. 8, ll. 40-46; **bold** added).

[2] See specification: "According to one aspect of the invention, a system for managing **location information** and providing **location information** to data locations queries comprises a transfer protocol configured to manipulate an identifier, and at least one location associated with the identifier, wherein the identifier uniquely specifies an entity and wherein each data location specifies a location of data in a network pertaining to the entity" (Applicant's p. 3, ll. 4-9; **bold** added). **See also**: "A network distributed tracking protocol (NDTP) is a transfer protocol having the capability to manipulate **location information** used to efficiently track the **location of information** associated with an individual entity in the distributed database system" (Applicant's p. 6, ll. 14-17; **bold** added).

transferring a portion of the identifiers and associated locations to a second data location server when a performance criterion of the first server reaches a predetermined performance limit (p. 46, ll. 25-27).

Thus, claim 24 relates to improvements for transaction rate scalability for **location information** separate and apart from any data to which the location information points.[3] As recited in claim 24, transferring a portion of the identifiers and associated locations to a second **data location server** involves isolating specifically the location information from the end-point data itself and making changes to how the location information is managed, not the end-point data that is stored at a location identified by the location information. Examples of partitioning portions of the ***location information*** across servers are found in Applicants' specification. Applicants' specification includes techniques and network topologies for optimizing transaction rate including *[1]* clustering and *[2]* distributed topology replication of *associated identifier and location information*.

> For example, FIG. 5 illustrates a flat NDTP server topology using ***[1]* clustering**, or a ***[2]* distributed topology using replication**, where each of the NDTP servers 12 in the cluster may contain a **different portion of** a pool of **associated identifier and location information** (p. 11, ll. 30 – p. 12, l. 1; **bold** and ***[enumeration]*** added).

Clustering and distributed topologies using replication separate specifically location information onto different machines, thereby allowing portions of the location information to be processed by more server and network resources.

In contrast to Claim 24, Lumelsky only focuses on replication of data objects rather than on management of specifically location information separated from the data objects themselves. Lumelsky teaches the use of location information to improve transmission performance and scalability of multimedia objects.[4] Instead of teaching

---

[3] Regarding **(a) transaction rate**, see: "An advantage of distributing an NDTP server data set across independent machines is that **both capacity and transaction rate scale can be increased**. In one embodiment, each additional machine in an NDTP server cluster 50 **linearly increases capacity**, by adding main and secondary storage, and **transaction rate**, by adding processing power and network bandwidth (assuming a properly scalable network infrastructure is employed)" (p. 25, ll. 24-30; **bold** added). Regarding **(b) specifically location information**, see: "For example, FIG. 5 illustrates a flat NDTP server topology using clustering, or a distributed topology using replication, where each of the NDTP servers 12 in the cluster may contain a different portion of a **pool of associated identifier and location information**" (p. 11, ll. 30 – p. 12, l. 1; **bold** added).

[4] See note 1.

the management of location data itself so that data location servers with data location information are reconfigured to handle queries for the location of data, Lumelsky discloses managing and replicating the end-point data itself (in Lumelsky, the data objects disclosed are multimedia files).[5] The method of claim 24 relates to the management of specifically location information and capacity and transaction rate scaling for accessing the location information needed to access data, while Lumelsky is concerned with the replicating and managing the data itself rather than the location information relating to the whereabouts of the data.

The Examiner asserts that Lumelsky teaches or suggests transferring portions of identifier-location associations to a second server given a performance limit. On page 3, the Examiner asserts that Lumelsky teaches:

> transferring a **portion of the identifiers and associated locations** to a second data location server when a performance criterion of the first location server reaches a predetermined performance limit (Examiner remarks, p. 3; **bold** added).

In support of this assertion, the Examiner cites Lumelsky:

> More particularly, the present invention introduces the notion of a global server which **provides a spare, shared, and highly available capacity that can be used to assist a multimedia server** by temporarily increasing the overall system capacity associated **with some particular multimedia object** to match its predicted demand. The present invention additionally introduces the notion of a **transient replica** which replica acts as a **migrating object** of limited lifetime that responds to demand and capacity conditions. To do so, the controller node monitors demand and capacity and uses, creates, and deletes **transient replicas** from global servers (col. 6, ll. 33-43; **bold** added).

Lumelsky's "spare, shared, and highly available capacity" refers to resources assisting multimedia objects not location information. Lumelsky's "transient replica" refers to a multimedia object not location information. Therefore, Lumelsky teaches transferring data objects to additional servers but does not teach transferring portions of location information to additional servers. Lumelsky fails to teach or suggest the separate management of location information pertaining to the data, therefore Lumelsky does not teach transferring a portion of the identifiers and associated locations to a

[5] See: "Large databases store large amounts of data, but the NDTP server is only concerned with the location of that data, **rather than the end-point referent data itself**" (p. 8, ll. 23-26; **bold** added). "End-point referent data itself" are multimedia objects in Lumelsky.

second data location server when a performance criterion of the first location server reaches a predetermined performance limit as claimed in claim 24.

Thus, Lumelsky does not teach either (a) a method of scaling at least one of location server capacity and transaction rate capability in a system for storing and retrieving location information, or (b) transferring a portion of the identifiers and associated locations to a second data location server when a performance criterion of the first location server reaches a predetermined performance limit. For at least these reasons, Applicants submit that independent Claim 24 is patentable over Lumelsky. Claims 25-37 are dependent claims, therefore their allowability directly follows from the allowability of independent claim 24.

CLAIM 38.

Claim 38 relates to a database using an indexing function to map identifiers and index designations. Claim 38 includes, *inter alia,* the step of:

> an indexing function stored in the computer readable medium, the indexing function operative to map each of the plurality of identifiers to a respective one of the plurality of index designations

An example of an indexing function may be found in Applicants' specification at, for example p. 27, ll. 15-22, where a well-known function for mapping identifiers to index designations is described:

> The presently preferred embodiment for accomplishing this [NDTP database insertion and scaling] is to define **a well-known function of the identifier** and **use this function** to select from a set of NDTP servers. NDTP clients will preferably apply this well-known function to the identifier for each NDTP request, and send the NDTP request to the indicated NDTP server. This technique will effectively partition the set of all identifier/location associations across the NDTP servers. **Each NDTP server will only maintain the portion of the total association set which corresponds to its particular identifiers** (**bold** added).

An example of a "well-known function" is a hash function.[6] Using a specific **indexing function** Applicants deliberately permit distributing portions of the database's location information onto separate servers. In contrast, Lumelsky teaches three **components** (but not a function) to interact with placement recommendations and inquiries:

[6] Applicants' specification (p. 28, ll. 6-27) provides an example algorithm and specific usage conditions.

> Particularly, the placement module (610) **interfaces with** both a replica directory service (665) (for maintaining the replica directory 666 as described herein with respect to FIG. 6(*a*)) and a server directory service (655) (for maintaining the server directory 656 as described herein with respect to FIG. 6(*b*)) **to generate the tentative placements** (620). That is, the placement module (610), replica directory service (665), and replica directory (666) **operate in conjunction** to locate all replicas associated with the given object identifier of the received request. Further, the placement module (610), server directory service (655) and server directory (656) **operate in conjunction** to determine the willingness of any such location (holding a replica) to consider new placement inquiries (620) (Col. 9, ll. 31-44; **bold** added).

Lumelsky teaches that the (a) placement module, (b) replica directory service, and (c) server directory service interact to generate placement recommendations and to consider placement inquiries, but Lumelsky does not teach an indexing function. Therefore, not teaching an indexing function, Lumelsky does not teach an indexing function operative to map each of the plurality of identifiers to a respective one of the plurality of index designations.

Illustrated in FIG. 6(a) and FIG. 6(b), Lumelsky further specifies the replica and server directories.[7] The replica directory records various statistics for identifiers, such as predicted demand, geography, demand volume, and time-to-live (col. 10, ll. 23-28). The server directory records information such as IP address or hostname and capacity rating (col. 10, ll. 42-46). These are values. However, Lumelsky does not teach an indexing function to map identifiers to index designations. Thus, Lumelsky does not teach an indexing function operative to map each of the plurality of identifiers to a respective one of the plurality of index designations.

Therefore, while Lumelsky teaches a placement module interacting with replica and server directory services, Lumelsky does not teach a database comprising the use of an indexing function stored in the computer readable medium, the indexing function operative to map each of the plurality of identifiers to a respective one of the plurality of index designations. For at least these reasons independent Claim 38 is patentable over Lumelsky. Claims 39-44 are dependent claims, therefore their allowability directly follows from the allowability of independent claim 38.

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[7] See discussion of replica directory in Lumelsky, Col. 10, ll. 21-35, and server directory in Col. 10, ll. 36-62.

CLAIM 45

Claim 45 relates to a system for managing location information and providing location information to location queries. Claim 45 includes, *inter alia,* the step of:

> a location server operating in accordance with a transfer protocol, the transfer protocol comprising instructions for manipulating an identifier and at least one location associated with the identifier

Different than Lumelsky, claim 45 recites a transfer protocol for **specifically managing location information**. Applicants' specification provides detail and figures describing an example of suitable protocol instructions for database management of specifically location information.[8]

> A network distributed tracking protocol (NDTP) is a transfer protocol having the capability to manipulate **location information** used to efficiently track the location of information associated with an individual entity in the distributed database system (p. 6, ll. 14-17; **bold** added).[9]

The NDTP transfer protocol runs on standard lower-level network transport protocols, such as TCP and UDP:

> NDTP defines a transaction oriented protocol, which can be carried over any of a variety of lower level network transport protocols. TCP and UPD are currently supported, however any of a number of other protocols are also supportable (p. 21, ll. 6-9; **bold** added).

NDTP is carried over TCP and UDP transport protocols, and NDTP is a transfer protocol designed for managing location information. In contrast, Lumelsky teaches use of transfer and transport protocols for transmitting multimedia data rather than for managing location information:

---

[8] See Applicants' specification, FIGS. 8-17B (p.12, l. 7 – p. 20, l. 20), which provides examples of instructions for database interaction and management of location information. Example instructions for location information include: (a) querying the database for identifier associations (NDTP_GET, NDTP_GET_RSP, NDTP_GET_TRANSACTION), (b) adding location associations to an identifier (NDTP_PUT, NDTP_PUT_RSP, NDTP_PUT_TRANSACTION), (c) deleting entries from the database (NDTP_DEL, NDTP_DEL_RSP, NDTP_DEL_TRANSACTION), (d) updating records in the database (NDTP_UPD, NDTP_UPD_RSP), and redirecting queries (NDTP_RDR_RSP).

[9] See also applicant specification: "The Network Distributed Tracking Protocol (NDTP) efficiently tracks the **location of data** associated with an individual entity in a distributed database" (p. 12, ll. 8-9, **bold** added).

> It should be noted that standards for controlling multimedia streaming data over the World Wide Web such as H. 323 and Real Time Streaming Protocol (RTSP) are already in place and implemented to provide the streaming capabilities they are intended for. Whereas H.323 is **designed for videoconferencing** across small groups, RTSP is designed to efficiently **broadcast audio-visual data** to large groups. Each standard [H.323 and RTSP] describes a client-server application-level protocol for **controlling the delivery of data** with real-time properties. For example, the RTSP establishes and controls either a single or several time-synchronized **streams of continuous media,** such as **audio and video** and **uses transport protocols** such as **UDP, multicast UDP, TCP,** and **Real Time Protocol (RTP)** to **deliver the continuous streams** (Lumelsky, Col. 9, ll. 14-21; **bold** added).

Lumelsky teaches the use of transfer protocols designed for (a) videoconferencing and (b) broadcasting audio-visual data, (c) controlling delivery of data, and (d) lower-level transport protocols UDP, multicast UDP, TCP, and RTP to deliver continuous streams. However, Lumelsky does not teach use of a transfer protocol comprising instructions for manipulating an identifier and at least one location associated with the identifier.

Lumelsky additionally teaches use of a controller device for managing placement of multimedia objects:

> FIG. 5 is a detailed block diagram of the intermediary ***controller device*** (**520**) implemented for ***managing the placement of multimedia objects themselves*** onto servers. As shown in FIG. 5, a request processing module (**600**) is provided for receiving requests **(601, 602, 603, 604**) from clients, the request including a unique object identifier, and feeding these requests to a ***placement module*** (**610**). The placement module (**610**) applies a ***placement policy*** (**615**) to each request and generates a set of tentative placement queries (**620**) for the request. Particularly, the placement module (**610**) ***interfaces with both a replica directory service*** (**665**) (for maintaining the replica directory **666** as described herein with respect to FIG. **6**(*a*)) and a ***server directory service*** (**655**) (for maintaining the server directory **656** as described herein with respect to FIG. **6**(*b*)) to generate the tentative placements (**620**) (Col. 9, ll. 22-37; ***bold italic*** added).

Lumelsky teaches use of a controller device for managing the placement of multimedia objects, using a placement module within a controller device, applying a placement policy, and interfacing the placement module with replica and server directory services, to generate tentative placements. However, Lumelsky does not teach the use of a transfer protocol comprising instructions for manipulating an identifier. Therefore, Lumelsky does not teach a location server operating in accordance with a transfer

protocol, the transfer protocol comprising instructions for manipulating an identifier and at least one location associated with the identifier.

Finally, Lumelsky teaches the use of replica and server directories to advise placement policy, illustrated in FIG. 6(a) and FIG. 6(b).[10] The *replica directory* records various statistics for identifiers, such as predicted demand, geography, demand volume, and time-to-live (col. 10, ll. 23-28). The *server directory* records information such as IP address or hostname and capacity rating (col. 10, ll. 42-46). However, Lumelsky does not teach the use of a *transfer protocol* comprising instructions for manipulating an identifier and at least one location associated with the identifier.

Lumelsky teaches the use of transport protocols for transmitting multimedia data, including videoconferencing, audio-visual data, and continuously streaming data. Lumelsky also teaches using a controller device and directory services for replicas and servers relating to placement policy of multimedia objects. However, Lumelsky does not teach the use of a transfer protocol comprising instructions for manipulating an identifier and at least one location associated with the identifier. For at least these reasons Applicants submit that claim 45 is patentable over Lumelsky.

IV. Rejections Under 35 U.S.C. § 103(a)

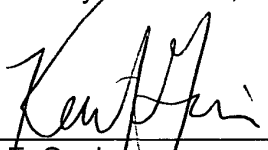
Applicants respectfully disagree with the Examiner's rejections under 35 U.S.C. § 103. Applicants submit that dependent claims 27-28 and 39 are allowable for at least the same reasons as provided above for their respective independent claims.

[10] See discussion of replica directory in Lumelsky, Col. 10, ll. 21-35, and server directory in Col. 10, ll. 36-62.

V. Conclusion

In light of the above, Applicants submit that claims 24-45 are in condition for allowance. If any issues arise or questions remain, the Examiner is invited to contact the undersigned at the number listed below in order to expedite disposition of this case.

Respectfully submitted,



Kent E. Genin
Registration No. 37,834
Attorney for Applicants

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200

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"Express Mail" mailing label number EV 655 031 233 US

Date of Deposit: February 22, 2006

Case No. 11958/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

J. Overton et al.

Serial No: 09/872,736

Examiner: M. Delgado

Filed: June 6, 2001

Group Art Unit: 2144

For: METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A

PETITION AND FEE FOR EXTENSION OF TIME (37 CFR § 1.136(a))

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This is a petition for an extension of the time to respond to the Offic Action dated August 22, 2005 for a period of three month(s).

☒ Applicant:

☒ claims small entity status. See 37 C.F.R. §1.27.

☐ is other than small entity

	Extension Months	**Other Than Small Entity**	**Small Entity**
☐	One Month	$120.00	$60.00
☐	Two Months	$450.00	$225.00
☒	Three Months	$1,020.00	$510.00
☐	Four Months	$1,590.00	$795.00
☐	Five Months	$2,160.00	$1,080.00

02/27/2006 SHASSEN1 00000009 09872736

01 FC:2253 510.00 OP

Fee Payment

☒ Attached is a check for $510 for the Petition fee.

☐ Attached is a credit card authorization form for $_____ for the Petition fee.

☐ Charge Petition fee to Deposit Account No. 23-1925. A duplicate copy of this Petition is attached.

☒ Charge any additional fee required or credit for any excess fee paid to Deposit Account No. 23-1925. A duplicate copy of this Petition is attached.

Respectfully submitted,

Dated: February 22, 2006

Kent E. Genin
Registration No. 37,834
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610
(312)321-4200

OIPE IAP82
FEB 22 2006
PATENT & TRADEMARK OFFICE

02-23-06

IFW 2144

BRINKS HOFER GILSON &LIONE

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Date of Deposit: February 22, 2006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of: J. Overton et al.

Appln. No.: 09/872,736

Filed: June 1, 2001

For: Method And Apparatus For Managing Location Information In A Network

Examiner: M. Delgado

Art Unit: 2144

Attorney Docket No: 11958/49

Mail Stop Amendment
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL

Sir:

Attached is/are:

☒ Check for $510.00 (three month extension of time); Transmittal Letter (in duplicate); Petition and Fee for Extension of Time (in duplicate); Amendment

☒ Return Receipt Postcard

Fee calculation:

☐ No additional fee is required.

☒ Small Entity.

☒ An extension fee in an amount of $510.00 for a three-month extension of time under 37 C.F.R. § 1.136(a).

☐ A petition or processing fee in an amount of $_____ under 37 C.F.R. § 1.17(_____).

☐ An additional filing fee has been calculated as shown below:

						Small Entity			Not a Small Entity	
	Claims Remaining After Amendment		Highest No. Previously Paid For	Present Extra		Rate	Add'l Fee	or	Rate	Add'l Fee
Total		Minus				x $25=			x $50=	
Indep.		Minus				X100=			x $200=	
First Presentation of Multiple Dep. Claim						+$180=			+ $360=	
						Total	$		Total	$

Fee payment:

☒ A check in the amount of $510.00 is enclosed.

☐ Please charge Deposit Account No. 23-1925 in the amount of $. A copy of this Transmittal is enclosed for this purpose.

☐ Payment by credit card in the amount of $_____ (Form PTO-2038 is attached).

☒ The Director is hereby authorized to charge payment of any additional filing fees required under 37 CFR § 1.16 and any patent application processing fees under 37 CFR § 1.17 associated with this paper (including any extension fee required to ensure that this paper is timely filed), or to credit any overpayment, to Deposit Account No. 23-1925.

Respectfully submitted,

February 22, 2006
Date

Kent E. Genin (Reg. No. 37,834)

Fee Payment

☒ Attached is a check for $510 for the Petition fee.

☐ Attached is a credit card authorization form for $_____ for the Petition fee.

☐ Charge Petition fee to Deposit Account No. 23-1925. A duplicate copy of this Petition is attached.

☒ Charge any additional fee required or credit for any excess fee paid to Deposit Account No. 23-1925. A duplicate copy of this Petition is attached.

Respectfully submitted,

Dated: February 22, 2006

Kent E. Genin
Registration No. 37,834
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610
(312)321-4200

Best Available Copy

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2000

Application or Docket Number
10400/109
09/872736

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	45	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	45 minus 20=	* 25
INDEPENDENT CLAIMS	6 minus 3 =	* 3
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	355.00	OR	BASIC FEE	710.00
X$ 9=		OR	X$18=	450
X40=		OR	X80=	240
+135=		OR	+270=	
TOTAL		OR	TOTAL	1400

CLAIMS AS AMENDED - PART II 2/22/06

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 45	Minus	** 45	=
Independent	* 6	Minus	*** 6	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM	☐			

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
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	☐			

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
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	☐			

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
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. 8/00)

Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE
*U.S. GPO: 2000-460-705/30103

Best Available Copy

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	22	(("5,291,399") or ("5,475,817") or ("5,479,654") or ("5,740,428") or ("5,903,889") or ("5,918,241") or ("6,108,787") or ("6,131,095") or ("6,154,873") or ("6,377,986") or ("6,418,441")).PN. or (2002/0112048).CCLS.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2006/05/25 13:14
L2	8	(("5,724,575") or ("5,913,210") or ("5,950,173") or ("5,974,409")).PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2006/05/25 13:15
L3	8	(("5,724,575") or ("5,913,210") or ("5,950,173") or ("5,974,409")).PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2006/05/25 13:15
S1	28293	("707").CLAS.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2005/08/13 09:38
S2	11332	S1 and @ad<"20000214"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/12 10:37
S3	250	S2 and (server with scal$4)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/09 12:23
S4	0	S3 and (Frontend with server)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/09 16:24
S5	699	(718/105).CCLS.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2005/08/09 12:23
S6	3	S3 and S5	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/09 12:23
S7	699	(718/105).CCLS.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2005/08/09 16:23
S8	395	S7 and @ad<"20000214"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 09:15

EAST Search History

S9	0	S8 and ("quality of service") and (front$3 near2 server)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 12:09
S10	0	S8 and ("quality of service")	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/09 16:25
S11	7	S8 and (front$3 near2 server)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/09 16:26
S12	1780	((mobile or handheld or cellular) with geograph$4).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 09:17
S13	811	S12 and @ad<"20000214"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 09:18
S14	54	S13 and (hand near off)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 09:40
S15	54	S14 and ((hand near off)withy server)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 09:41
S16	2	S14 and ((hand near off) with server)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 11:52
S17	5	NDTP	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 12:00
S18	1661	(distribut$4 with database).ti.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 12:01
S19	833	S18 and @ad<"20000214"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 12:02
S20	825	S18 and @ad<"20000214"	USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 12:02

EAST Search History

S21	0	S20 and ("quality of service") and (front$3 near2 server)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 12:10
S22	1	S20 and(front$3 near2 server)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 12:10
S23	8	S20 and messaging	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 12:14
S24	2	S20 and messaging and (application with server)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 12:16
S25	19	S20 and (application adj server)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/10 12:17
S26	2	("6463454").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2005/08/12 10:01
S27	6053	(mobile or cellular or handheld or vehicle) and (hash or b?tree or t?tree)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/12 10:37
S28	1272	S27 and @ad<"20000214"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/12 10:38
S29	700	(718/105).CCLS.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2005/08/12 10:38
S30	5	S28 and S29	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/12 10:38
S31	2	("6240455").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2005/08/12 17:04
S32	45456	(meyer or murray or ranous).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/13 09:42

EAST Search History

S33	9699	"HEWLETT PACKARD COMPANY".as.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/13 09:44
S34	49058	HEWLETT.as.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/13 09:43
S35	48964	"HEWLETT PACKARD".as.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/13 09:44
S36	9699	S33 and S35	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/13 09:52
S37	1	S35 and NAR	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/13 09:49
S38	532	S35 and aggregat$4	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/13 09:52
S39	38	S35 and (aggregat$4 and encapsul$4)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/13 10:04
S40	267	S32 and S35	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/13 09:52
S41	10	S40 and aggregat$4	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/13 10:01
S42	7177	(709/223-224).CCLS.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2005/08/13 10:03
S43	0	("11and@ad<20000427").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2005/08/13 10:03
S44	2707	S42 and @ad<"20000427"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/08/13 10:03

EAST Search History

S45	64	S44 and (aggregat$4 and encapsul$4)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2006/05/25 13:12



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,736	06/01/2001	John K. Overton	10406/49	3927

7590 06/01/2006

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

EXAMINER	
DELGADO, MICHAEL A	
ART UNIT	**PAPER NUMBER**
2144	

DATE MAILED: 06/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	09/872,736	OVERTON ET AL.	
	Examiner	Art Unit	
	Michael S. A. Delgado	2144	

-- 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 *22 February 2006*.

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) *24-45* is/are pending in the application.

4a) Of the above claim(s) *1-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24-45* 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 *14 September 2001* 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-1449 or PTO/SB/08) Paper No(s)/Mail Date 9/14/01, 5/7/02, 8/13/02
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 02/22/2006 have been fully considered but they are not persuasive. In response to the argument that US Patent No. 6,466,980 by Lumelsky et al does not teach about managing specifically the location of information relevant to the identifier. Lumelsky teaches about creating replica of objects, which are associated with their respective identifier (Fig 6a) (Col 8, lines 45-55) (Col 9, lines 30-45). These object are distributed across different servers in which the combine function of a replica directory service and a server directory service is used to determine where the objects were located amongst the different servers (Fig 6b) (Col 10, lines 30-45). This feature is consistent with the limitation as claimed.

Claim Rejections - 35 USC § 102

1. 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.

2. Claims 24-26, 29-38 and 40-45 rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6,466,980 by Lumelsky et al.

In claim 24, Lumelsky teaches about a method of scaling at least one of location server capacity and transaction rate capability in a system for storing and retrieving location information, the method comprising (Fig 4) (abstract) :

providing a transfer protocol configured to transport identifier and location information, the location information specifying the location of information relevant to the identifier (Col 9, lines 15-20) (Col 9, lines 20-30);

providing a first location server storing location information formatted according to the transfer protocol (Col 9, lines 20-25);

receiving an identifier and a location relevant to the identifier at the first location server (Col 9, lines 20-25);

storing the received location in a location store at the first data location server, the location store comprising a plurality of identifiers, each identifier associated with at least one location, wherein the received location is associated with the received identifier in the location store (Fig 6) (Col 9, lines 35-45); and

transferring a portion of the identifiers and associated locations to a second data location server when a performance criterion of the first location server reaches a predetermined performance limit (Col 6, lines 33-43).

In claim 25, Lumelsky teaches about a method of claim 24, wherein receiving an identifier and a location comprises receiving the identifier and the location at the first location server from an application server, wherein the location comprises an address for the application server (Col 9, lines 50-60).

In claim 26, Lumelsky teaches about a method of claim 24, wherein receiving an identifier and a location comprises receiving the identifier and the location at the first location

server from a physical object, wherein the identifier identifies the physical object and wherein the location comprises a geographic location for the physical object (Col 10, lines 10-30).

In claim 29, Lumelsky teaches about a method of claim 24, wherein transferring a portion of the identifier and location associations comprises:

identifying a portion of identifier and location associations on the first location server to be transferred to the second location server and identifying a data set state of the identified portion at an initial time (Col 24, lines 10-20);

copying a data set for the identified portion corresponding to the identified data set state from the first location server to the second location server and maintaining a second data set containing changes to the identified portion since the initial time (Col 24, lines 10-20);

identifying a data set state for the second data set (Col 24, lines 19-23);

ceasing operation of the first location server with respect to the identified portion and copying the second data set to the second location server, wherein the second data set corresponds to the identified data set state for the second data set (Col 20, lines 20-30) (Col 24, lines 10-20); and

initiating operation of the second location server for the identified portion of identifiers and location associations (Col 24, lines 10-20).

In claim 30, Lumelsky teaches about a method of claim 24, wherein the performance criterion comprises an amount of available persistent storage space in the first location server (Col 19, lines 40-45).

In claim 31, Lumelsky teaches about a method of claim 24, wherein the performance criterion comprises a transaction rate limit (Col 1, lines 45-55) (Col 10, lines 47-56).

In claim 32, Lumelsky teaches about a method of claim 24, wherein the transaction rate limit comprises a processor speed limit (Col 1, lines 45-55) (Col 10, lines 47-56).

In claim 33, Lumelsky teaches about a method of claim 24, wherein the transaction rate limit comprises a network connection bandwidth limit (Col 1, lines 45-55) (Col 10, lines 47-56).

In claim 34, Lumelsky teaches about a method of claim 24, further comprising transmitting a location server map from the first location server, the location server map comprising information identifying the second location server and a list of identifiers associated with the second location server (Fig 6) (Col 10, lines 20-30).

In claim 35, Lumelsky teaches about a method of claim 34, wherein the first and second location servers are part of a location server cluster comprising a plurality of location servers, and wherein transmitting the location server map comprises transmitting the location server map to each of the plurality of data location servers asynchronously (Fig 4) (Col 10, lines 35-45).

In claim 36, Lumelsky teaches about a method of claim 34, wherein transmitting a location server map comprises transmitting the location server map to a client in response to

query received at the first location server from the client regarding an identifier that is not resident on the first location server (Col 24, lines 1-10).

In claim 37, Lumelsky teaches about a method of claim 24, wherein transferring a portion of the identifiers and associated locations to a second location server when a performance criterion of the first data location server reaches a predetermined performance limit further comprises monitoring the performance criterion and automatically transferring the portion of identifiers and associated locations when the first location server reaches the predetermined limit (Col 24, lines 10-20).

In claim 38, Lumelsky teaches about a database comprising;

a computer readable medium (Col 28, lines 20-25);

a plurality of index designations, each index designation representative of one of a plurality of identifiers, wherein each identifier uniquely identifies an entity (Fig 6) (Col 9, lines 35-45);

a plurality of locations, wherein each of the locations is associated with at least one of the plurality of index designations and represents a location of information relevant to an identifier represented by an index designation (Col 9, lines 35-45);

a location store stored in the computer readable medium, the location store comprising a table containing the plurality of index designations and associated locations (Fig 6); and

an indexing function stored in the computer readable medium, the indexing function operative to map each of the plurality of identifiers to a respective one of the plurality of index designations (Col 9, lines 35-45).

In claim 40, Lumelsky teaches about a database of claim 39, further comprising a front end in communication with the location store and indexing function, the front end operative to transport identifiers and associated locations via a transport protocol (Col 9, lines 15-25).

In claim 41, Lumelsky teaches about a database of claim 40, further comprising a buffer in communication with the front end, the buffer configured to maintain a log of each of a plurality of location store update transactions (Col 10, lines 20-30).

In claim 42, Lumelsky teaches about a database of claim 38, wherein the computer readable medium comprises at least one of RAM and a persistent storage device (Col 28, lines 20-30).

In claim 43, Lumelsky teaches about a database of claim 38, wherein the location store comprises a string store and wherein the plurality of locations comprise network address strings (Fig 6a).

In claim 44, Lumelsky teaches about a database of claim 43, wherein at least one of the network address strings comprises an address of a database in a network (Fig 6b).

In claim 45, Lumelsky teaches about a system for managing location information and providing location information to location queries, the system comprising (Fig 4):

a location server operating in accordance with a transfer protocol, the transfer protocol comprising instructions for manipulating an identifier and at least one location associated with the identifier, wherein the identifier uniquely specifies an entity and wherein each location specifies a location of data in a network pertaining to the entity, the location server containing location information corresponding to at least one entity and formatted according to the transfer protocol, and wherein the location of data for the location comprises an application server in communication with the network (Col 9, lines 15-20) (Col 9, lines 20-30); and

programming logic stored on the location server responsive to a location query identifying a desired entity to return a location message, the location message comprising all locations associated with the desired entity, wherein the location server returns the location message if the location server contains location information for the desired entity (Col 10, lines 20-30).

Claim Rejections - 35 USC § 103

3. 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.

4. Claim 27-28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,466,980 by Lumelsky et al in view of US Patent No. 6,578,068 by Bowman-Amuah.

In claim 27 Lumelsky teaches all the limitation but fails to explicitly teach that the physical object comprises a vehicle. In Bowman-Amuah, the advantage of a delivery vehicle is used in the association of end-user (object) to applications (Col 23, lines 50-65).

The vehicle approach combined with the object method of Lumelsky (Col 9, lines 20-30) would improve the portability of the software thus makes it reusable.

It would have been obvious for some one of ordinary skill at the time of the invention to use an object comprising of a vehicle in order to take advantage of the portable feature

In claim 28, the use of a physical object comprises a portable telecommunications device is well known in the art as disclosed by Bowman-Amuah (Col 29, lines 44-50)

In claim 39, the use of an indexing function comprises a hash function is commonly used in object search and is well known in the art as disclosed by Bowman-Amuah (Col 191, lines 50-60).

Conclusion

5. **THIS ACTION IS MADE FINAL.** 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 mailing date of this final action.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6,438,652 by Jordan et al , teaches about load balancing cooperating cache servers by shifting forwarded request.

US 6,711,408 by Raith, teaches about position assisted handoff within a wireless communications network.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael S. A. Delgado whose telephone number is (571) 272-3926. The examiner can normally be reached on 7.30 AM - 5.30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William C. Vaughn Jr. can be reached on (571) 272-3922. 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.

MD

WILLIAM C. VAUGHN, JR.
PRIMARY EXAMINER

OIPE
MAY 07 2002
PATENT & TRADEMARK OFFICE
JC29

FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 10406/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): John K. Overton et al.	

REFERENCE DESIGNATION U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS/ SUBCLASS	FILING DATE
MM	B1	5,724,575	03/03/98	Hoover et al.		
	B2	5,913,210	06/15/99	Call		
	B3	5,950,173	09/07/99	Perkowski		
	B4	5,974,409	10/26/99	Sanu et al.		

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS/ SUBCLASS	TRANSLATION YES	NO
MM	B5	EP 0 919 912 A2	06/02/99	EPO			

EXAMINER INITIAL	OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)	
MM	B6	Copy of Communication relating to the results of the Partial International Search Report for PCT Application No. PCT/US01/18013 dated April 15, 2002

RECEIVED
MAY 10 2002
Technology Center 2100

EXAMINER M. Delgado	DATE CONSIDERED 5/25/08

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Rev. Dec.-99
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AUG 13 2002
PATENT & TRADEMARK OFFICE

FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 10406/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

REFERENCE DESIGNATION U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS/ SUBCLASS	FILING DATE
MP	C1	5,724,575	03/03/98	Hoover et al.		
	C2	5,913,210	06/15/99	Call		
	C3	5,950,173	09/07/99	Perkowski		
	C4	5,974,409	10/26/99	Sanu et al.		

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS/ SUBCLASS	TRANSLATION YES	NO
MP	C5	EP 0 919 912 A2	06/02/99	EPO			

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AUG 16 2002
Technology Center 2100

EXAMINER M. Pelaez	DATE CONSIDERED 5/25/06

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Rev. Dec.-99
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O/IPE JC10 SEP 14 2001 PATENT & TRADEMARK OFFICE

FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 10406/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

REFERENCE DESIGNATION **U.S. PATENT DOCUMENTS**

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS/ SUBCLASS	FILING DATE
AM	A1	4,553,261	11/12/85	FROESSL		
	A2	4,636,858	01/1987	HAGUE		
	A3	4,728,978	03/01/88	INOUE ET AL.		
	A4	4,800,488	01/24/89	AGRAWAL ET AL.		
	A5	4,825,406	04/25/89	BEAN ET AL.		
	A6	4,914,571	04/03/90	BARATZ ET AL.		
	A7	5,008,700	04/1991	OKAMOTO		
	A8	5,124,814	06/23/92	TAKAHASHI ET AL.		
	A9	5,193,185	03/1883	LANTER		
	A10	5,208,623	05/04/93	TAKAHASHI		
	A11	5,319,401	06/07/94	HICKS		
	A12	5,347,600	09/1994	BARNSLEY		
	A13	5,384,643	01/24/95	INGA ET AL.		
	A14	5,414,841	05/09/95	BINGHAM ET AL.		
	A15	5,455,648	10/03/95	KAZAMI		
	A16	5,499,113	03/1996	TSUBOI		
	A17	5,522,077	05/28/96	CUTHBERT ET AL.		
	A18	5,537,547	07/16/96	CHAN ET AL.		
	A19	5,550,981	08/27/96	BAUER ET AL.		
	A20	5,551,027	08/27/96	CHOY ET AL.		
	A21	5,557,790	09/17/96	BINGHAM ET AL.		
	A22	5,560,005	09/24/96	HOOVER ET AL.		
	A23	5,576,952	11/19/96	STUTMAN ET AL.		
	A24	5,579,067	11/26/96	WAKABAYASHI		
	A25	5,610,653	03/1997	ABECASSIS		
	A26	5,617,570	04/01/97	RUSSELL ET AL.		
	A27	5,625,841	04/29/97	DAWKINS ET AL.		
	A28	5,649,247	07/15/97	ITOH ET AL.		
	A29	5,664,170	09/02/97	TAYLOR		
	A30	5,669,029	09/16/97	FYSON ET AL.		
	A31	5,764,889	06/09/98	AULT ET AL.		
	A32	5,764,906	06/09/98	EDELSTEIN ET AL.		
	A33	5,774,670	06/30/98	MONTULLI		
	A34	5,781,725	07/14/98	SAITO		
	A35	5,784,565	07/21/98	LEWINE		
	A36	5,802,518	09/01/98	KARAEV ET AL.		
	A37	5,809,161	09/1998	AUTY		

EXAMINER M. Reloyado	DATE CONSIDERED 5/25/06

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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OIPE JC10 SEP 14 2001 PATENT & TRADEMARK OFFICE

FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 10406/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

REFERENCE DESIGNATION **U.S. PATENT DOCUMENTS**

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS/ SUBCLASS	FILING DATE
MM	A38	5,809,331	09/15/98	STAATS ET AL.		
	A39	5,809,495	09/15/98	LOAIZA		
	A40	5,813,006	09/22/98	POLNEROW ET AL.		
	A41	5,848,246	12/08/98	GISH		
	A42	5,864,482	01/1999	HAZAMA		
	A43	5,872,973	02/16/99	MITCHELL ET AL.		
	A44	5,875,302	02/23/99	OBHAN		
	A45	5,907,837	05/25/99	FERREL ET AL.		
	A46	5,915,240	06/22/99	KARPF		
	A47	5,920,702	07/06/99	BLEIDT ET AL.		
	A48	5,940,844	08/17/99	CAHILL ET AL.		
	A49	5,961,610	10/05/99	KELLY ET AL.		
	A50	5,966,705	10/12/99	KONERU ET AL.		
	A51	5,974,124	10/26/99	SCHLUETER, JR. ET AL.		
	A52	5,978,773	11/02/99	HUDETZ ET AL.		
	A53	5,987,519	11/16/99	PEIFER ET AL.		
	A54	5,995,965	11/30/99	EXPERTON		
	A55	6,032,175	02/29/00	FLETCHER ET AL.		
	A56	6,047,332	04/04/00	VISWANATHAN ET AL.		
	A57	6,055,544	04/25/00	DEROSE ET AL.		
	A58	6,058,193	05/02/00	CORDERY ET AL.		
	A59	6,092,189	07/18/00	FISHER ET AL.		
	A60	6,188,766 B1	02/13/01	KOCHER		
	A61	6,201,931 B1	03/13/01	CIPOLLA ET AL.		
	A62	6,202,070 B1	03/13/01	NGUYEN ET AL.		
	A63	6,209,095 B1	03/27/01	ANDERSON ET AL.		
	A64	6,212,280 B1	04/03/01	HOWARD, JR. ET AL.		

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS/ SUBCLASS	TRANSLATION YES	NO
MM	A65	0 568 161 A1	01/1992	EPO			
	A66	0 889 422 A2	01/07/99	EPO			
	A67	WO 86/05610	09/1986	PCT			
•	A68	WO 98/00624	07/1998	PCT			
	A69	WO 98/15910	04/16/98	PCT			
	A70	WO 98/31138	07/16/98	PCT			
	A71	WO 00/03526	01/20/00	PCT			

EXAMINER M. Pelaez	DATE CONSIDERED 5/25/06

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 10406/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

EXAMINER INITIAL		OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)
MM	A72	Bourke D G et al: "Programmable Module and Circuit for Machine-Readable Unique Serial Number" IBM Technical Disclosure Bulletin, vol. 27, no. 4A, 1 September 1984 pages 1942-1944.
	A73	Kleinholz L et al: "Supporting Cooperative Medicine: The Bermed Project" IEEE Multimedia, vol. 1, no. 4, 21 December 1994 pages 44-53.
	A74	"Method for Network Naming and Routing" IBM Technical Disclosure Bulletin, vol. 37, no. 9, 1 September 1994 page 255.
	A75	"Minimizing Locking To Access Global Shared Data", IBM Technical Disclosure Bulletin, pp 619-622, February 1995.
	A76	"A robust software barcode reader using the Hough transform", Muniz, R., Junco, L.; Otero, A., Abstract, 1999 Int'l Conf. On Information Intelligence and Systems (10-31 to 11-3/1999).
	A77	"In-Fab identification of silicon wafers with clean, laser marked barcodes", Fresonke, D., Abstract, 1994 IEEE/Semi Advanced Semiconductor Manufacturing Conference and Workshop (11-14 to 11-16/1994).
	A78	"Applications of barcode technology in automated storage and retrieval systems", Sriram, T.; Vishwanatha Rao, K.; Biswas, S.; Ahmed, Abstract, Proceedings of the 1996 IEEE IECON 22nd Int'l Conf. On Industrial Electrodes (8-5 to 8-10/1996).
•	A79	Copy of claims for U.S. Application Serial No. 09/111,896 filed July 8, 1998 entitled System And Method For Establishing And Retrieving Data Based On Global Indices.
•	A80	Copy of claims for U.S. Application Serial No. 09/503,441 filed February 14, 2000 entitled Automated Image Archiving System.
•	A81	Copy of claims for U.S. Application Serial No. 09/367,461 filed August 13, 1999 entitled Automated Image Archiving System.
•	A82	Copy of claims for U.S. Application Serial No. 09/661,222 filed September 13, 2000 entitled Network Distributed Tracking Wire Transfer Protocol.

EXAMINER M. Reingold	DATE CONSIDERED 5/25/06

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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PATENT & TRADEMARK OFFICE

FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 11958/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

REFERENCE DESIGNATION U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER Number-Kind Code (If known)	DATE	NAME	CLASS/ SUBCLASS	FILING DATE
MP	D1	4,835,372	05/1989	Gombrich et al.		
	D2	5,291,399	03/1994	Chaco		
	D3	5,475,817	12/1995	Waldo et al.		
	D4	5,479,654	12/1995	Squibb		
	D5	5,740,428	04/1998	Mortimore et al.		
	D6	5,903,889	05/1999	de la Huerga et al.		
	D7	5,918,241	06/1999	Perkowski		
	D8	6,108,787	08/2000	Anderson et al.		
	D9	6,131,095	10/2000	Low et al.		
	D10	6,154,873	11/2000	Call		
	D11	6,377,986	04/2002	Philyaw et al.		
	D12	6,418,441	07/2002	Call		
	D13	2002/0112048	08/2002	Gruyer et al.		

EXAMINER INITIAL		OTHER ART – NON PATENT LITERATURE DOCUMENTS (Include name of author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date page(s), volume-issue number(s), publisher, city and/or country where published.)
MP	D14	Callaghan V L et al., "Structures and Metrics for Image Storage and Interchange" Journal of Electronic Imaging, Vol. 2, No. 2, 1 April 1993, pp. 126-137
	D15	"Method for Network Naming and Routing" IBM Technical Disclosure Bulletin, Vol. 37, No. 9, 1 September 1994, page 255
	D16	"Service Location in an Open Distributed Environment," Beitz et al., Second International Workshop on Services in Distributed and Networked Environments, IEEE Comput. Soc., June, 1995, pp. 28-34
	D17	Baer, Tony, "Tales from the Network", Computerworld Healthcare Journal, www.computerworld.com/news/1996/story/0,11280,14557,00.html, pp. 1-9, October 1, 1996

EXAMINER M. Alonzo	DATE CONSIDERED 5/25/06

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
09/872,736	OVERTON ET AL.
Examiner	**Art Unit**
Michael S. A. Delgado	2144

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
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Claim		Date
Final	Original	5/25/06
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Search Notes

Application/Control No.	Applicant(s)/Patent under Reexamination
09/872,736	OVERTON ET AL.
Examiner	**Art Unit**
Michael S. A. Delgado	2144

SEARCHED			
Class	Subclass	Date	Examiner

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
IDS : 9/14/01 IDS: 8/13/02 IDS: 5/7/02	5/25/2006	MM

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,736	06/01/2001	John K. Overton	10406/49	3927

7590 08/24/2006

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

EXAMINER	
DELGADO, MICHAEL A	
ART UNIT	PAPER NUMBER
2144	

DATE MAILED: 08/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Interview Summary	Application No.	Applicant(s)	
	09/872,736	OVERTON ET AL.	
	Examiner	Art Unit	
	Michael S. A. Delgado	2144	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Michael S. A. Delgado*. (3)*Kent Genin*.

(2) *William Vaughn*. (4)*John Overton*.

Date of Interview: *09 August 2006*.

Type: a)☒ Telephonic b)☐ Video Conference
c)☐ Personal [copy given to: 1)☒ applicant 2)☒ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☒ No.
If Yes, brief description: _____.

Claim(s) discussed: *1*.

Identification of prior art discussed: *US 6,466,980*.

Agreement with respect to the claims f)☐ was reached. g)☐ was not reached. h)☒ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *the prior art not using the management of location identifier in order to support load balancing* .

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

M. Delgado
Examiner's signature, if required

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)
In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

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PATENT & TRADEMARK OFFICE
IAP66

"Express Mail" mailing label number EV 316 041 955 US

Date of Deposit: November 1, 2006

Our Case No. 11958/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

JOHN OVERTON et al.

Serial No. 09/872,736

Filing Date: June 6, 2001

For METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK

Examiner: Delgado, Michael A.

Group Art Unit: 2144

AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Office Action dated August 24, 2006, please consider the following:

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A system having a plurality of location servers for managing location information and providing location information to location queries, the system comprising:

~~a transfer protocol comprising an identifier and at least one location associated with the identifier, wherein the identifier uniquely specifies an entity and wherein each location specifies a location of data in a network pertaining to the entity;~~

a first location server containing a first set of location information corresponding to at least one entity, the location information comprising an identifier and at least one location string associated with the identifier, wherein the identifier identifies an entity and the location string specifies a location of data pertaining to the entity ~~formatted according to the transfer protocol, and wherein the location of data for the location comprises an application server in communication with the network~~;

a second location server comprising a second set of location information, wherein at least a portion of the second set of location information differs from the first set of location information; and

programming logic stored on each of the location servers ~~the location server~~ responsive to a location query identifying a desired entity to return a location message, the location message comprising ~~all~~ at least one location of data pertaining to ~~locations associated with~~ the desired entity, ~~wherein the location server returns the location message~~ if the location server receiving the location query contains location information for the desired entity.

2. – 3. (Cancelled)

4. (Currently Amended) The system of claim 1, wherein the at least one location comprises a plurality of geographic locations, each of the geographic locations representing a position of the entity ~~an object~~ at a different time.

5. (Cancelled)

6. (Currently Amended) The system of claim 1[[5]], wherein the programming logic ~~stored at each of the location servers~~ further comprises logic responsive to the location query to return one of a location message or[[and]] a redirect message, wherein the location server receiving the query returns the location message if the queried location server contains location information for the desired entity, and wherein the queried location server returns a redirect message if the queried location server lacks location information for the desired entity, the redirect message comprising information for finding a ~~a list of at least one other~~ location server known to have location information relevant to the location query.

7. (Currently Amended) The system of claim 6, wherein the information for finding the location server known to have location information relevant to the location query ~~list of at least one other location server~~ comprises a list of [[all]] location servers ~~in the plurality of location servers~~ and a corresponding list of each of the entities having location information on the ~~respective~~ location servers.

8. (Currently Amended) The system of claim 1 [[5]], wherein each of the location servers stores at least a portion of the ~~total amount of~~ location information on a persistent storage device.

9. (Cancelled)

10. (Currently Amended) The system of claim 1, wherein the location information in the location server is maintained in an indexed location store indexed by a hash table.

11. (Cancelled)

12. (Currently Amended) The system of claim 10, wherein the location query identifying the desired entity comprises a unique identifier for the desired entity, and wherein the programming logic stored on the location server further comprises programming logic for applying an index function to the unique identifier to retrieve at least a portion of the location information ~~locations~~ associated with the unique identifier in the indexed location store.

13. – 14. (Cancelled)

15. (Currently Amended) The system of claim 1[[6]], wherein the plurality of location servers are arranged in a network topology having a plurality of nodes organized in a logical hierarchy ~~tree-structure~~, wherein each node comprises at least one location server and wherein each node is connected to at least one other node in the logical hierarchy ~~tree-structure~~.

16. (Currently Amended) The system of claim 12, wherein the [[data]] location query is received at a [[data]] location server in a first node and wherein the redirect message comprises a list of at least one other location server in a node other than the first node that may ~~is known to~~ have [[data]] location information relevant to the location query.

17. (Currently Amended) A system having a plurality of location servers for managing location information and providing ~~data~~ location information to location queries, the system comprising:

~~a transfer protocol comprising an identifier and at least one location association, wherein the identifier uniquely specifies an entity and wherein each location specifies a location pertaining to the entity;~~

a plurality of location servers containing location information corresponding to a plurality of entities, the location information formatted according to a ~~the~~ transfer protocol configured for manipulating location information, and comprising at least one application server address, wherein the plurality of location servers are arranged in a ~~server~~ cluster topology such that each location server contains a unique set of location information ~~portion~~ of an aggregate set of the location information; and

programming logic stored on each of the plurality of location servers responsive to a location query for a desired identifier to return one of a location message, wherein a queried location server returns a location message if the queried location server contains location information for the desired identifier, and a redirect message if the queried location server does not contain location information relevant to the desired identifier, wherein the redirect message comprises information for finding a location server having ~~a list of all of the plurality of location servers containing~~ location information related to the desired identifier.

18. (Previously Presented) The system of claim 17, wherein the location information comprises geographic location information.

19. (Previously Presented) The system of claim 17, wherein the location information comprises network address information.

20. (Previously Presented) The system of claim 19, wherein the network address information comprises a network address of a data repository containing data pertaining to the desired identifier.

21. (Currently Amended) A method of handling location queries in a network, the network comprising a plurality of location servers, each location server containing a unique set of location information of an aggregate set of location information ~~containing location information~~ correlating each of a plurality of identifiers with at least one location, the method comprising:

receiving a location query from a client at one of the plurality of location servers, the location query requesting an entity's ~~identifier's~~ location;

sending a location response message to the client if the queried location server contains location information relevant to an entity identified in the query, the location response message comprising location information identifying at least one application server containing information relevant to the entity identified in the query; and

sending a redirect message to the client if the queried location server does not contain data location information relevant to the entity identified in the query, the

redirect message comprising information for finding a location server storing ~~a list of location servers containing location information relevant to~~ the entity identified in the query.

22. (Previously Presented) The method of claim 21, further comprising applying information in the location query from the client to an indexing function to determine if the queried location server contains location information relevant to the entity identified in the query.

23. (Previously Presented) The method of claim 22, wherein each of the plurality of location servers comprises an indexed table of identifiers and associated locations, and wherein applying information in the location query comprises applying an identifier in the location query to a hash function.

24. (Currently Amended) A method of scaling at least one of capacity and transaction rate capability in a location server ~~capacity and transaction rate capability~~ in a system having a plurality of location servers for storing and retrieving location information, wherein each of the plurality of location servers stores unique set of location information of an aggregate set of location information, the method comprising:

providing a transfer protocol configured to transport identifier and location information, the location information specifying the location of information related ~~relevant~~ to the identifier;

~~providing a first location server~~ storing location information formatted according to the transfer protocol at a first location server;

receiving an identifier and a location relevant to the identifier at the first location server;

storing the received location in a location store at the first data location server, the location store comprising a plurality of identifiers, each identifier associated with at least one location, wherein the received location is associated with the received identifier in the location store; and

transferring a portion of the identifiers and associated locations to a second data location server when a performance criterion of the first location server reaches a predetermined performance limit.

25. (Original) The method of claim 24, wherein receiving an identifier and a location comprises receiving the identifier and the location at the first location server from an application server, wherein the location comprises an address for the application server.

26. (Original) The method of claim 24, wherein receiving an identifier and a location comprises receiving the identifier and the location at the first location server from a physical object, wherein the identifier identifies the physical object and wherein the location comprises a geographic location for the physical object.

27. (Original) The method of claim 26, wherein the physical object comprises a vehicle.

28. (Original) The method of claim 26, wherein the physical object comprises a portable telecommunications device.

29. (Original) The method of claim 24, wherein transferring a portion of the identifier and location associations comprises:

identifying a portion of identifier and location associations on the first location server to be transferred to the second location server and identifying a data set state of the identified portion at an initial time;

copying a data set for the identified portion corresponding to the identified data set state from the first location server to the second location server and maintaining a second data set containing changes to the identified portion since the initial time;

identifying a data set state for the second data set;

ceasing operation of the first location server with respect to the identified portion and copying the second data set to the second location server, wherein the second data set corresponds to the identified data set state for the second data set; and

initiating operation of the second location server for the identified portion of identifiers and location associations.

30. (Original) The method of claim 24, wherein the performance criterion comprises an amount of available persistent storage space in the first location server.

31. (Original) The method of claim 24, wherein the performance criterion comprises a transaction rate limit.

32. (Original) The method of claim 24, wherein the transaction rate limit comprises a processor speed limit.

33. (Original) The method of claim 24, wherein the transaction rate limit comprises a network connection bandwidth limit.

34. (Original) The method of claim 24, further comprising transmitting a location server map from the first location server, the location server map comprising information identifying the second location server and a list of identifiers associated with the second location server.

35. (Original) The method of claim 34, wherein the first and second location servers are part of a location server cluster comprising a plurality of location servers, and wherein transmitting the location server map comprises transmitting the location server map to each of the plurality of data location servers asynchronously.

36. (Original) The method of claim 34, wherein transmitting a location server map comprises transmitting the location server map to a client in response to query received at the first location server from the client regarding an identifier that is not resident on the first location server.

37. (Original) The method of claim 24, wherein transferring a portion of the identifiers and associated locations to a second location server when a performance criterion of the first data location server reaches a predetermined performance limit further comprises monitoring the performance criterion and automatically transferring

the portion of identifiers and associated locations when the first location server reaches the predetermined limit.

38. – 44. (Cancelled)

45. (Currently Amended) A system for managing location information and providing location information to location queries, the system comprising:

a location server operating in accordance with a transfer protocol, the transfer protocol comprising instructions for manipulating an identifier and at least one location associated with the identifier, wherein the identifier uniquely specifies an entity and wherein each location specifies a location of data in a network pertaining to the entity, the location server containing location information corresponding to at least one entity and formatted according to the transfer protocol, and wherein the location of data for the location comprises an application server in communication with the network; and

programming logic stored on the location server responsive to a location query identifying a desired entity to return a location message, the location message comprising [[all]] locations associated with the desired entity, wherein the location server returns the location message if the location server contains location information for the desired entity.

REMARKS

I. Office Action Summary

Upon entry of this amendment claims 1, 4, 6-8, 10, 12, 15-37 and 45 will be pending. In the Office Action dated June 1, 2006, the Examiner rejected claims 24-26, 29-38, and 40-45, under 35 U.S.C. §102(e) as being anticipated by Lumelsky et al (U.S. Patent No. 6,466,980). The Examiner also rejected claims 27-28 and 39 under 35 U.S.C. §103(a) as obvious over the combination of Lumelsky et al. in view of Bowman-Amuah (U.S. Patent No. 6,578,068).

II. Interview Summary

A telephone interview was conducted with the inventor, the undersigned and Examiners Delgado and Vaughn on August 9, 2006. The undersigned thanks the Examiners for the courtesy extended in that discussion. The aspect of the claims that was discussed was the management of location information separate from the data to which the location information pertains. The inventor pointed out that this permitted functions, such as load balancing, to be performed by management of location information rather than simple replication of location information and the data to which the location information pertains. The inventor also pointed out that the cited Lumelsky reference relates to manipulation of the actual data (multimedia objects in Lumelsky) rather than just the location information for that data.

III. Rejections Under 35 U.S.C. § 102(e)

Applicants respectfully disagree with the Examiner's rejections of claims 24-26, 29-38 and 40-45 over U.S. Patent No. 6,466,980 (Lumelsky). As discussed in greater detail below, Lumelsky discloses using location information in service of optimizing **distribution of multimedia objects**, whereas Applicants' specification **manages location information** separately from the data (or multimedia objects, using the Lumelsky terminology) to which the location information pertains.

CLAIM 24

Amended claim 24 relates to a method of scaling at least one of location server capacity and transaction rate capability in a system for storing and retrieving location information by manipulating the location information used to find the data that is being requested.

Claim 24 includes, *inter alia,* the step of:

> transferring a portion of the identifiers and associated locations to a second data location server when a performance criterion of the first server reaches a predetermined performance limit

Thus, amended claim 24 relates to improvements for transaction rate scalability for location information separate and apart from any data to which the location information points. As recited in claim 24**, transferring a portion of the identifiers and associated locations to a second data location server** involves isolating specifically the location information from the end-point data itself and making changes to how the location information is managed, not the end-point data that is stored at a location identified by the location information. Examples of partitioning portions of the ***location information*** across servers are found in Applicants' specification (See, for example, FIG. 5 and p. 11, ll. 30 – p. 12, l. 1 illustrating location data server topology using clustering, or a distributed topology using replication, where each of the servers in the cluster may contain a different portion of a pool of associated identifier and location information).

In contrast to Claim 24, Lumelsky only focuses on replication of data objects rather than on management of specifically location information separated from the data objects themselves. Instead of teaching the management of location data itself so that data location servers with data location information are reconfigured to handle queries for the location of data, Lumelsky discloses managing and replicating the end-point data itself (in Lumelsky, the data objects disclosed are multimedia files). The method of claim 24 relates to the management of specifically location information and capacity and transaction rate scaling for accessing the location information needed to access data,

while Lumelsky is concerned with the replicating and managing the data itself rather than the location information relating to the whereabouts of the data.

The Examiner asserts that Lumelsky teaches or suggests transferring portions of identifier-location associations to a second server given a performance limit. As pointed out in Applicants' Response filed February 22, 2006, Lumelsky actually teaches replication of the multimedia objects, not simply the location data (See Lumelsky, Col. 6, lines 33-43: "The present invention additionally introduces the notion of a transient replica which replica acts as a migrating object of limited lifetime that responds to demand and capacity conditions. To do so, the controller node monitors demand and capacity and uses, creates, and deletes transient replicas from global servers.")

Lumelsky's "transient replica" refers to a multimedia object, not location information. Therefore, Lumelsky teaches transferring data objects to additional servers but does not teach transferring portions of location information to additional servers separate from data objects. Lumelsky fails to teach or suggest the separate management of location information pertaining to the data, therefore Lumelsky does not teach transferring a portion of the identifiers and associated locations to a second data location server when a performance criterion of the first location server reaches a predetermined performance limit as claimed in claim 24.

Thus, Lumelsky does not teach either (a) a method of scaling at least one of location server capacity and transaction rate capability in a system for storing and retrieving location information, or (b) transferring a portion of the identifiers and associated locations to a second data location server when a performance criterion of the first location server reaches a predetermined performance limit. Also, Applicants have amended claim 24 to note that different sets of location information are maintained on each of the location servers to further emphasize the difference between Lumelsky and the invention of claim 24.

For at least these reasons, Applicants submit that independent Claim 24 is patentable over Lumelsky. Claims 25-37 are dependent claims, therefore their allowability directly follows from the allowability of independent claim 24.

CLAIM 45

Claim 45 relates to a system for managing location information and providing location information to location queries. Claim 45 includes, *inter alia*:

> a location server operating in accordance with a transfer protocol, the transfer protocol comprising instructions for manipulating an identifier and at least one location associated with the identifier . . .

Unlike Lumelsky where replication of data (e.g. multimedia objects) is disclosed rather than the location information relating to the whereabouts of the data, claim 45 recites a location server specifically configured with a location data protocol for managing location information separately from the data the location data is pointing to. In contrast, Lumelsky teaches use of transfer and transport protocols for transmitting multimedia data rather than for managing location information (See Lumelsky, Col. 9, lines 14-21). Lumelsky teaches the use of transfer protocols designed for (a) videoconferencing and (b) broadcasting audio-visual data, (c) controlling delivery of data, and (d) lower-level transport protocols UDP, multicast UDP, TCP, and RTP to deliver continuous streams. However, Lumelsky does not teach use of a transfer protocol comprising instructions for manipulating an identifier and at least one location associated with the identifier.

Accordingly, Applicants submit that Lumelsky does not teach a location server operating in accordance with a transfer protocol, the transfer protocol comprising instructions for manipulating an identifier and at least one location associated with the identifier.

Finally, Lumelsky teaches the use of replica and server directories to advise placement policy, illustrated in FIG. 6(a) and FIG. 6(b). The replica directory records various statistics for identifiers, such as predicted demand, geography, demand volume, and time-to-live (col. 10, ll. 23-28). The server directory records information such as IP address or hostname and capacity rating (col. 10, ll. 42-46). However, Lumelsky does not teach the use of a transfer protocol comprising instructions for manipulating an identifier and at least one location associated with the identifier.

As discussed in the interview of August 9, 2006 and reiterated in more detail above, Applicants respectfully submit that claim 45 distinguishes over Lumelsky

because Lumelsky fails to teach or suggest a system for manipulating location information separately from the data to which the location data pertains.

For at least the above reasons, Applicants submit that claim 45 is allowable over the cited art.

IV. Rejections Under 35 U.S.C. § 103(a)

Applicants respectfully disagree with the Examiner's rejections under 35 U.S.C. § 103. Applicants submit that dependent claims 27-28 are allowable for at least the same reasons as provided above for independent claim 24. Claim 39 has been cancelled to expedite allowance of the remaining claims. Applicants reserve the right to refile claim 39 in a continuation application.

V. Reintroduction of Withdrawn Claims

In view of the August 9, 2006 interview and the clarification that the claims relate to systems and methods for manipulating location information, as opposed to data identified by the location information, Applicants have reintroduced claims 1, 4, 6-8, 10, 12, and 15-23 which all relate to manipulation of location information.

Independent claim 1 relates to a system for managing location information for an entity (e.g. data) separately from the entity itself, where location servers in the system each have differing sets of location information and are configured to return a location information for the desired entity (i.e. information on where to find the entity) if that location server contains the location information.

Independent claim 17 relates to a system for managing location information for data separately from the data itself, where, among other features, each of a plurality location servers are arranged in a cluster topology and, in response to a query, will return either the requested location information or a redirect message providing information on where to find a location server with the location information for the data.

Independent claim 21 recites a method for handling location queries where each of a plurality of location servers has a unique set of location information of an aggregate set of the location information. The method includes the steps of receiving an identifier for an entity, sending a location response with the location information of the entity if the

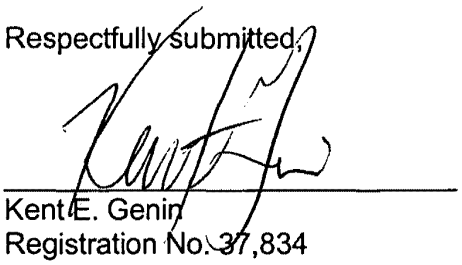
location server receiving the query possesses the location information, or sending a redirect message identifying another location server with the location information for the entity.

Applicants submit that each of the reintroduced claims, along with their respective dependent claims, distinguish over Lumelsky for at least one or more of the reasons provided above. Consideration and allowance of the reintroduced claims is respectfully requested.

VI. Conclusion

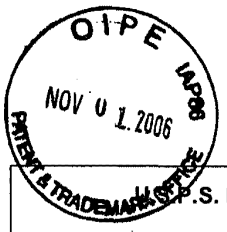
In light of the above, Applicants submit that claims 1, 4, 6-8, 10, 12, 15-37 and 45 are in condition for allowance. Applicants further submit that the amendments to the claims are fully supported by the specification as filed. Applicants have cancelled claims 2-3, 5, 9, 11, 13-14 and 38-44 in order to expedite review and allowance of the remaining claims. Applicants reserve the right to refile these claims in a continuation application. If any issues arise or questions remain, the Examiner is invited to contact the undersigned at the number listed below in order to expedite disposition of this case.

Respectfully submitted,



Kent E. Genin
Registration No. 37,834
Attorney for Applicants

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200



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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	John Overton et al.	
Appln. No.:	09/872,736	Examiner: M. Delgado
Filed:	June 6, 2001	Art Unit: 2144
For:	METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK	
Attorney Docket No:	11958/49	

Mail Stop RCE
Commissioner for Patents
U.S. Patent and Trademark Office
P. O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR CONTINUED EXAMINATION (37 C.F.R. § 1.114)

Sir:

Applicant(s) requests continued examination of the above-identified application under 37 C.F.R. §1.114.

☒ Submission under 37 CFR 1.114 (*check at least one of the following*):

- ☐ Previously submitted:
  - ☐ Applicant(s) requests nonentry of any previously-filed unentered amendments.
  - ☐ Please enter and consider the Amendment After Final Under 37 C.F.R. §1.116 previously filed on_____
  - ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
  - ☐ Other: _____

11/02/2006 MBIZUNES 00000084 231925 09872736
01 FC:2801 395.00 DA

- ☒ Attached is/are:
  - ☐ An Information Disclosure Statement
  - ☒ An Amendment to the written description, claims, or drawings
  - ☐ New Arguments and/or New Evidence in support of Patentability
  - ☐ Other: _____

☐ Request for suspension of action:

Applicant(s) hereby request suspension of action on the above-identified application under 37 C.F.R. §1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; requires Processing Fee under 37 C.F.R. §1.17(i)).

☒ Small Entity Status:

- ☒ Applicant hereby asserts entitlement to claim small entity status under 37 CFR §§ 1.9 and 1.27.
- ☐ A small entity statement or assertion of entitlement to claim small entity status was filed in prior application no._____/_____ and such status is still proper and desired.
- ☐ Is no longer desired.

☒ Applicant(s) calculate the following fees to be due in connection with this Request:

- ☒ A Request fee of $395 under 37 C.F.R. §1.17(e).
- ☐ A suspension processing fee of $_____ under 37 C.F.R. §1.17(i).
- ☐ An additional filing fee of $_____ under 37 C.F.R. §1.16 (_____ additional independent claims and/or _____ additional total claims).
- ☒ An extension fee of $225 under 37 C.F.R. §1.17(a) for a two-month extension of time.

☒ Fee payment to cover the above-enumerated fee(s):

- ☐ A check in the amount of $_____ is enclosed.
- ☒ Please charge Deposit Account No. 23-1925 (BRINKS HOFER GILSON & LIONE) in the amount of $620. A copy of this Request is enclosed for this purpose.
- ☐ A payment by credit card in the amount of $_____ (Form PTO-2038 is attached).
- ☒ The Commissioner is hereby authorized to charge payment of any additional filing fees required under 37 CFR § 1.16 and any patent application processing fees under 37 CFR § 1.17 associated with this paper (including any extension fee required to ensure that this paper is timely filed), or to credit any overpayment, to Deposit Account No. 23-1925 (BRINKS HOFER GILSON & LIONE). A copy of this Request is enclosed for this purpose.

Respectfully submitted,

November 1, 2006
Date

Kent E. Genin (Reg. No. 37,834)

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Date of Deposit: November 1, 2006

Case No. 11958/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

J. Overton et al.

Serial No: 09/872,736

Examiner: M. Delgado

Filed: June 6, 2001

Group Art Unit: 2144

For: METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A

PETITION AND FEE FOR EXTENSION OF TIME (37 CFR § 1.136(a))

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This is a petition for an extension of the time to respond to the Offic Action dated August 24, 2006 for a period of two month(s).

☒ Applicant:

☒ claims small entity status. See 37 C.F.R. §1.27.

☐ is other than small entity

	Extension Months	Other Than Small Entity	Small Entity
☐	One Month	$120.00	$60.00
☒	Two Months	$450.00	$225.00
☐	Three Months	$1,020.00	$510.00
☐	Four Months	$1,590.00	$795.00
☐	Five Months	$2,160.00	$1,080.00

11/02/2006 MBIZUNES 00000084 231925 09872736
02 FC:2252 225.00 DA

Fee Payment

☐ Attached is a check for $_____ for the Petition fee.

☐ Attached is a credit card authorization form for $_____ for the Petition fee.

☒ Charge Petition fee to Deposit Account No. 23-1925. A duplicate copy of this Petition is attached.

☒ Charge any additional fee required or credit for any excess fee paid to Deposit Account No. 23-1925. A duplicate copy of this Petition is attached.

Respectfully submitted,

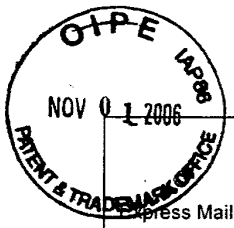
Dated: November 1, 2006

Kent E. Genin
Registration No. 37,834
Attorney for Applicant

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610
(312)321-4200

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	J. Overton et al.
Appln. No.:	09/872,736
Filed:	June 1, 2001
For:	Method And Apparatus For Managing Location Information In A Network

Examiner: M. Delgado

Art Unit: 2144

Attorney Docket No: 11958/49

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Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL

Sir:

Attached is/are:

☒ Transmittal (in duplicate); Petition and Fee for Extension of Time (in duplicate); Request for Continued Examination (in duplicate); Amendment

☒ Return Receipt Postcard

Fee calculation:

☐ No additional fee is required.

☒ Small Entity.

☒ An extension fee in an amount of $225 for a two-month extension of time under 37 C.F.R. § 1.136(a).

☐ A petition or processing fee in an amount of $_____ under 37 C.F.R. § 1.17(_____).

☐ An additional filing fee has been calculated as shown below:

						Small Entity			Not a Small Entity	
	Claims Remaining After Amendment		Highest No. Previously Paid For	Present Extra		Rate	Add'l Fee	or	Rate	Add'l Fee
Total		Minus				x $25=			x $50=	
Indep.		Minus				X100=			x $200=	
First Presentation of Multiple Dep. Claim						+$180=			+ $360=	
						Total	$		Total	$

Fee payment:

☐ A check in the amount of $_____ is enclosed.

☒ Please charge Deposit Account No. 23-1925 in the amount of $620. A copy of this Transmittal is enclosed for this purpose.

☐ Payment by credit card in the amount of $_____ (Form PTO-2038 is attached).

☒ The Director is hereby authorized to charge payment of any additional filing fees required under 37 CFR § 1.16 and any patent application processing fees under 37 CFR § 1.17 associated with this paper (including any extension fee required to ensure that this paper is timely filed), or to credit any overpayment, to Deposit Account No. 23-1925.

Respectfully submitted,

November 1, 2006
Date

Kent E. Genin (Reg. No. 37,834)

Best Available Copy

09/872736

Application or Docket Number

09/872736

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2000

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	45	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	45 minus 20=	* 25
INDEPENDENT CLAIMS	6 minus 3 =	* 3
MULTIPLE DEPENDENT CLAIM PRESENT	☐	

SMALL ENTITY TYPE ☐			OR	OTHER THAN SMALL ENTITY	
RATE	FEE			RATE	FEE
BASIC FEE	355.00		OR	BASIC FEE	710.00
X$ 9=			OR	X$18=	450
X40=			OR	X80=	240
+135=			OR	+270=	
TOTAL			OR	TOTAL	1400

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II 2/22/06

AMENDMENT A	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 45	Minus	** 45	=
Independent	* 6	Minus	*** 6	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM	☐			

SMALL ENTITY			OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE			RATE	ADDITIONAL FEE
X$ 9=			OR	X$18=	
X40=			OR	X80=	
+135=			OR	+270=	
TOTAL ADDIT. FEE			OR	TOTAL ADDIT. FEE	

11/1/06

AMENDMENT B	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 31	Minus	** 45	= 1
Independent	* 5	Minus	*** 6	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM	☐			

SMALL ENTITY			OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE			RATE	ADDITIONAL FEE
X$ 9=			OR	X$18=	1
X40=			OR	X80=	
+135=			OR	+270=	
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	☐			

SMALL ENTITY			OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE			RATE	ADDITIONAL FEE
X$ 9=			OR	X$18=	
X40=			OR	X80=	
+135=			OR	+270=	
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. 8/00)
* Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE
*U.S. GPO: 2000-460-705/00103

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	19010	709/203,207,223,226,230,232,235,241,242.ccls.	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:03
L4	1706	2 and (location same (load balance$3 delay congest$5 bottleneck neck))	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:04
L5	132	4 and (server near5 (location near (information data address)))	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:05
L7	7025	location near server	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:08
L9	177	7 and ((location near (data information)) same (location near2 quer$4))	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:11
L12	1	("7103640").pn.	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:13
L13	19010	709/203,207,223,226,230,232,235,241,242.ccls.	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:13
L14	11606	2 and (location)	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:13
L15	1706	2 and (location same (load balance$3 delay congest$5 bottleneck neck))	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:13
L16	132	4 and (server near5 (location near (information data address)))	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:13
L17	36	5 and @ad<"20000602"	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:13
L18	7025	location near server	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:13
L19	3047	7 and (location near (data information))	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:13
L20	177	7 and ((location near (data information)) same (location near2 quer$4))	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:13

EAST Search History

L21	20	9 and @ad<"20000602"	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:13
L22	14	7 and (((location near (data information)) same (location near2 quer$4)) same (management manag$5))	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/02/05 15:13

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

7590 02/13/2007

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

EXAMINER	
KANG, PAUL H	
ART UNIT	PAPER NUMBER
2144	

DATE MAILED: 02/13/2007

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,736	06/01/2001	John K. Overton	10406/49	3927

TITLE OF INVENTION: METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK SEPARATE FROM THE DATA TO WHICH THE LOCATION INFORMATION PERTAINS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1400	$300	$0	$1700	05/14/2007

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 07/06) Approved for use through 04/30/2007.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 02/13/2007

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,736	06/01/2001	John K. Overton	10406/49	3927

TITLE OF INVENTION: METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK SEPARATE FROM THE DATA TO WHICH THE LOCATION INFORMATION PERTAINS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1400	$300	$0	$1700	05/14/2007

EXAMINER	ART UNIT	CLASS-SUBCLASS
KANG, PAUL H	2144	709-217000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☐ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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.

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.
09/872,736	06/01/2001	John K. Overton	10406/49	3927

7590 02/13/2007

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

EXAMINER	
KANG, PAUL H	
ART UNIT	PAPER NUMBER
2144	

DATE MAILED: 02/13/2007

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 813 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 813 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 07/06) Approved for use through 04/30/2007.

Notice of Allowability	Application No.	Applicant(s)	
	09/872,736	OVERTON ET AL.	
	Examiner	Art Unit	
	Paul H. Kang	2144	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *the amendment filed November 1, 2006*.

2. ☒ The allowed claim(s) is/are *1,4,6-8,10,12,15-37 and 45*.

3. ☐ 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 the:
      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)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. An Examiner's Amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 C.F.R. § 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the Issue Fee.

2. Pursuant to MPEP 606.01, the title has been changed to read:

--METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK SEPARATE FROM THE DATA TO WHICH THE LOCATION INFORMATION PERTAINS--

Allowable Subject Matter

3. The following is an Examiner's Statement of Reasons for Allowance:

In interpreting the claims, in light of the specification and the applicant's arguments, the Examiner finds the claimed invention to be patentably distinct from the prior art of record. Lumelsky et al., US Pat. No. 6,466,980 B1, teaches the invention substantially as claimed. Lumelsky teaches a system and method for capacity shaping in an internet environment to enable network management functions such as load balancing. Lumelsky also teaches a replica directory (66) for storing location information of a data object to retrieve all replicas of the data object using the user provided unique object identifier (See Lumelsky, col. 9, lines 22 – col. 10, line 3).

However, the prior art of record fails to teach or suggest individually or in combination a system in which a location query requests from multiple servers location information, separate from the data objects to which the location information pertains, to be returned to the requestor. The Examiner finds the applicant's arguments in page 10, lines 9-27 of the amendment filed November 1, 2006 to be persuasive. The applicant argued in substance that Lumelsky does not teach a system and method for management of location information separate from the data to which the location information pertains, but instead relates to manipulation of the actual data (multimedia objects in Lumelsky) rather than just the location information for that data.

4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul H. Kang whose telephone number is (571) 272-3882. The examiner can normally be reached on 9 hour flex. First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Vaughn can be reached on (571) 272-3922. 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.

PAUL H. KANG
PRIMARY PATENT EXAMINER

Issue Classification	Application/Control No.	Applicant(s)/Patent under Reexamination	
	09/872,736	OVERTON ET AL.	
	Examiner	Art Unit	
	Paul H. Kang	2144	

ISSUE CLASSIFICATION

ORIGINAL		CROSS REFERENCE(S)							
CLASS	SUBCLASS	CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)						
709	217	709	226	232					
INTERNATIONAL CLASSIFICATION									
G06F 15/16									
/									
/									
/									
/									

N/A (Assistant Examiner) (Date)	Paul H. Kang Feb. 5, 2006 (Primary Examiner) (Date)	Total Claims Allowed: 31
(Legal Instruments Examiner) (Date)		O.G. Print Claim(s): 1 / O.G. Print Fig.: 24

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	24	31		61		91		121		151		181
	2	25	32		62		92		122		152		182
	3	26	33		63		93		123		153		183
2	4	27	34		64		94		124		154		184
	5	28	35		65		95		125		155		185
3	6	29	36		66		96		126		156		186
4	7	30	37		67		97		127		157		187
5	8		38		68		98		128		158		188
	9		39		69		99		129		159		189
6	10		40		70		100		130		160		190
	11		41		71		101		131		161		191
7	12		42		72		102		132		162		192
	13		43		73		103		133		163		193
	14		44		74		104		134		164		194
9	15	31	45		75		105		135		165		195
8	16		46		76		106		136		166		196
10	17		47		77		107		137		167		197
11	18		48		78		108		138		168		198
12	19		49		79		109		139		169		199
13	20		50		80		110		140		170		200
14	21		51		81		111		141		171		201
15	22		52		82		112		142		172		202
16	23		53		83		113		143		173		203
17	24		54		84		114		144		174		204
18	25		55		85		115		145		175		205
19	26		56		86		116		146		176		206
20	27		57		87		117		147		177		207
21	28		58		88		118		148		178		208
22	29		59		89		119		149		179		209
23	30		60		90		120		150		180		210

Search Notes

Application/Control No.	Applicant(s)/Patent under Reexamination
09/872,736	OVERTON ET AL.
Examiner	**Art Unit**
Paul H. Kang	2144

SEARCHED			
Class	Subclass	Date	Examiner
709	203 207	2/07	pk
	223		
	226 230		
	232 235		
	241 242		
(SUPPLEMENTED WITH EAST)			
UPDATED PREVIOUS 2/07 PK			

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner
709	217	2/07	pk
	226		
	232		

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
EAST UPDATE	2/07	pk
DP SEARCH (USP 7103640)	2/07	pk

U.S. Patent and Trademark Office

Part of Paper No. 20070205

Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
09/872,736	OVERTON ET AL.
Examiner	**Art Unit**
Paul H. Kang	2144

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

Claim		Date
Final	Original	2/07
	1	11
	~~2~~	~~11~~
	~~3~~	~~11~~
	4	11
	~~5~~	~~11~~
	6	11
	7	11
	8	11
	~~9~~	
	10	11
	~~11~~	
	12	11
	13	
	14	
	15	11
	16	↓
	17	↓
	18	↓
	19	↓
	20	↓
	21	↓
	22	↓
	23	↓
	24	↓
	25	↓
	26	↓
	27	↓
	28	↓
	29	↓
	30	11
	31	↓
	32	↓
	33	↓
	34	↓
	35	↓
	36	↓
	37	11
	~~38~~	~~11~~
	~~39~~	↓
	~~40~~	↓
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	~~42~~	↓
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Claim		Date
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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. 3927

SERIAL NUMBER	FILING DATE / RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/872,736	06/01/2001	709	2152	10406/49

APPLICANTS

John K. Overton, Chicago, IL;
Stephen W. Bailey, Andover, MA;

** CONTINUING DATA **********

THIS APPLICATION IS A CIP OF 09/661,222 09/13/2000
WHICH CLAIMS BENEFIT OF 60/153,709 09/14/1999
THIS APPLICATION 09/872,736
CLAIMS BENEFIT OF 60/209,070 06/02/2000

pvc 2/9/07

** FOREIGN APPLICATIONS **********

None pvc 2/9/07

IF REQUIRED, FOREIGN FILING LICENSE GRANTED** SMALL ENTITY **
** 08/02/2001

		STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
Foreign Priority claimed	☐ yes ☒ no	IL	15	45	6
35 USC 119 (a-d) conditions met	☐ yes ☐ no ☐ Met after Allowance				
Verified and Acknowledged	Examiner's Signature / Initials				

ADDRESS

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO ,IL 60610

TITLE

Method and apparatus for managing location information in a network

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
765	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

OIPE
SEP 14 2004
PATENT & TRADEMARK OFFICE

FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 11958/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

REFERENCE DESIGNATION U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER Number-Kind Code (If known)	DATE	NAME	CLASS/ SUBCLASS	FILING DATE
MM	D1	4,835,372	05/1989	Gombrich et al.		
	D2	5,291,399	03/1994	Chaco		
	D3	5,475,817	12/1995	Waldo et al.		
	D4	5,479,654	12/1995	Squibb		
	D5	5,740,428	04/1998	Mortimore et al.		
	D6	5,903,889	05/1999	de la Huerga et al.		
CJ 3/14/07	D7	~~5,918,241~~ 5,918,214	06/1999	Perkowski		
	D8	6,108,787	08/2000	Anderson et al.		
	D9	6,131,095	10/2000	Low et al.		
	D10	6,154,873	11/2000	Call		
	D11	6,377,986	04/2002	Philyaw et al.		
	D12	6,418,441	07/2002	Call		
	D13	2002/0112048	08/2002	Gruyer et al.		

EXAMINER INITIAL	OTHER ART – NON PATENT LITERATURE DOCUMENTS (Include name of author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date page(s), volume-issue number(s), publisher, city and/or country where published.)	
MM	D14	Callaghan V L et al., "Structures and Metrics for Image Storage and Interchange" Journal of Electronic Imaging, Vol. 2, No. 2, 1 April 1993, pp. 126-137
	D15	"Method for Network Naming and Routing" IBM Technical Disclosure Bulletin, Vol. 37, No. 9, 1 September 1994, page 255
	D16	"Service Location in an Open Distributed Environment," Beitz et al., Second International Workshop on Services in Distributed and Networked Environments, IEEE Comput. Soc., June, 1995, pp. 28-34
	D17	Baer, Tony, "Tales from the Network", Computerworld Healthcare Journal, www.computerworld.com/news/1996/story/0,11280,14557,00.html, pp. 1-9, October 1, 1996

EXAMINER M. Alexander	DATE CONSIDERED 5/25/06

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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OIPE
SEP 14 2004
PATENT & TRADEMARK OFFICE

FORM PTO-1449	SERIAL NO. 09/872,736	CASE NO. 11958/49
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT	FILING DATE June 1, 2001	GROUP ART UNIT 2152
(use several sheets if necessary)	APPLICANT(S): J. Overton et al.	

REFERENCE DESIGNATION U.S. PATENT DOCUMENTS

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MM	D1	4,835,372	05/1989	Gombrich et al.		
	D2	5,291,399	03/1994	Chaco		
	D3	5,475,817	12/1995	Waldo et al.		
	D4	5,479,654	12/1995	Squibb		
	D5	5,740,428	04/1998	Mortimore et al.		
	D6	5,903,889	05/1999	de la Huerga et al.		
	D7	~~5,918,241~~ 5,918,214	06/1999	Perkowski		
CM 3/12/07	D8	6,108,787	08/2000	Anderson et al.		
	D9	6,131,095	10/2000	Low et al.		
	D10	~~6,154,873~~ 6,154,738	11/2000	Call		
	D11	6,377,986	04/2002	Philyaw et al.		
	D12	6,418,441	07/2002	Call		
	D13	2002/0112048	08/2002	Gruyer et al.		

EXAMINER INITIAL		OTHER ART – NON PATENT LITERATURE DOCUMENTS (Include name of author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date page(s), volume-issue number(s), publisher, city and/or country where published.)
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	D15	"Method for Network Naming and Routing" IBM Technical Disclosure Bulletin, Vol. 37, No. 9, 1 September 1994, page 255
	D16	"Service Location in an Open Distributed Environment," Beitz et al., Second International Workshop on Services in Distributed and Networked Environments, IEEE Comput. Soc., June, 1995, pp. 28-34
	D17	Baer, Tony, "Tales from the Network", Computerworld Healthcare Journal, www.computerworld.com/news/1996/story/0,11280,14557,00.html, pp. 1-9, October 1, 1996

EXAMINER M. Alonzo	DATE CONSIDERED 5/25/06

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BIBDATASHEET

CONFIRMATION NO. 3927

Bib Data Sheet

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/872,736	06/01/2001 RULE	709	2144	10406/49

APPLICANTS

John K. Overton, Chicago, IL;
Stephen W. Bailey, Andover, MA;

**** CONTINUING DATA **********

This application is a CIP of 09/661,222 09/13/2000 PAT 7,103,640
and is a CIP of 09/503,441 02/14/2000 ABN
and is a CIP of 09/367,461 08/13/1999 ABN
and is a CIP of 09/111,896 07/08/1998 ABN
and claims benefit of 60/209,070 06/02/2000
and claims benefit of 60/277,408 03/19/2001

**** FOREIGN APPLICATIONS **********

IF REQUIRED, FOREIGN FILING LICENSE GRANTED
** 08/02/2001

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
☒ yes ☐ no	IL	15	45	6

35 USC 119 (a-d) conditions met: ☒ yes ☐ no ☐ Met after Allowance

Verified and Acknowledged: _____ Examiner's Signature _____ Initials

ADDRESS

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL60610

TITLE

METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK SEPARATE FROM THE DATA TO WHICH THE LOCATION INFORMATION PERTAINS

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
765	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

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 02/13/2007

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

05/16/2007 LUONDIH2 00000044 231925 09872736

01 FC:1501 1400.00 DA
02 FC:1504 300.00 DA



Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Kent E. Genin	(Depositor's name)
	(Signature)
May 14, 2007	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,736	06/01/2001	John K. Overton	10406/49	3927

TITLE OF INVENTION: METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK SEPARATE FROM THE DATA TO WHICH THE LOCATION INFORMATION PERTAINS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1400	$300	$0	$1700	05/14/2007

EXAMINER	ART UNIT	CLASS-SUBCLASS
KANG, PAUL H	2144	709-217000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Brinks Hofer Gilson & Lione
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3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Econnectix, LLC

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Chicago, Illinois

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☒ Issue Fee

☒ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 23-1925 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☒ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date May 14, 2007

Typed or printed name Kent E. Genin Registration No. 37,834

This collection of information is required by 37 CFR 1.311. 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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.

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MAY 16 2007
PATENT & TRADEMARK OFFICE

CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail, with sufficient postage, in an envelope addressed to: Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450, on the below date:

Date: May 14, 2007 Name: Kent E. Genin Signature: _____

BRINKS HOFER GILSON &LIONE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	J. Overton et al.	
Appln. No.:	09/872,736	Examiner: P. Kang
Filed:	June 1, 2001	Art Unit: 2144
For:	Method And Apparatus For Managing Location Information In A Network Separate From The Data To Which The Location Information Pertains	
Attorney Docket No:	11958/49	

Mail Stop Issue Fee
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL

Sir:

Attached is/are:

☒ Transmittal (in duplicate); Issue Fee Transmittal (in duplicate); Comments On Statement Of Reasons For Allowance

☒ Return Receipt Postcard

Fee calculation:

☐ No additional fee is required.

☒ Small Entity.

☐ An extension fee in an amount of $_____ for a _____-month extension of time under 37 C.F.R. § 1.136(a).

☐ A petition or processing fee in an amount of $_____ under 37 C.F.R. § 1.17(_____).

☐ An additional filing fee has been calculated as shown below:

						Small Entity			Not a Small Entity	
	Claims Remaining After Amendment		Highest No. Previously Paid For	Present Extra		Rate	Add'l Fee	or	Rate	Add'l Fee
Total		Minus				x $25=			x $50=	
Indep.		Minus				x 100=			x $200=	
First Presentation of Multiple Dep. Claim						+$180=			+ $360=	
						Total	$		Total	$

Fee payment:

☐ A check in the amount of $_____ is enclosed.

☒ Please charge Deposit Account No. 23-1925 in the amount of $1000. A copy of this Transmittal is enclosed for this purpose.

☐ Payment by credit card in the amount of $_____ (Form PTO-2038 is attached).

☒ The Director is hereby authorized to charge payment of any additional filing fees required under 37 CFR § 1.16 and any patent application processing fees under 37 CFR § 1.17 associated with this paper (including any extension fee required to ensure that this paper is timely filed), or to credit any overpayment, to Deposit Account No. 23-1925.

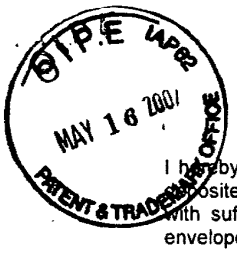
Respectfully submitted,

May 14, 2007
Date

Kent E. Genin (Reg. No. 37,834)

BRINKS HOFER GILSON & LIONE
NBC Tower – Suite 3600, 455 N. Cityfront Plaza Drive, Chicago, IL 60611-5599

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GILSON
&LIONE



I hereby certify that this correspondence is being deposited with the United States Postal Service, with sufficient postage, as first class mail in an envelope addressed to:

Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
on May 14, 2007

Date of Deposit

Kent E. Genin

Name of applicant, assignee or Registered Representative

Signature

May 14, 2007

Date of Signature

Attorney Docket No. 11958/49

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

J. Overton et al.

Serial No. 09/872,736

Filing Date: June 01, 2001

For : Method And Apparatus For Managing Location Information In A Network Separate From The Data To Which The Location Information Pertains

Examiner: P. Kang

Group Art Unit: 2144

Comments on Statement of Reasons for Allowance

Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Notice of Allowance dated February 13, 2006, Applicants provide the following comments on the Examiner's Statement of Reasons for Allowance:

Reasons for allowance are only warranted in instances in which "the record of the prosecution as a whole does not make clear the Examiner's reasons for allowing a claim or claims." 37 C.F.R. 1.104(e). In the present case, Applicants believe the record as a whole makes clear the reasons for allowance and therefore no statement by the Examiner is necessary or warranted. Therefore, the record should reflect that Applicants do not necessarily agree with the limited statement in the reasons for allowance.

For example, the Examiner recites only general inventive concepts in the Statement of Reasons for Allowance, which purportedly apply to all of the claims of the application. Applicants' claims should be limited only by the terms utilized therein. Thus, Applicants hereby submit these Comments in an effort to ensure that the claims are properly construed based only upon limitations that are actually present therein and/or to ensure that the claims are not interpreted so as to include any additional claim limitations that are not found in the respective claims.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned. If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 23-1925 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200

Kent E. Genin
Registration No. 37,834
Attorney for Applicants

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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BIBDATASHEET

Bib Data Sheet

CONFIRMATION NO. 3927

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/872,736	06/01/2001 RULE	709	2144	10406/49

APPLICANTS

John K. Overton, Chicago, IL;
Stephen W. Bailey, Andover, MA;

**** CONTINUING DATA **********

This application is a CIP of 09/661,222 09/13/2000 PAT 7,103,640
and is a CIP of 09/503,441 02/14/2000 ABN
and is a CIP of 09/367,461 08/13/1999 ABN
and is a CIP of 09/111,896 07/08/1998 ABN
and claims benefit of 60/209,070 06/02/2000
and claims benefit of 60/277,408 03/19/2001

**** FOREIGN APPLICATIONS **********

IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** SMALL ENTITY **
** 08/02/2001

		STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
Foreign Priority claimed ☐ yes ☐ no 35 USC 119 (a-d) conditions met ☐ yes ☐ no ☐ Met after Allowance Verified and Acknowledged _____ Examiner's Signature Initials		IL	15	45	6

ADDRESS

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL60610

TITLE

METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK SEPARATE FROM THE DATA TO WHICH THE LOCATION INFORMATION PERTAINS

FILING FEE RECEIVED		
1065	FEES: Authority has been given in Paper 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

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,736	06/19/2007	7233978	10406/49	3927

7590 05/30/2007

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 810 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

John K. Overton, Chicago, IL;
Stephen W. Bailey, Andover, MA;

Trials@uspto.gov
571-272-7822

Paper 23
Date: June 16, 2020

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMAZON WEB SERVICES, INC.,
Petitioner,

v.

KOVE IO, INC.,
Patent Owner.

IPR2020-00276
Patent 7,233,978 B2

Before BRYAN F. MOORE, BARBARA A. PARVIS, and KAMRAN JIVANI, *Administrative Patent Judges.*

JIVANI, *Administrative Patent Judge.*

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314, 37 C.F.R. § 42.4

I. INTRODUCTION

A. Background and Summary

On December 12, 2019, Amazon Web Services, Inc. ("Petitioner") filed a petition for *inter partes* review of claims 1, 3, 6, 10, 14, 17, 23, 24, 30, and 31 of U.S. Patent No. 7,233,978 ("the '978 patent"). Paper 2 ("Pet."

or "Petition"). Kove IO, Inc. ("Patent Owner") filed a Preliminary Response. Paper 11 ("Prelim. Resp.").

We have authority to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). An *inter partes* review may be instituted if "the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a). Additionally, a decision to institute under 35 U.S.C. § 314 may not institute on fewer than all claims challenged in the Petition. *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018).

Upon consideration of the Petition and supporting evidence, we determine that the Petition fails to demonstrate a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of at least one challenged claim of the '978 patent. Accordingly, we do not institute *inter partes* review requested in the Petition for the following reasons.

B. The Challenged Patent (Ex. 1001)

The '978 patent relates to "managing global search and retrieval of information across a network." Ex. 1001, 1:30–33. By way of background, the '978 patent teaches, "[d]ata records can reside in many different places." *Id.* at 1:37. In a distributed database, which the '978 patent describes as "one where data is stored and retrieved among multiple machines connected by a network," "each machine in which some portion of the data in a distributed database may reside is called an application server." *Id.* at 1:59–63. The '978 patent continues, "[o]ne commonly asked question in an application server environment is: Where is data associated with a particular

entity in a distributed database? The data location is a key question when a distributed database has highly dynamic, and even spontaneous, data distribution properties." *Id.* at 1:63–67.

The '978 patent describes that in networked environments, "there are a large number of data repositories and any particular entity does not have data in all of the data repositories, a mechanism is needed that would permit queries to be directed only at data repositories with relevant information." *Id.* at 2:1–5.

Against this backdrop, the '978 patent describes that users may enter queries to servers which "maintain location information in the form of a list of location associations with an entity." *Id.* at 4:52–57. "The location may be address information for the application server(s) containing information relevant to the identifier or address information for the application server(s) through which data relevant to the identifier may be accessed." *Id.* at 4:57–61. In response to the query, the "server preferably returns a list of all locations for the specified entity. The client then can directly access the various locations" to retrieve the data associated with the "entity." *Id. at* 4:61–67. The server described by the '978 patent "is only concerned with the location of that data, rather than the endpoint referent data itself." *Id.* at 5:44–47.

Figure 18, reproduced below, provides a basic illustration of the mechanism employed.

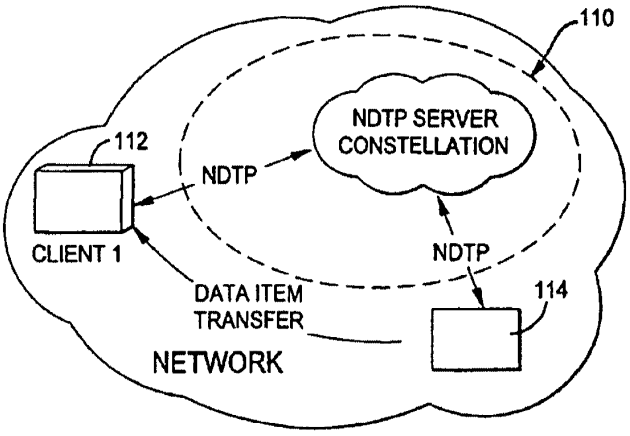


Figure 18 displays a Network Distributed Tracking Protocol (NDTP) server 110, client requestor 112, and application server 114, on which the data requested is located. *Id.* at 18:42–47.

According to the '978 patent, the "Network Distributed Tracking Protocol (NDTP) efficiently tracks the location of data associated with an individual entity in a distributed database." *Id.* at 7:55–57. The '978 patent discloses the NDTP server doing so by using an identifier that "is assumed to be unique to a particular entity." *Id.* at 7:62–64. "The NDTP identifier might be a unique customer identifier, for example, a Social Security Number." *Id.* at 7:66–8:3. In one embodiment, the '978 patent describes entities as automobile vehicles "and the identifier assigned to the vehicles may be the unique vehicle identification number (VIN) assigned by automobile manufacturers." *Id.* at 22:48–52.

The '978 patent also describes application to "the physical location and availability of portable devices belonging to a particular user," such as cellular devices. *Id.* at 23:14–17. In such application, "an NDTP server location store may use the electronic serial number (ESN) of, for example,

cellular phones as identifiers, and the cellular tower translation encoding or latitude longitude of the phone as the location." *Id.* at 24:16–21.

With respect to the locations storing related data, the "location might be an Internet machine name, and a TCP/IP port number for a relational database server, or an HTTP Universal Resource Locator (URL), or some concatenation of multiple components." *Id.* at 8:10–13. The entity and location identifiers may be defined using "any format, size, encoding, etc." *Id.* at 24:65–25:3. The system provides that "an identifier may be associated with any number of locations." *Id.* at 8:13–17. Thus, "where the location information relates to locations of application servers containing data or routing information for finding data, . . . [w]hen a query is performed for an identifier, the NDTP server supplies the set of application servers in which data may be found for that identifier." *Id.* at 8:17–25.

The '978 patent addresses "NDTP server scaling with the NDTP's redirection mechanism, which . . . allows arbitrary distribution of the data set across completely independent machines." *Id. at* 15:47–51. This permits a client permanently to store only a single NDTP server address, but be able to retrieve all the necessary location data that may not be stored at that server. *Id.* at 16:18–23. This also permits the location data to be distributed among servers. *Id.* at 16:54–67. In a distributed configuration, a client either continues to seek location data from NDTP servers based on redirect responses (*id. at* 18:60–19:3), or the servers assemble multiple server responses into a single response to return to the requesting client (*id. at* 19:5–20. Additional configurations are possible. *Id.* at 19:26–50. Also, the "NDTP server supports on-the-fly addition and removal of data repositories and application servers from its deployed topology." *Id.* at 7:33–35.

Significantly, the '978 patent describes its NDTP system and protocol as "provid[ing] a specialized database designed to solve general naming and addressing needs." *Id.* at 23:61–63. "[I]t supports an architecture in which information about where data associated with particular application entities can be managed and obtained independently of the data itself." *Id.* at 23:66–24:1. The '978 patent differentiates its NDTP system from the Domain Name System as follows:

> One way to understand this is as a highly dynamic domain name service (DNS) for data. DNS maintains a mapping between names and machines. NDTP and its associated servers maintain a mapping between identifiers and locations. The identifier/location mapping maintained by NDTP servers is much more dynamic (suitable for frequent updates), than the domain name/IP address mapping maintained by DNS. NDTP may be viewed in this respect as fully generalized name service suitable for any kind of service and not restricted to a specialized service.

Id. at 24:2–11.

C. Challenged Claims

Petitioner challenges claims 1, 3, 6, 10, 14, 17, 23, 24, 30, and 31 of the '978 patent. Pet. 14–15. Thus, Petitioner challenges all independent claims of the '978 patent, namely claims 1, 10, 14, 17, and 31. Claim 1 is representative of the claimed subject matter and is reproduced below.

> 1. A system having a plurality of location servers for managing location information and providing location information to location queries, the system comprising:
>
> a first location server containing a first set of location information corresponding to at least one entity, the location information comprising an identifier and at least one location string associated with the identifier, wherein the identifier identifies an entity

and the location string specifies a location of data pertaining to the entity

a second location server comprising a second set of location information, wherein at least a portion of the second set of location information differs from the first set of location information; and

programming logic stored on each of the location servers responsive to a location query identifying a desired entity to return a location message, the location message comprising at least one location of data pertaining to the desired entity, if the location server receiving the location query contains location information for the desired entity.

D. Asserted Grounds of Unpatentability

Petitioner asserts unpatentability as follows (Pet. 14–15):

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1, 3, 6, 10, 14, 31	§ 102(b)	RFC1034[1]
6	§ 103(a)	RFC1034
17, 23, 30	§ 103(a)	RFC1034, Neimat[2]
24	§ 103(a)	RFC1034, Neimat, Venkatasubramanian[3]

Petitioner submits the Declaration of Dr. Jon Weissman. (Ex. 1002) in support of its arguments.

[1] P. Mochapetris, "Domain Names - Concepts And Facilities," Request for Comment No. 1034, Network Working Group, Nov. 1987. (Ex. 1003) ("RFC1034").

[2] U.S. Patent No. 5,542,087 (issued July 30, 1996) (Ex. 1004).

[3] N. Venkatasubramanian and S. Ramanathan, "Load Management in Distributed Video Servers," *Proceedings of 17th International Conference on Distributed Computing Systems*, IEEE, Baltimore, MD, USA, 1997, pp. 528–35.

E. Real Parties in Interest

Petitioner identifies itself as a real party-in-interest, as well as Amazon.com, Inc., Amazon.com Services, Inc., Amazon Digital Services, LLC, and AWSHC, Inc. Pet. 61. Petitioner also asserts "[n]o other parties have controlled, directed, funded, or participated in the preparation of this Petition, and therefore no other parties are understood to be a real party-in-interest here." *Id.*

Patent Owner states, "Patent Owner Kove IO, Inc. is a real party-in-interest for this proceeding. In addition, for completeness, Patent Owner identifies Arctide, LLC." Paper 4, 2.

Neither party disputes the identifications of real parties-in-interest in the record before us. *See generally* Pet., *and* Prelim. Resp.

F. Related Matters

Petitioner and Patent Owner identify as a related matter the patent litigation pending between them in United States District Court for the Northern District of Illinois, case 1:18-cv-08175 (N. D. Ill.), filed December 12, 2018. Pet. 62; Prelim. Resp. 17; Paper 4, 2. According to the parties, this litigation includes an assertion of the '978 patent claims that are challenged here. *Id.*

II. CLAIM CONSTRUCTION

Because the Petition was filed after November 13, 2018, we construe the challenged claims using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b).

37 C.F.R. § 42.100(b) (2019).[4] This rule adopts the same claim construction standard used by Article III federal courts, which follow *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), and its progeny. Under this standard, the words of a claim are generally given their "ordinary and customary meaning," which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *See Phillips*, 415 F.3d at 1312–13.

Petitioner indicates it "does not ask the Board to construe any claim terms at this time" and that it "applies the ordinary and customary meaning of the claim terms in light of the specification." Pet. 16. Conversely, Patent Owner proposed constructions of the claim terms "identifier," "location," "location server," and "location information." Prelim. Resp. 17–32.

We address below the scope of the claimed "identifier." In light of our analysis of Petitioner's asserted grounds, we further determine that we need not reach construction of the terms "location," "location server," and "location information," and therefore, decline to construe these terms. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)) ("[W]e need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy.'").

Each independent claim of the '978 patent recites the use of an "identifier." For instance, independent claim 1 recites "a first set of location

[4] *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (final rule).

information corresponding to at least one entity, the location information comprising an identifier." Ex. 1001, 25:27–29. Independent claim 1 further recites "the identifier identifies an entity." *Id.* at 25:31. Independent claim 31 similarly recites "manipulating an identifier . . . wherein the identifier uniquely specifies an entity." *Id.* at 28:51–52. Independent claim 10 recites responding "to a location query for a desired identifier" by searching "location information corresponding to a plurality of entities." *Id.* at 26:27–37. Independent claim 14 also recites responding to a "location query requesting an entity's location" by searching location information including "a plurality of identifiers." *Id.* at 26:58–63. Independent claim 17 recites a "location store comprising a plurality of identifiers, each identifier associated with at least one location." *Id.* at 27:35–37.

Patent Owner proposes construing the claimed identifier as: "a unique encoding that identifies an individual entity, and with which zero or more data location specifiers are associated in a location server." Prelim. Resp. 18, 20–24. Patent Owner further states that its proposed construction "requires that there be a 1-to-1 relationship between an identifier and the entity that it is identifying." *Id.* at 34.

We address first Patent Owner's inclusion within its proposed construction of the phrase "a unique encoding . . . with which zero or more data location specifiers are associated in a location server." The United States Court of Appeals for the Federal Circuit instructs that a patentee is free to act as their own lexicographer in order "to define the specific terms used to describe his or her invention, [however,] this must be done with reasonable clarity, deliberateness, and precision." *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Here, we find the '978 patent contains an

express definition of the claimed "identifier." The '978 patent begins its detailed description section of the Specification with a series of definitions. Ex. 1001, 4:19–43. In particular, the '978 patent states, "[t]he following terms are used to describe the operation of the presently preferred distributed database system." *Id.* at 4:19–20. Among the terms defined in this passage, the '978 discloses, "[a]n 'entity identifier' or an 'identifier' is a unique encoding, which may be a string in one embodiment, with which zero or more data location specifiers are associated in an NDTP server." *Id.* at 4:25–28. We find the foregoing statements reasonably clear, deliberate, and precise so as to give one of ordinary skill in the art notice of the patentee's intent to limit the scope of the claimed "identifier" to "a unique encoding . . . with which zero or more data location specifiers are associated in a location server." Therefore, we agree with Patent Owner's incorporation of this definition in its proposed construction. We further observe that in a footnote excluded from the Petition's brief claim construction section, Petitioner recognizes, "[t]he specification recites that identifiers are unique encodings, such as strings, with which zero or more data location specifiers are associated in an NDTP server." Pet. 20 n.7 (citing Ex. 1001, 4:25–28).

We turn next to Patent Owner's inclusion within its proposed construction of the phrase "identifies an individual entity." Whereas the earlier discussed phrase describes the relationship between the identifier and its associated data location specifiers, this phase describes the relationship between the identifier and an entity. Patent Owner's proposed inclusion of this phrase is supported by the '978 patent's disclosure that the claimed identifier "is assumed to be unique to a particular entity." Ex. 1001, 7:62–64. This understanding is reinforced by the examples of identifiers set forth

in the Specification, namely, a unique customer identifier such as a Social Security Number (SSN), a vehicle identification number (VIN), and an electronic serial number (ESN) of a cellular phone. *Id.* at 7:66–8:3, 22:48–52, 24:16–21. We find that one of ordinary skill in the art would readily understand these examples as instances in which a given identifier identifies only one entity, and therefore, these examples confirm Patent Owner's understanding that the claimed identifier identifies an individual entity.

Returning to the claim language, we observe that recitation of the singular term "an identifier" supports the foregoing understanding, particularly where the recitation relates to the relationship between an identifier and the entity it identifies. For instance, as Patent Owner correctly contends, claims 1 and 31 each recite "the identifier identifies ***an*** entity." Prelim. Resp. 23–24. It is well established that the "indefinite article 'a' or 'an' in patent parlance carries the meaning of 'one or more.'" *KCJ Corp. v. Kinetic Concepts, Inc.*, 223 F.3d 1351, 1356 (Fed. Cir. 2000); *Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1342 (Fed. Cir. 2008). Here, however, the language immediately surrounding the phrase "an identifier" in both independent claims 1 and 31 recites "at least one location" and "at least one entity." Ex. 1001, 25:28–30, 28:51–52, 28:55. This surrounding usage suggests Patent Owner's intention to use the explicit phrase "at least one" when describing a quantity of one or more, and not rely upon on the implied understanding of the indefinite article "an."

Finally, although we agree with Patent Owner's proposed construction for the reasons set forth above, we disagree based on the record before us with Patent Owner's argument that its construction requires "a 1-to-1 relationship between an identifier and the entity that it is identifying."

Prelim. Resp. 34. Rather, we understand the claim language and passages of the Specification cited above as relating to the notion that a given identifier must resolve to a single entity, i.e., at most, a many-to-1 relationship. We do not decide whether the claim language in light of the Specification requires that a given entity must be identified by one and only one identifier, i.e., a 1-to-1 relationship, because this determination would not alter the outcome of our analysis of Petitioner's asserted grounds, as set forth below. *See Nidec Motor Corp.*, 868 F.3d 1013 at 1017.

Accordingly, for the foregoing reasons, we construe the claim term "identifier" to mean "a unique encoding that identifies an individual entity, and with which zero or more data location specifiers are associated in a location server."

III. ANALYSIS OF ASSERTED GROUNDS

A. Legal Standards

Petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). At this stage of the proceeding, Petitioner must establish that there is a reasonable likelihood that it will prevail with respect to at least one of the challenged claims. 35 U.S.C. § 314(a).

A claim is anticipated only if each and every element as set forth in the claims is found, either expressly or inherently described in a single prior art reference. *Verdegaal Bros., Inc. v. Union Oil. Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). The elements must be arranged as recited in the challenged claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990).

A claim is unpatentable as obvious in light of the asserted prior art if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time of the invention to a person having ordinary skill in the art. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) when in evidence, objective evidence of non-obviousness, i.e., so-called secondary considerations such as commercial success, long felt but unsolved needs, and failure of others. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). The obviousness inquiry further requires an analysis of "whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (requiring "articulated reasoning with some rational underpinning to support the legal conclusion of obviousness")).

B. Level of Ordinary Skill in the Art

The level of skill in the art is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)).

Petitioner argues that one of ordinary skill in the art at the time of the invention of the '978 patent "would typically have had a bachelor's degree in computer science (or a similar field) and at least two years of experience working with distributed software systems, or at least seven years of

experience working with distributed systems (or in a similar field), or equivalent." Pet. 11–12. Patent Owner does not propose a differing view. Prelim. Resp. 16–17.

We regard Petitioner's formulation of the level of skill as consistent with the Specification and the asserted prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (prior art itself may reflect an appropriate level of skill). Thus, we adopt Petitioner's proposal for the purposes of this Decision only.

C. Overview of the Asserted Prior Art

1. RFC1034 (Ex. 1003)

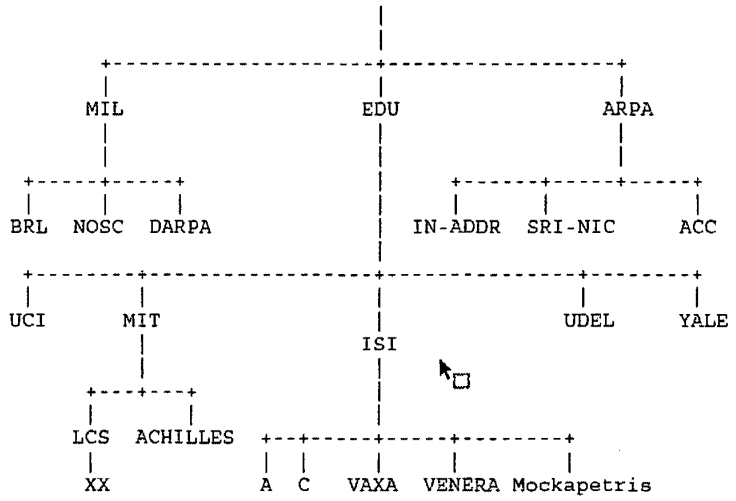
RFC1034 provides an introduction to concepts and facilities, but not implementation and specification, of the Domain Name System (DNS), for Internet mail and host address support. Ex. 1003, 1. The development of DNS was driven by an increase in the number host computers, and the subsequent increase in network traffic to copy a single file that mapped each computer to its network identifier, as well as an increase in sophistication of applications on those computers. *Id.* at 1–2.

RFC1034 describes distributed database problems in the host name scenario, where "a particular name server may be presented with a query that can only be answered by some other server." *Id.* at 4. RFC1034 prefers an approach it labels "'iterative,' in which the server refers the client to another server and lets the client pursue the query," but is open to the approach it labels "'recursive', in which the first server pursues the query for the client at another server." *Id.*

RFC1034 describes "a tree structured name space and data associated with the names." *Id.* at 6. Using this, "queries for address resources return

Internet host addresses." *Id.* RFC1034 describes the use of "name servers," which each have "complete information about a subset of the domain space, and pointers to other name servers that can be used to lead to information from any part of the domain tree." *Id.*

An example of a high-level portion of the tree-structured Internet domain name space is reproduced below in an unlabeled figure in Section 3.4, page 10, of RFC1034.



In the unlabeled figure, above, appearing in the section named "Example name space," is a root domain which "has three immediate subdomains: MIL, EDU, and ARPA. The LCS.MIT.EDU domain has one immediate subdomain named XX.LCS.MIT.EDU." *Id.* at 10. Each node in the tree has a set of resource information, referred to as "resource records," ("RR") which include information such as the domain name where the resource record is found, the type and class of resource, a time-to-live value for the data, the data itself, such as domain name (usually a pointer to other information in the database), or IP address. *Id.* at 11–13.

An example of resource records, with class and time-to-live data omitted, is provided as follows:

```
ISI.EDU.          MX      10 VENERA.ISI.EDU.
                  MX      10 VAXA.ISI.EDU.
VENERA.ISI.EDU.   A       128.9.0.32
                  A       10.1.0.52
VAXA.ISI.EDU.     A       10.2.0.27
                  A       128.9.0.33
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Id. at 14. In this example above, ISI.EDU has two "mail exchange" records, which point to sub-domains, each of which has two IP addresses associated with it. *See id.* at 12–13.

In the DNS system, the "response by the name server either answers the question posed in the query, refers the requester to another set of name servers, or signals some error condition." *Id.* at 16. Further, a "given name server will typically support one or more zones, but this gives it authoritative information about only a small section of the domain tree. It may also have some cached non-authoritative data about other parts of the tree." *Id.* at 19. The "authoritative data for a zone is simply all of the RRs attached to all of the nodes from the top node of the zone down to leaf nodes or nodes above cuts around the bottom edge of the zone." *Id.* at 20. Thus, "a zone can be completely described in terms of a set of RRs. Whole zones can be transferred between name servers by transferring the RRs." *Id.*

2. Neimat (Ex. 1004)

Neimat concerns "generating a correct memory address from a character or digit string such as a record key." Ex. 1004, 1:6–9. Petitioner asserts that Neimat discloses "the particular method of scaling capacity or transaction rate capability recited." Pet. 44.

Neimat describes a system that "generate[s] a correct memory address from a character or digit string such as a record key value, and which is adapted for use in distributed or parallel processing architectures such as computer networks, multiprocessing systems, and the like." Ex. 1004, 4:41–46. In Neimat's system, "[r]ecords of the database are stored at memory locations or 'buckets' provided by file servers. In accordance with a preferred embodiment of the present invention, a number of servers is large, for example in a range of 10 to 10,000 servers." *Id.* at 4:53–57. Then, "the client initiating the operation provides a record key value, [f]rom the record key value, the method of the present invention provides a correct memory address needed to perform the database operation." *Id.* at 5:23–29.

Neimat discloses that "[i]f memory location 0 becomes full, then what is known as a 'collision' occurs." *Id.* at 13:26–27. If that condition occurs, "locations available for storage [are] gradually increased as needed by a process of 'splitting' a respective predetermined one of the memory locations or 'buckets.'" *Id.* at 13:28–32. Then, Neimat's system proceeds by "moving approximately half of the records from the respective predetermined memory location to the respective new memory location." *Id.* at 13:32–37.

3. Venkatasubramanian (Ex. 1005)

Venkatasubramanian, a conference paper, defines various policies for load management in distributed video servers. Ex. 1005, 1. The paper proposes "a predictive placement policy that determines the degree of replication necessary for popular videos using a cost-based optimization procedure based on a priori predictions of expected subscriber requests." *Id.* The paper concludes that "[p]erformance evaluations indicate that a load

management procedure which uses a judicious combination of the different policies performs best for most server configurations." *Id.*; *see also id.* at 535 (concluding that "policies that utilize a combination of the predictive placement, adaptive scheduling, eager replication, and lazy dereplication policies perform well in most server configurations"). The paper provides an example which "illustrates a case in which localization (i.e., minimizing the number of copies) of a video object, Vi, actually leads to improved server throughput." *Id.* at 529. The paper points out, though, that "if additional requests are received for V_1, replication becomes essential. In general, the exact load management mechanism has to be decided depending upon the current utilization of resources in the data sources of the video server and the expected subscriber requests including buffer memory and CPU processing power." *Id.*

D. Asserted Anticipation of Claims 1, 3, 6, 10, 14, and 31 by RFC1034

1. Claim 1

Independent claim 1 recites, in relevant part, "a first set of location information corresponding to at least one entity, the location information comprising an identifier." Ex. 1001, 25:27–29. Independent claim 1 further recites "the identifier identifies an entity." *Id.* at 25:31.

Petitioner contends RFC1034 discloses the claimed identifier and entity. Pet. 19–20, 22–23. In particular, Petitioner contends the claimed "[i]dentifier corresponds to DNS domain names. Hosts and mailboxes are identified by identifiers—their domain names." (Ex. 1003, 1, 6, 7, 8; Ex. 1002 ¶ 75). Thus, Petitioner alternatively contends that a "host" meets the claimed entity with its corresponding domain name as the claimed identifier or a "mailbox" meets the claimed entity with its corresponding

domain name as the claimed identifier. Pet. 23 ("In RFC1034, the 'identifier' (domain name) identifies an 'entity' (host or mailbox).").[5]

With regard to Petitioner's host theory, Petitioner states, "[f]or example, venera.isi.edu is such a domain name for a host." Pet. 20. Petitioner's declarant, Dr. Weissman, in turn states, "[h]ost computers and mailbox entities are identified by a unique domain name." Ex. 1002 ¶ 75 (citing Ex. 1003, 6, 7, 8). Petitioner and Dr. Weissman reproduce a table from RFC1034 in support of their argument.

For example, we might show the RRs carried in a message as:

ISI.EDU.	MX	10 VENERA.ISI.EDU.
	MX	10 VAXA.ISI.EDU.
VENERA.ISI.EDU.	A	128.9.0.32
	A	10.1.0.52
VAXA.ISI.EDU.	A	10.2.0.27
	A	128.9.0.33

Ex. 1002 ¶ 88; Pet. 20. As discussed above, the table above represents a resource record from RFC1034, with highlighting applied in Dr. Weissman's declaration. *Id.* Relying on this table, Dr. Weissman contends, "[a] person of ordinary skill understands that the IP address is used by Internet routers to locate the specific entity in question." *Id.*

Absent from Petitioner's arguments is clear explanation of how a "host" as disclosed in RFC1034 meets the claimed entity and how a domain name (i.e., the "identifier") identifies a single host. The Petition's cursory treatment of these claim elements refers only to a "host" without detailing what is described by RFC1034's use of "host." Pet. 19–20, 22–23. Dr. Weissman clarifies that Petitioner's theory refers to "host computer"

[5] Petitioner further contends that an RFC1034 "resource" or "object" may also meet the claimed entity, but offers no analysis of how either is identified by an identifier as claimed. Pet. 19–20.

(Ex. 1002 ¶ 75); however, Dr. Weissman's clarification does not resolve the failure of Petitioner to account for the required relationship between a host computer (i.e., entity) and a domain name (i.e., identifier). Pet. 19–20, 22–23; Ex. 1002 ¶¶ 75, 88. We construed above the claim term "identifier" to mean "a unique encoding that identifies an individual entity, and with which zero or more data location specifiers are associated in a location server." *See supra* Section II. As Patent Owner correctly contends, Petitioner and Dr. Weissman fail to explain how a given domain name identifies only one host computer of RFC1034. Prelim. Resp. 35. To the contrary, the resource record for the domain name on which Petitioner and Dr. Weissman rely, venera.isi.edu, describes only that the domain resolves to two IP addresses, namely 128.9.0.32 and 10.1.0.52, which Petitioner cites as meeting the claimed "at least one location string," not the claimed "entity." Ex. 1003, 14; Pet. 20, 28. Petitioner's brief discussion of this disclosure does not explain how the domain venera.isi.edu allegedly identifies only a single host.

Petitioner's mailbox theory similarly fails to account for the required relationship between a mailbox (i.e., entity) and a domain name (i.e., identifier). Petitioner states, "[i]n the above example, venera.isi.edu is the domain name associated with email addresses ending in 'isi.edu.'" Pet. 19. The disclosure of RFC1034, however, does not support Petitioner's assertion. RFC1034 describes returning the record reproduced below in response to a "mailer tying to send mail to Mockapetris@ISI.EDU [by asking] the resolver for mail information about ISI.EDU, resulting in a query for QNAME=ISI.EDU, QTYPE=MX, QCLASS=IN" (Ex. 1003, 17):

```
ISI.EDU.        MX      10 VENERA.ISI.EDU.
                MX      10 VAXA.ISI.EDU.
```

The response record reproduced above shows the domain name ISI.EDU to be associated with two mail exchanges, namely venera.isi.edu and vaxa.isi.edu. *Id.* Thus, contrary to Petitioner's argument, RFC1034 describes that in response to requesting "mail information about ISI.EDU . . . [t]he response's answer section would be" both venera.isi.edu and vaxa.isi.edu, not only venera.isi.edu, as Petitioner contends. *Id.* Petitioner's theory fails to account for vaxa.isi.edu and explain how the entity/identifier relationship is allegedly disclosed in light thereof.

Petitioner and Dr. Weissman, thus, fail to account for the identifier recited in claim 1. Accordingly, we determine Petitioner has failed to show a reasonable likelihood of success in challenging claim 1 as anticipated by RFC1034.

2. Claims 3, 6, 10, 14, and 31

Claims 3 and 6 depend ultimately from independent claim 1. Petitioner relies on RFC1034 to meet the identifier recited in these claims, as discussed above in the context of claim 1. Pet. 30–32. Accordingly for the same reasons discussed above, we determine Petitioner has failed to show a reasonable likelihood of success in challenging these claims as anticipated by RFC1034.

Claims 10, 14, and 31 are each independent and each recite an "identifier." Ex. 1001, 26:27–37 (claim 10 recites responding "to a location query for a desired identifier" by searching "location information corresponding to a plurality of entities"), 26:58–63 (claim 14 recites responding to a "location query requesting an entity's location" by searching location information including "a plurality of identifiers"), 28:51–52 (claim 31 recites "manipulating an identifier . . . wherein the identifier

uniquely specifies an entity"). Petitioner relies on RFC1034 to meet the identifier recited in these claims, as discussed above in the context of claim 1. Pet. 32–39. Accordingly for the same reasons discussed above, we determine Petitioner has failed to show a reasonable likelihood of success in challenging these claims as anticipated by RFC1034.

E. Asserted Obviousness of Claims 6, 17, 23, 24, and 30 Alone or in Combination with Various Other References

Petitioner's obviousness allegations regarding claim 6 do not address the claimed identifier and thus do not repair the deficiencies discussed above in the context of claim 1. Pet. 41. Accordingly for the same reasons discussed above, we determine Petitioner has failed to show a reasonable likelihood of success in challenging this claim as obvious over RFC1034.

Independent claim 17 recites a "location store comprising a plurality of identifiers, each identifier associated with at least one location." Ex. 1001, 27:35–37. Claims 23, 24, and 30 depend ultimately from claim 17. Petitioner's obviousness argument for these claims relies on RFC1034 to meet the recited identifier in the same manner discussed above in the context of claim 1. Pet. 44, 51, 58. Accordingly for the same reasons discussed above, we determine Petitioner has failed to show a reasonable likelihood of success in challenging these claims as obvious over RFC1034 and Neimat, and, in the case of claim 24, over RFC1034, Neimat, and Venkatasubramanian.

IV. CONCLUSION

Having reviewed the record before us, we are not persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing with respect to any one of the challenged claims and, therefore, we do not institute the requested *inter partes* review.

V. ORDER

It is, therefore,

ORDERED that the Petition is *denied*; and

FURTHER ORDERED that the requested *inter partes* review is not instituted with respect to any claim of the '978 patent.

FOR PETITIONER:

Michael Babbitt
mbabbitt@jenner.com
Lisa Schoedel
lschoedel@jenner.com

FOR PATENT OWNER:

Khue Hoang
khoang@reichmanjorgensen.com
Michael Flanigan
mflanigan@reichmanjorgensen.com

PTO/AIA/81B (07-13)
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REEXAMINATION OR SUPPLEMENTAL EXAMINATION – PATENT OWNER POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS FOR REEXAMINATION OR SUPPLEMENTAL EXAMINATION AND PATENT		
	Control Number(s)	90019034
	Filing Date(s)	November 19, 2021
	First Named Inventor	John K. Overton
	Title	
	Patent Number	7233978
	Examiner Name	Joshua D. Campbell
	Attorney Docket No(s)	KOVE-978EPR034

I. **Power of Attorney**. This form may be used to change the Power of Attorney in a reexamination or supplemental examination proceeding (or multiple proceedings where merged). This form may also be used to change the Power of Attorney in the patent file; in such a case, a copy of this form will be placed in both the patent file and the reexamination or supplemental examination proceeding.

A. Revocation of Previous Power of Attorney. I hereby revoke all previous patent owner powers of attorney, if any, given:

☒ in the above-identified reexamination or supplemental examination proceeding control number(s) (more than one may be changed only if the proceedings are merged).

☐ in the file of the above-identified patent.

(check BOTH boxes if change in BOTH the patent file and the reexamination or supplemental examination proceeding is requested).

B. Designation of Power of Attorney.

☐ A Power of Attorney is submitted herewith.

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☒ I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right as my/our attorney(s) or agent(s) to prosecute the proceeding(s)/patent identified above and selected in section I(A), and to transact all business in the United States Patent and Trademark Office connected therewith:

184647

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Authorization for the Power of Attorney is provided by the signature on page 2 of this form.

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 update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 15 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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III. Authorization for Power of Attorney and (if selected) Change of Correspondence Address

I am the:
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OR
☒ Patent owner.
Statement under 37 CFR 3.73(c) (Form PTO/AIA/96) submitted herewith or filed on _____.

Signature of Inventor or Patent Owner		Date	2021-12-17
Name	John K. Overton	Telephone	312-850-3147
Title and Company	CEO, Kove IO, Inc.		

NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.

☐ A total of _____ forms are submitted. *If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

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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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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Kove IO, Inc.

Application No./Patent No.: 7233978 Filed/Issue Date: June 19, 2007

Titled: METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORKSEPARATE FROM THE DATA TO WHICH THE LOCATION INFORMATION PERTAINS

Kove IO, Inc., a Delaware corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ 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 _____, Frame _____, or for which a copy thereof is attached.

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: the inventors To: OVERX, INC.

   The document was recorded in the United States Patent and Trademark Office at

   Reel 012175, Frame 0847, or for which a copy thereof is attached.

2. From: OVERX, INC. To: ECONNECTIX, LLC

   The document was recorded in the United States Patent and Trademark Office at

   Reel 014254, Frame 0049, or for which a copy thereof is attached.

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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STATEMENT UNDER 37 CFR 3.73(c)

3. From: ECONNECTIX, LLC To: ECONNECTIX, CORPORATION

The document was recorded in the United States Patent and Trademark Office at
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4. From: ECONNECTIX, CORPORATION To: KOVE CORPORATION

The document was recorded in the United States Patent and Trademark Office at
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5. From: KOVE CORPORATION To: KOVE IO, INC.

The document was recorded in the United States Patent and Trademark Office at
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6. From: KOVE IO, INC. To: ARCTIDE, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 036831, Frame 0804, or for which a copy thereof is attached.

☑ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(c)(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.

Signature	Date: 2021-12-17
John K. Overton	CEO
Printed or Typed Name	Title or Registration Number

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STATEMENT UNDER 37 CFR 3.73(c) – SUPPLEMENTAL SHEET

7. From: ARCTIDE, LLC To: KOVE IO, INC.

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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 Acknowledgement Receipt	
EFS ID:	44553642
Application Number:	90019034
International Application Number:	
Confirmation Number:	3927
Title of Invention:	METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK SEPARATE FROM THE DATA TO WHICH THE LOCATION INFORMATION PERTAINS
First Named Inventor/Applicant Name:	7233978
Correspondence Address:	BRINKS HOFER GILSON & LIONE - P.O. BOX 10395 - CHICAGO IL 60610 US - -
Filer:	Philip Joseph Eklem
Filer Authorized By:	
Attorney Docket Number:	
Receipt Date:	17-DEC-2021
Filing Date:	19-NOV-2021
Time Stamp:	18:39:26
Application Type:	Reexam (Patent Owner)

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	Power of Attorney	90019034_7233978_poa.pdf	2373996 f0cc663d0e868ecbb4f5c89e149b77609ffcd168	no	3
Warnings:					
Information:					
2	Assignee showing of ownership per 37 CFR 3.73	90019034_7233978_37CFR373c_w_Supp.pdf	2662312 6eb7eca3e6b7339c7715c2a47239036395be6106	no	4
Warnings:					
Information:					
		Total Files Size (in bytes):	5036308		

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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.

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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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/872,736	06/01/2001	John K. Overton	10406/49

CONFIRMATION NO. 3927

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

POWER OF ATTORNEY NOTICE

OC000000130711034

Date Mailed: 12/28/2021

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/17/2021.

- 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).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/872,736	06/01/2001	John K. Overton	10406/49

CONFIRMATION NO. 3927

184647
Reichman Jorgensen Lehman & Feldberg LLP
100 Marine Parkway
Suite 300
Redwood City, CA 94065

POA ACCEPTANCE LETTER

OC000000130711561

Date Mailed: 12/28/2021

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/17/2021.

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.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

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PTO/AIA/123 (08-12)
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Patent Number	7233978
Issue Date	June 19, 2007
Application Number	09872736
Filing Date	June 1, 2001
First Named Inventor	John K. Overton
Attorney Docket Number	KOVE-978EPR034

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☑ The address associated with Customer Number: 184647

OR

☐ **Firm *or* Individual Name**

Address

City | **State** | **ZIP**

Country

Telephone | **Email**

This form cannot be used to change the data associated with a Customer Number. To change the data associated with an existing Customer Number use "Request for Customer Number Data Change" (PTO/SB/124).

This form will not affect any "fee address" provided for the above-identified patent. To change a "fee address" use the "Fee Address Indication Form" (PTO/SB/47).

I am the:

☑ Patentee.

☑ If the Patentee was not the applicant for patent (37 CFR 1.42), then a Statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is enclosed or was filed on _____. See 37 CFR 3.71.

☐ Attorney or agent of record. Registration Number _____.

☐ Patent practitioner acting in a representative capacity whose correspondence address is the correspondence address of record. Notice has been given to the patentee or owner. Registration Number _____.

Signature

Typed or Printed Name John Overton

Date 2022-01-11 | Telephone 312-850-3147

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. 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 1.33. 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: Mail Stop Post Issue, 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.

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.

PTO/AIA/96 (08-12)
Approved for use through 11/30/2020. 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 displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Kove IO, Inc.

Application No./Patent No.: 7233978 Filed/Issue Date: June 19, 2007

Titled: METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORKSEPARATE FROM THE DATA TO WHICH THE LOCATION INFORMATION PERTAINS

Kove IO, Inc., a Delaware corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ 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 _____, Frame _____, or for which a copy thereof is attached.

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: the inventors To: OVERX, INC.

The document was recorded in the United States Patent and Trademark Office at Reel 012175, Frame 0847, or for which a copy thereof is attached.

2. From: OVERX, INC. To: ECONNECTIX, LLC

The document was recorded in the United States Patent and Trademark Office at Reel 014254, Frame 0049, or for which a copy thereof is attached.

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.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/AIA/96 (08-12)
Approved for use through 11/30/2020. 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 displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: ECONNECTIX, LLC To: ECONNECTIX, CORPORATION

The document was recorded in the United States Patent and Trademark Office at
Reel 023373, Frame 0833, or for which a copy thereof is attached.

4. From: ECONNECTIX, CORPORATION To: KOVE CORPORATION

The document was recorded in the United States Patent and Trademark Office at
Reel 036886, Frame 0111, or for which a copy thereof is attached.

5. From: KOVE CORPORATION To: KOVE IO, INC.

The document was recorded in the United States Patent and Trademark Office at
Reel 036888, Frame 0700, or for which a copy thereof is attached.

6. From: KOVE IO, INC. To: ARCTIDE, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 036831, Frame 0804, or for which a copy thereof is attached.

☑ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(c)(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.

Signature	Date: 2021-12-17
John K. Overton	CEO
Printed or Typed Name	Title or Registration Number

STATEMENT UNDER 37 CFR 3.73(c) – SUPPLEMENTAL SHEET

7. From: ARCTIDE, LLC To: KOVE IO, INC.

The document was recorded in the United States Patent and Trademark Office at Reel 046131, Frame 0507, or for which a copy thereof is attached.

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.

Electronic Acknowledgement Receipt	
EFS ID:	44719110
Application Number:	09872736
International Application Number:	
Confirmation Number:	3927
Title of Invention:	METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK SEPARATE FROM THE DATA TO WHICH THE LOCATION INFORMATION PERTAINS
First Named Inventor/Applicant Name:	John K. Overton
Customer Number:	184647
Filer:	Philip Joseph Eklem
Filer Authorized By:	
Attorney Docket Number:	10406/49
Receipt Date:	11-JAN-2022
Filing Date:	01-JUN-2001
Time Stamp:	15:38:40
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	Change of Address	2022-01-11--SIGNED--CoA--978.pdf	1766227 2619c7933ba48d76d8709512ce5de753c15a4484	no	2
Warnings:					

Information:					
2	Assignee showing of ownership per 37 CFR 3.73	90019034_7233978_37CFR373c_w_Supp.pdf	2662312 6eb7eca3e6b7339c7715c2a47239036395be6106	no	4
Warnings:					
Information:					
			Total Files Size (in bytes):	4428539	

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.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
09/872,736	**01/31/2024 03:12:36 PM Z ET**	**10406/49**

Title of Invention

METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK SEPARATE FROM THE DATA TO WHICH THE LOCATION INFORMATION PERTAINS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	7233978
CONFIRMATION #	3927	FILED BY	Naveed Hasan
PATENT CENTER #	64158612	AUTHORIZED BY	-
CUSTOMER #	184647	FILING DATE	06/01/2001
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	John K. Overton

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 7593	**E20241UF14107100**	**Naveed Hasan**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1462	PETITIONS REQUIRING THE PETITION FEE SET FORTH IN 37 CFR 1.17(F) (GROUP I)	420.00	1	420.00
			TOTAL AMOUNT:	**$420.00**

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 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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Patent of John K. Overton et al.

Patent No.: 7,233,978

Application No.: 09/872,736

Filing Date: June 1, 2001

Title: Method and Apparatus for Managing Location Information in a Network Separate from the Data to which the Location Information Pertains

PATENT OWNER'S PETITION FOR REQUESTING A DUPLICATE COPY OF THE LETTERS OF PATENT, PURSUANT TO 37 C.F.R. § 1.182

Mail Stop Petitions
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Patent Owner hereby petitions the Commissioner of Patents to request a duplicate copy of the letters of patent for U.S. Patent No. 7,233,978 ('978 patent). A fee of $420.00 in accordance with 37 CFR 1.17(f) is submitted herewith.

Relief Requested by This Petition

Patent Owner requests a request a duplicate copy of the letters of patent for '978 patent because the original letters of patent were destroyed by dark-colored liquid spilling onto the original letters of patent. Patent Owner requests the duplicate copy of the letters of patent to be sent to:

Reichman Jorgensen Lehman & Feldberg LLP
Attn: Gina Cremona
100 Marine Parkway, Suite 300
Redwood Shores, CA 94065
(650) 623-1401

Respectfully submitted,

Date: January 31, 2024

By /Khue V. Hoang/
Khue V. Hoang
Reg. No. 44,767
REICHMAN JORGENSEN LEHMAN
& FELDBERG LLP
Counsel for Patent Owner

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
09/872,736	**01/31/2024 03:12:36 PM Z ET**	**10406/49**

Title of Invention

METHOD AND APPARATUS FOR MANAGING LOCATION INFORMATION IN A NETWORK SEPARATE FROM THE DATA TO WHICH THE LOCATION INFORMATION PERTAINS

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	7233978
CONFIRMATION #	3927	FILED BY	Naveed Hasan
PATENT CENTER #	64158612	FILING DATE	06/01/2001
CUSTOMER #	184647	FIRST NAMED INVENTOR	John K. Overton
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
978 Patent - Petition Under 1.182 to Request Duplicate Ribbon Copy.pdf	2	Petition for review by the Office of Petitions	82 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
978 Patent - Petition Under 1.182 to Request Duplicate Ribbon Copy.pdf	E90FE10FC041159A705C8DEF258F07CD6942AE1BDF5D4EC3 1B70E4FA126FD86D156447B8E589E38AA687A12C8625068CF 8E86590CE7B1A6AF8C1EF820CFBC179

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 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.

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.
09/872,736	06/01/2001	John K. Overton	10406/49	3927

184647 7590 02/20/2024

Reichman Jorgensen Lehman & Feldberg LLP
100 Marine Parkway
Suite 300
Redwood City, CA 94065

EXAMINER	
KANG, PAUL H	

ART UNIT	PAPER NUMBER
2144	

NOTIFICATION DATE	DELIVERY MODE
02/20/2024	ELECTRONIC

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.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@reichmanjorgensen.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

In re Patent No. 7,233,978	:	
Issue Date: June 19, 2007	:	
Application No. 09/872,736	:	DECISION ON PETITION
Filed: June 01, 2001	:	
Attorney Docket No. 10406/49	:	

This is a decision on the petition under 37 CFR 1.182, filed January 31, 2024, requesting issuance of duplicate Letters Patent for the above-identified patent.

The petition is **GRANTED**.

The Office of Data Management is directed to issue duplicate Letters Patent.

As authorized, the $420.00 fee for the petition under 37 CFR 1.182 has been assessed to petitioner's credit card.

Telephone inquiries concerning this decision may be directed to Dale Hall at (571) 272-3586.

Inquiries regarding the issuance of duplicate Letters Patent may be directed to Rochaun Hardwick at 571-272-4200 in the Office of Data Management.

A copy of this decision is being sent to Office of Data Management for issuance of duplicate Letters Patent.

/Michelle R. Eason/
Michelle R. Eason
Lead Paralegal Specialist
Office of Petitions

cc: Rochaun Hardwick, Randolph Square, 9th Floor, Room D33 (Fax No. ((571) 270-9958).