

UTILITY/PLANT PATENT APPLICATION TRANSMITTALAttorney Docket No. **1505-1090**

(Only for new nonprovisional applications under 37 CFR 1.53(b))

To the Director of Patents

Transmitted herewith for filing is the patent application of:

Inventors: **Jim SUNDQVIST, Erik LUNDGREN**

Corresponding to Patent Application No. _____ filed on _____, the entirety of which application is hereby expressly incorporated by reference in the accompanying application.

Title: **METHOD AND ARRANGEMENTS IN AN IP NETWORK**

Enclosed are:

- ☒ **28** Pages of Specification containing **24** claims, **4** Sheets of Drawings and an Abstract of the Disclosure.
- ☐ Submission of English translation of prior provisional application under 37 CFR 1.78(a)(5)
- ☐ Newly executed Oath or Declaration/Power of Attorney
- ☐ Copy of Oath or Declaration/Power of Attorney from a prior application (continuation/divisional)
- ☐ The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied as indicated in the preceding box, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
- ☐ Deletion of inventor(s). A signed statement attached deleting inventor(s) named in the prior application (see 37 CFR 1.63 (d)(2) and 1.33(b))
- ☒ Application Data Sheet under 37 C.F.R. § 1.76
- ☐ Assignment Papers (cover sheet & document(s))
- ☐ An assignment to _____ for parent application no. _____ was recorded on _____ at Reel _____, Frame _____
- ☐ Information Disclosure Statement (IDS) w/PTO-1449 - ☐ Copy of IDS citations
- ☒ Preliminary Amendment
- ☒ Itemized Return Receipt Postcard
- ☐ Certified Copy of Priority Document(s)
- ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)
- ☐ Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
- a. ☐ Computer Readable Form (CRF)
- b. Specification Sequence Listing on:
- i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ paper
- c. ☐ Statement verifying identity of above copies
- ☐ Other Attachment: _____

113002 U.S. PTO
11/315293

Y&T December 23, 2005

UTILITY/PLANT PATENT APPLICATION TRANSMITTAL (continued)	Attorney Docket No. 1505-1090
If a CONTINUING APPLICATION, check appropriate box, and supply requisite information below and in a preliminary amendment or in an Application Data Sheet under 37 CFR 1.76: ☐ Continuation ☐ Divisional ☐ Continuation-in-part of Prior Appln. # Prior Application Information: Examiner: Tech Center:	
CORRESPONDENCE INFORMATION	
Customer Number: 00466	Correspondence Address: Young & Thompson 745 South 23 rd Street, Second Floor Arlington, VA 22202 Telephone (703) 521-2297 Facsimile (703) 979-4709

☐ Applicant claims small entity status under 37 C.F.R. § 1.27

The filing fee has been calculated as follows:

Two filing fees have been calculated as follows:

BASIC FILING FEES				Fee Description	Fee Paid
Large Entity		Small Entity			
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1011	300	2011	150	Utility filing fee	\$300.00
1111	500	2111	250	Utility search fee	\$500.00
1311	200	2311	100	Utility examination fee	\$200.00
1013	200	2013	100	Plant filing fee	\$0.00
1113	300	2113	150	Plant search fee	\$0.00
1313	160	2313	80	Plant examination fee	\$0.00
SIZE FEE size fee each additional 50 sheets in excess of 100				Additional Sheets $28 - 100 = 0 = 0 \times$ 50	Fee From Below <u>\$125.00</u> \$0.00
EXTRA CLAIM FEES Independent Claims				Extra Claims $7 - 3 = 4 \times$	<u>\$200.00</u> \$800.00
Total Claims				<u>24</u> - 20 = <u>4</u> X	<u>\$50.00</u> \$200.00
Multiple Dependent					\$0.00
Large Entity		Small Entity		Fee Description	
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1081	250	2081	125	Utility Size fee sheets in excess of 100	
1083	250	2083	125	Plant Size fee sheets in excess of 100	
1201	200	2201	100	Independent claims in excess of 3	
1202	50	2202	25	Claims in excess of 20	
1203	360	2203	180	Multiple dependent claim	
ADDITIONAL FEES					
Fee Code	Fee (\$)	Fee Description			
8021	40	Recording each patent assignment per property			\$0.00
TOTAL					\$2,000.00

- ☒ A Check in the amount of **\$2,000.00** to cover all fees is attached.
- ☐ The Director is hereby authorized to charge indicated fees and credit any overpayment to Deposit account No. 25-0120 in the name of Young & Thompson, as described below. A duplicate copy of this sheet is enclosed.
- ☒ The Director is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fee required under 37 C.F.R. §§ 1.16 or 1.17.


 Benoit Castel, Reg. No. 35,041
 745 South 23rd Street
 Arlington, VA 22202
 Telephone (703) 521-2297

BC/gw
 Date: **December 23, 2005**

Method and arrangements in an IP network

FIELD OF THE INVENTION

The present invention relates to methods and arrangements in an IP network, in particular for initiating a multicast media distribution.

BACKGROUND OF THE INVENTION

The Internet and Internet Protocol (IP) networks have had a tremendous growth over the past decades. The simplicity and flexibility are the major advantages with the IP technology compared to traditional telecommunication technologies such as circuit-switched networking and ATM. The IP technology is packet-based and has been designed to keep the network infrastructure simple and open to support a variety of applications, while the intelligence have been moved to the clients connected to the networks. The network infrastructure has one major task, which is to forward data from a sending client to at least one receiving client. The sending client has the major task to pack the information it would like to send to the receiving client(s) and address it accordingly so it can be forwarded towards the receiving client(s) by the network infrastructure. The receiving client(s) has its major task as putting together the received data to reproduce the information that was sent by the sender. A receiving client may for example be a set-top-box (STB) or a PC equipped with an application capable of receiving media streams whereas a sending client is typically an application framework or integrated content portal/content server. The network infrastructure comprised of e.g. routers, switches, Broadband

Remote Access Servers (BRAS), access nodes or other network elements has no knowledge about the information that is being sent from the sending client to the receiving client(s), thereby it can be seen as simple. Among the advantages with having this approach for the network infrastructure can be mentioned low cost and openness. Since the network infrastructure does not know what the data is that is being sent, it is up to the sending client and receiving client(s) to develop different applications for different purposes.

This design has made it possible to run so called multi-service networks, i.e. a wide variety of applications can run over the same network infrastructure. Initially, applications were text messages (e-mail) and non real-time critical file transfers. Today the Internet is being used for a huge variety of applications including real-time applications such as IP telephony and video on demand over broadband networks. Offerings from the broadband operators are referred to as Triple play, where the customer gets telephony, video and data over the same broadband connection. Media content distribution is achieved by combining an element of control sometimes referred to as session control or application framework with an element of distribution, content server or servers. The application framework handles the session control interaction between the sending clients and receiving clients and mediates between clients and content servers. The content server and application framework may be integrated or separated both logically and geographically.

For applications such as telephony, video and broadcast TV the source information must be adapted to be able to be transmitted over IP networks. Continuous source information is segmented into appropriate information blocks (e.g. speech frames and video frames) and for each block the information is encoded by a source encoder, packet into an IP packet and then

sent to the receiving client(s) where these decode the information to reproduce the original information.

Encoding information in each information block can be made independently of previous and following information blocks. However, information between current information block and previous and/or following information block are usually more or less correlated. By using this property one can reduce the amount of data needed to encode the source information through the use of predictive or differential coding.

Today, many of the compression schemes that exist for media encoding relies on predictive coding whereby the difference between the reproduced signal and its prediction is transmitted instead of transmitting the reproduction, frame by frame. A typical example is MPEG video (as described for example in ISO IEC 13818-2 Information technology - Generic coding of moving pictures and associated audio information - Part 2: Video ISO/IEC JTC 1/SC 29 N 635) which is incorporated herein as a reference. The transmitted frame types are divided in three different subcategories, I-frames, P-frames and B-frames which are illustrated in **figure 1**.

The I-frame, referred to as the key frame, is a self-contained item of data i.e. it has no references to any other frames and is as such a directly reproducible and represents a complete image while the P-frames are encoded representations of the difference between the contents of the current frame and the previous I- or P-frame. The B-frames are the encoded representations of the bidirectional difference between the previous I- or P-frame and the next I- or P-frame whichever is closest.

Predictive/differentially coded media suffers from the drawback that it is required to wait for the next key frame before reproduction (play out) can begin since the key frame is the only frame type that can be reproduced without any other information. The decoder typically buffers or discards data until a key frame is received after which reproduction can begin. Depending on the level of compression and compression method used, this can take anywhere from a few milliseconds up to several seconds.

For distributing media streams e.g. video in IP networks, there are currently basically two different methods called unicast and multicast.

Unicast describes the method whereby each client receives its own copy of the media stream and the media stream can not be shared between different clients. Even though one server can serve many clients, the media streams are separate, i.e. one instance per receiver. This method is typically used to provide services such as video-on-demand (VoD) where a user controlling the client may want to start a media stream at any instant and where the user may want to fast-forward/rewind or pause the stream at any time. The advantage of using unicast is that all clients may have their own copy of the media stream. The disadvantage of unicast is that for each new instance of the same media stream, additional bandwidth is required, leading to scalability problems for large deployments.

Multicast, in contrast to unicast, describes a method whereby a plurality of clients can receive a media stream simultaneously, i.e. one sender transmits the same media flow to the plurality of receiving clients. The plurality of the receiving clients constitutes a multicast group. That implies that multicast is a very resource efficient method and is

typically used to provide live broadcasts to one or more recipient at a time.

Thus, providing bandwidth efficient live broadcast media streams in IP networks requires multicast to avoid having to duplicate the same information for all clients currently sharing the same media flow.

For unicast distribution of differentially coded media, the sender can guarantee that the first transmitted item of data is a key frame and as such suitable for immediate reproduction. If differentially coded media is distributed using multicast, the receiver can get no guarantees about what type of frame it will first encounter since the receiver in effect typically subscribes (latches on) to an ongoing media stream and the first received frame may be of any type transmitted. If the first received frame is not a key frame, it references a frame already sent but since this non key frame was the first frame encountered by the receiver, the reference has not been received and the receiver must wait for the next transmitted key frame which will cause a delay of the reproduction.

As stated above, the bandwidth efficient multicast media distribution is required for live broadcast media streams in IP networks. However, media such as video are usually differentially coded which implies that multicast causes that the receiver must wait for a key frame before it can reproduce the information. This could be perceived by the user as a delay. It would therefore be desired to utilize the property of the unicast distribution to immediately start the reproduction of the unicast distribution for differentially coded media.

To combine the bandwidth efficiency of the multicast media distribution with the ability to immediately start the reproduction of the unicast distribution for differentially coded media, both distribution methods (unicast and multicast) can be used in combination. I.e. a unicast media distribution is initiated and a multicast distribution are also initiated if there is no existing multicast stream to synchronize with. The unicast distribution is ongoing until the initiated multicast distribution is ready to start or when synchronization with an already existing multicast stream is completed, i.e. when the key frame is received. Thus, the media receiver is first served a unicast stream and the receiver can initiate play out from the unicast stream immediately while waiting for the multicast transmission to be able to start if the multicast transmission is not available or while waiting for synchronizing with an already existing multicast transmission. When the multicast transmission is initiated, data is buffered until enough information is available, i.e. at least when a next key frame is received, and then the client switches from reproducing data from the unicast stream to reproducing data from the multicast stream. Additional buffering may also be desired. The unicast stream may then be dropped when the multicast stream itself can continue to reproduce the media. Thus, the advantages of both the unicast distribution and the multicast distribution can be achieved. This procedure also enables very fast media changes such as channel changes. This procedure is referred to as "Media Quick Start" in this description.

Since unicast media distribution is less bandwidth efficient than multicast distribution, a plurality of unicast media distributions requires much more resources than one multicast distribution. Hence, problems occur when the media server gets a request that would result in Media Quick Start unicast data from a client in an already congested network or a network

that will experience congestion if the resulting unicast traffic should be admitted into the network. If the request is denied, the media distribution can not start, even if client would have been able to receive media from the multicast distribution. If the request is granted, the network will be congested to the point where the admitted traffic can affect already existing traffic admitted before the congestion occurred thus adversely affecting the Quality of Experience for all users of the network in question. It is therefore desired to achieve an improved solution for a Media Quick Start such that additional data transmission in an already congested network is avoided. Without this improvement, service for other users will be disrupted by the additional data.

SUMMARY OF THE INVENTION

As stated above, the multicast distributed media streams (i.e. the broadcast or media-on-demand streams) from e.g. an IPTV solution are usually encoded by state-of-the-art coding techniques using predictive or differential coding. Predictive and differential coding methods both need a reference frame to start from. That implies that the receiver has to wait for the reference frame until it can reproduce and play out the received data which could be perceived by the user as a delay. For e.g. an IPTV solution, it is possible to start the media requiring multicast distribution by using a Media Quick Start. That results in that the receiver can start play out immediately thanks to the unicast distribution that does not suffer from the delay as the multicast distribution. However, this requires that an additional unicast distribution is initiated in addition to the requested multicast distribution, which may result in disruption of services for other users if the current network is congested.

The present invention solves that by providing feedback information to the application framework e.g. the IPTV server, regarding the resource availability between the sender and the receiver. Based on this feedback information, the application framework can use the Media Quick Start if enough resources are available, otherwise the application framework can select another more suitable start method that requires less resources.

According to embodiments of the present invention said another behavior is, to deny, or to temporarily deny the requested Media Quick Start.

According to a further embodiment said another behavior is to use the feedback information provided by the resource manager to signal to the client that a Media Quick Start unicast stream for the requested multicast distribution is not available due to resource shortage in the IP network but the client is still allowed to subscribe to the multicast distribution.

An advantage with the present invention is that the network operator is able to get better control of what is happening of the value added services that the network operator enables through the network.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates a typical MPEG stream according to prior art.

Figure 2 shows a schematic example of a network resource map according to prior art.

Figure 3 shows schematically a network with a network resource manager and an application framework according to the present invention.

Figures 4a and 4b shows a flowchart of the methods according to the present invention.

DESCRIPTION OF THE INVENTION

The present invention will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

The present invention is applicable to the situation when a client requests a distribution of a media stream that requires multicast distribution and when the application framework requests resources for a Media Quick Start to start the media distribution.

To start a multicast media distribution by using a combined unicast and multicast media distribution is as stated above referred to as a Media Quick Start. Thus, a Media Quick Start implies that both a unicast media distribution and also a multicast media distribution are initiated if there is no existing multicast media distribution. If there is an existing multicast media distribution, a unicast distribution is initiated but no further multicast distribution but the receiver starts a synchronization procedure with that existing multicast stream. The synchronization procedure is completed when a key frame is received or when the receiving clients determines that the synchronization procedure is completed.

A media stream in this context is a packet data flow comprising audio, video, other media or any combination thereof.

The above mentioned problem with the use of the Media Quick Start is solved by providing feedback information regarding the resource situation in the network between the sender and the receiver to the application framework (e.g. an IPTV server). Based on this feedback information, the application framework can allow Media Quick Start or select another appropriate behaviour to start the media distribution. I.e. if there are enough available resources in the network between the sender and the receiver, Media Quick Start is allowed, otherwise another start behaviour is selected that requires less resources.

The resource situation can be analysed by a network resource manager. The network resource manager is a functional entity in the network that keeps and maintains an updated map of the resources in the network. The resources in the map typically consist of devices and interconnecting elements in the network. Examples of network resources include routers, Digital Subscriber Line Access Modules (DSLAMs), switches, physical wires, optical fiber and many other types of elements. A network resource may also be a partition of a device, network or interconnecting element (logical link).

The network resource manager is described in many different forums under many different names. In some forums, it is referred to as Bandwidth Manager or Bandwidth Broker. ETSI/TISPAN refers to the function as Resource Admission Control Subsystem (RACS). The 3GPP initiative calls it Policy Decision Function (PDF) and ITU denotes it Resource and Admission Control Function (RACF) but the common denominator is that it is an entity in the network that keeps track of the network resources and network resource utilization and/or

performs admission control. This entity is in this description referred to as a network resource manager.

The network resource manager supports application and service frameworks by providing information about the network resources in which the application and service frameworks act. For example, a video server may, when it receives a request for data from a client, reserve resources with the network resource manager for transmission of the requested data. The network resource manager will then add the reserved resources to the current network utilization, thus keeping track of how much of the available resources in the network are in use.

A topologically correct view of the network or contention points is essential for the network resource manager to be able to determine when network resources are exhausted in any parts of the managed network. The topology information can be acquired through interaction with Operation Support Systems (OSSs) and/or active/passive probing of network devices.

Turning now to **figure 2** showing a schematic example of a network resource map 200 arranged to indicate the resource situation 260, i.e. the usage of the network. Interfaces 210, devices 220 and subnets 230, 240 in the network are represented as resources in the map and provisioned with its physical or logical (partitioned) capacity. Capacity is usually measured in bandwidth and logical capacity concerns a provisioned value that can be lower than its physical value. This can be exemplified by the scenario where the network architecture partitions a 100Mbit/s connection in four connections, each having the capacity of 25 Mbit/s. The partitioning can be done in routers and switches and may be modelled by the resource manager. Furthermore, consider the following example of application/network resource manager interaction: When a media server in the media distribution

network gets a media request from a client, it reserves bandwidth by means of the network resource manager that, due to its topology knowledge can track the impact of the additional traffic, that a transmission of the requested media would result in, on all resources or contention points between the sender and receiver. It should be noted that the network resource manager may actively configure a network element or just keep track of reserved resources. However, in the context of the present invention it is enough if the resource manager keeps track of reserved resources, and whether the resource manager actively configure the network elements is beyond the scope of the invention. If the reservation fails due to excessive resource usage anywhere between sender and receiver of the media stream, the request is denied. Thus the congested networks are protected from additional data (i.e. the media request) that would otherwise affect the Quality of Experience for existing sessions.

By participating in multicast control protocols such as Internet Group Management Protocol (IGMP) signalling or acting as an intermediate (proxy) in IGMP snooping or by interaction with the application framework, the network resource manager can be aware of and in some cases even limit the propagation of the multicast information in the network. This allows the network resource manager to keep track of multicast flows in the network which also is needed to keep a correct view of the network resource situation since multicast flows also consume network resources.

Thus the present invention uses a topology-aware network resource manager keeping a resource map of all traffic in the network. The application framework such as video server farm, or an IPTV server, requests resources in the network for a Media Quick Start from the resource manager prior to sending

any additional media streams into the network. The Media Quick Start request implies resources for a unicast distribution and also for resources for the multicast distribution if there is no existing multicast distribution. However, another approach is to specifically partitioning resources for multicast media distribution and just reserve resources for the unicast distribution. Based on the network resource utilization, the network resource manager provides feedback information to the application framework whether or not the requested media stream distribution can be accommodated by all networks between the media distribution site and the receiver. The application framework can then based on the received feedback information select an appropriate way to start distribution of the requested media.

If there are enough resources available in the network according to the received feedback information from the network resource manager, the application framework allows the Media Quick Start, otherwise the application framework selects another behaviour.

Such another behaviour may involve that the application framework denies Media Quick Starts that would otherwise cause congestion in networks between the sender and receiver. Doing so would avoid affecting the Quality of Experience for all users in the congested networks.

According to one embodiment of the present invention, provided the multicast version of the requested media stream is already available "close" to the receiver, the application framework opts to just temporarily deny the requested Media Quick Start. The term "close" implies that the current multicast group already is available in the closest router or switch and does not need to be requested further away in the network.

According to a further embodiment, the application framework comprises means for using the feedback provided by the resource manager to signal to the client that a Media Quick Start unicast stream for the requested media is not available due to resource shortage in the network but the client may still be allowed to subscribe to the multicast version of the media. The client may then subscribe to the multicast stream and, once it receives a key frame (or an appropriate position in the stream), start reproducing the media. In this case, the client will not receive the Media Quick Start feature but any already congested or near congested networks between the sender and receiver will be spared from an additional unicast media stream.

The resource utilization map may take best effort traffic into account. Depending on how the network is provisioned by the network operator, the best-effort traffic may be separated from other non best-effort traffic by partitioning or all traffic both the best-effort and the non best-effort may be included in the same class. If there is a partitioning between the best-effort and the non best-effort traffic, the best-effort traffic will not affect the other time critical traffic such as video and telephony. In contrast, if all traffic belongs to the same class and if all traffic is allowed to use all the available resources it is not possible to guarantee a quality of service since the best effort traffic may affect the traffic any time. However, the resource utilization map may nevertheless take best-effort traffic into account by traffic measurement and/or provisioning to ensure that best effort traffic can not affect the resource situation for value-added services, e.g. the requested media stream.

Turning now to **figure 3**, showing a scenario where the present invention is applicable. **Figure 3** illustrates an access device 300 such as a multiservice edge router or BRAS having five

connected access networks 310-305. The networks 301-303 are connected to the same network segment while the network 304 and the network 305 are connected straight to the access device 300. An application framework in this case combined with a content server network is further connected to the access device 300 and a management network 307 comprising a network resource manager is also connected to the access device 300. In the scenario of **figure 3**, the networks 310-304 have enough resources to for a Media Quick Start, which is illustrated by the empty squares of the network resource utilization maps 308-309 provided by the network resource manager 307. The map 308 shows the resource utilization for the networks 301-303, the map 309 shows the resource utilization for the network 304 and the map 310 shows the resource utilization for the network 305. Thus the squares of the maps 308-310 of the resource manager 307 illustrates in this description the resource utilization map, which in reality is an internal data structure preferably.

The access network 305 is however full, which means that the resource manager will not allow a Media Quick Start, e.g. in the case when a user in network 305 wants to change channel and the application framework tries to reserve resources for a Media Quick Start. The feedback information according to the present invention from the resource manager to the application framework is transmitted by means of request/response messages. The application framework 306 sends a request to the network resource manager 307 for resources for a Media Quick Start. The request comprises the address of the client (e.g. located in the access network 301) and the address of the content server and the request is made each time a client requests media. The Network resource manager 307 analyzes the network resource utilization map and determines if there are enough available resources between the client and the content server and sends then feedback information regarding the resource availability

to the application framework such that the application framework can allow the Media Quick Start or select another appropriate behaviour to start the media distribution based on the feedback information.

Thus the present invention relates to an application framework comprising means for receiving a request for a media distribution that requires a multicast distribution from a client in said IP network, means for requesting network resources from a network resource manager for a Media Quick Start, to start the requested media distribution, means for receiving feedback information relating to network resource availability from the network resource manager, and means for allowing the Media Quick start or to use another behavior to start the requested media distribution based on the received feedback information.

Further, the present invention also relates to a network resource manager comprising a resource utilization map adapted to managing network resources in an IP network. The network resource manager comprises means for receiving a resource request from an application framework to start a media distribution by using a media quick start and means for, in response to said request, providing feedback information relating to resource availability such that the application framework can select to allow the Media Quick start or to use another behavior to start the media multicast distribution based on the received feedback information.

Further the present invention relates to a system comprising the application framework and the network resource manager.

The present invention also relates to methods. The method of the application framework according to the present invention

is illustrated in the flowchart of **figure 4a** and comprises the steps of:

401. Receive a request for a media distribution that requires multicast distribution from a client in said IP network.

402. Request network resources from a network resource manager for a Media Quick Start, to start the requested media distribution.

403. Receive feedback information relating to network resource availability from the network resource manager.

404. Allow the Media Quick start or use another behavior to start the requested media distribution based on the received feedback information.

The method of the network resource manager is illustrated in the flowchart of **figure 4b** and comprises the steps of:

405. Receive a resource request from an application framework to start a media distribution by using a media quick start.

In response to said request:

406. Provide feedback information relating to resource availability such that the application framework can select to allow the Media Quick start or to use another behavior based to start the media multicast distribution on the received feedback information.

The methods are preferably implemented by computer program products. The computer program products are directly loadable into the internal memory of a computer within a router or server in the IP network, comprising the software code portions for performing the steps of the methods. The computer program products may also be stored on a computer usable medium, comprising readable program for causing a computer, within a router or server in the IP network, to control execution of the steps of the methods.

However, the methods may also be implemented by Application-Specific Integrated Circuits (ASICs) which are chips designed for the particular methods according to the invention.

The present invention is not limited to the above-described preferred embodiments. Various alternatives, modifications and equivalents may be used. Therefore, the above embodiments should not be taken as limiting the scope of the invention, which is defined by the appending claims.

CLAIMS

1. A network resource manager comprising a resource utilization map adapted to managing network resources in an IP network, the network resource manager comprising means for receiving a resource request from an application framework to start a media multicast distribution by using a media quick start and means for, in response to said request, providing feedback information relating to resource availability such that the application framework can select to allow the Media Quick start or to use another behavior to start the media multicast distribution based on the received feedback information.
2. The network resource manager according to claim 1, wherein the resource utilization map is arranged to take best effort traffic into account.
3. The network resource manager according to claim 2, wherein the best effort traffic is taken into account by means of provisioning means for ensuring that best effort traffic can not affect the resource situation for the requested media stream.
4. The network resource manager according to claim 2, wherein the best effort traffic is taken into account by means of traffic measurement.
5. The network resource manager according to claim 4, wherein the best effort traffic is taken into account by means of provisioning means for ensuring that best effort traffic can not affect the resource situation for the requested media stream.
6. An application framework connectable to an IP network, the application framework comprises means for receiving a request for a media distribution requiring a multicast distribution from a client in said IP network, means for requesting network resources from a network resource

manager for a Media Quick Start, to start the multicast distribution, means for receiving feedback information relating to network resource availability from the network resource manager, and means for allowing the Media Quick start or to use another behavior to start the media distribution based on the received feedback information.

7. The application framework according to claim 6, wherein said another behavior is to temporarily deny the requested Media Quick Start.
8. The application framework according to claim 6, wherein said another behavior is to deny the use of Media Quick Start to start the media distribution.
9. The application framework according to claim 6, wherein said another behavior is to use the feedback information provided by the resource manager to signal to the client that a Media Quick Start unicast stream for the requested media distribution is not available due to resource shortage in the IP network but the client is still allowed to subscribe to the multicast distribution.
10. A system comprises a network resource manager comprising a resource utilization map adapted to manage network resources in an IP network, an application framework comprising means for receiving a request for a media distribution requiring a multicast distribution from a client in said IP network, and means for requesting network resources from a network resource manager for a Media Quick Start, to start the requested media distribution, the network resource manager comprises means for providing the application framework with feedback information relating to network resource availability from the network resource manager, and the application framework comprises means for receiving said feedback information and means for allowing the Media

Quick start or to use another behavior to start the requested media distribution based on the received feedback information.

11. The system according to claim 10, wherein said another behavior is to temporarily deny the Media Quick Start.
12. The system according to claim 10, wherein said another behavior is to deny the Media Quick Start.
13. The system according to claim 10, wherein said another behavior is to use the feedback information provided by the resource manager to signal to a client that a Media Quick Start unicast stream for the requested media is not available due to resource shortage in the network but the client is still allowed to subscribe to the multicast version of the media.
14. A method for a network resource manager comprising a resource utilization map adapted to managing network resources in an IP network, wherein the method comprises the steps of:
 - receiving a resource request from an application framework to start a media multicast distribution by using a media quick start, and in response to said request,
 - providing feedback information relating to resource availability such that the application framework can select to allow the Media Quick start or to use another behavior to start the media multicast distribution based on the received feedback information.
15. A computer program product directly loadable into the internal memory of a computer within a server or router in an IP network, comprising the software code portions for performing the steps of claim 14.

16. A computer program product stored on a computer usable medium, comprising readable program for causing a computer, within a server or router in an IP network, to control an execution of the steps of claim 14.
17. A method for an application framework connectable to an IP network, wherein the method comprises the steps of:
- receiving a request for a media distribution requiring a multicast distribution from a client in said IP network,
 - requesting network resources from a network resource manager for a Media Quick Start, to start the requested media distribution,
 - receiving feedback information relating to network resource availability from the network resource manager, and
 - allowing the Media Quick start or using another behavior to start the requested media distribution based on the received feedback information.
18. The method according to claim 17, wherein said another behavior is to temporarily deny the requested Media Quick Start.
19. The method according to claim 17, wherein said another behavior is to deny the requested Media Quick Start.
20. The method according to claim 17, wherein said another behavior is to use the feedback information provided by the resource manager to signal to the client that a Media Quick Start unicast stream for the requested media distribution is not available due to resource shortage in the IP network but the client is still allowed to subscribe to the multicast distribution.
21. A computer program product directly loadable into the internal memory of a computer within an application

framework in an IP network, comprising the software code portions for performing the steps of any of claims 17-20.

22. A computer program product stored on a computer usable medium, comprising readable program for causing a computer, within an application framework in an IP network, to control an execution of the steps of any of claims 17-20.
23. An Application-Specific Integrated Circuit for providing network resource information in an IP network, wherein the Integrated Circuit comprises means for receiving a resource request from an application framework to start a media multicast distribution by using a media quick start and means for, in response to said request, providing feedback information relating to resource availability by using a network resource utilization map such that the application framework can select to allow the Media Quick start or to use another behavior to start the media multicast distribution based on the received feedback information.
24. An Application-Specific Integrated Circuit for starting a multicast media distribution in an IP network, wherein the Integrated Circuit comprises means for receiving a request for a media distribution requiring a multicast distribution from a client in said IP network, means for requesting network resources from a network resource manager for a Media Quick Start, to start the requested media distribution, means for receiving feedback information relating to network resource availability from the network resource manager, and means for allowing the Media Quick start or to use another behavior to start the requested media distribution based on the received feedback information.

Abstract

The present invention relates to an IP network comprising a network resource manager comprising a resource utilization map adapted to manage network resources in an IP network and an application framework comprising means for receiving a request for a multicast distribution from a client in said IP network, and means for requesting network resources from a network resource manager for a Media Quick Start, to start the requested multicast distribution. Further, the network resource manager comprises means for providing the application framework with feedback information relating to network resource availability from the network resource manager, and the application framework comprises means for receiving said feedback information and means for allowing the Media Quick start or to use another behavior to start the requested multicast distribution based on the received feedback information..

Publ. fig. 3

1/4

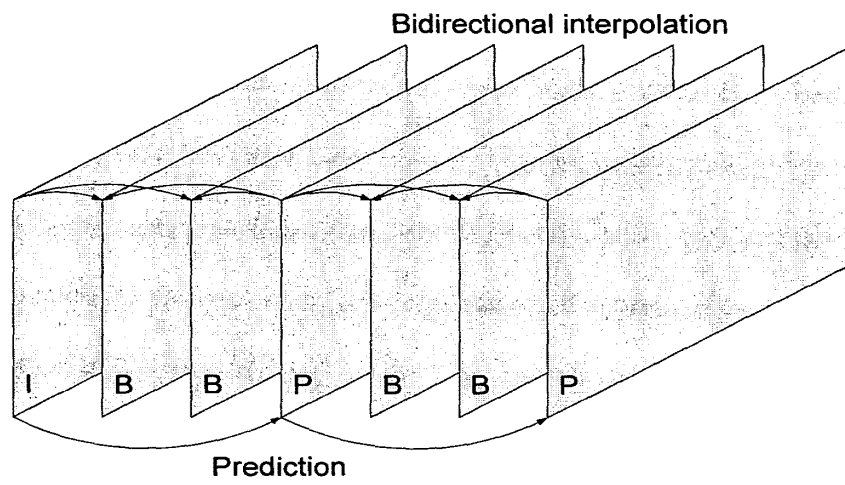


Fig. 1

2/4

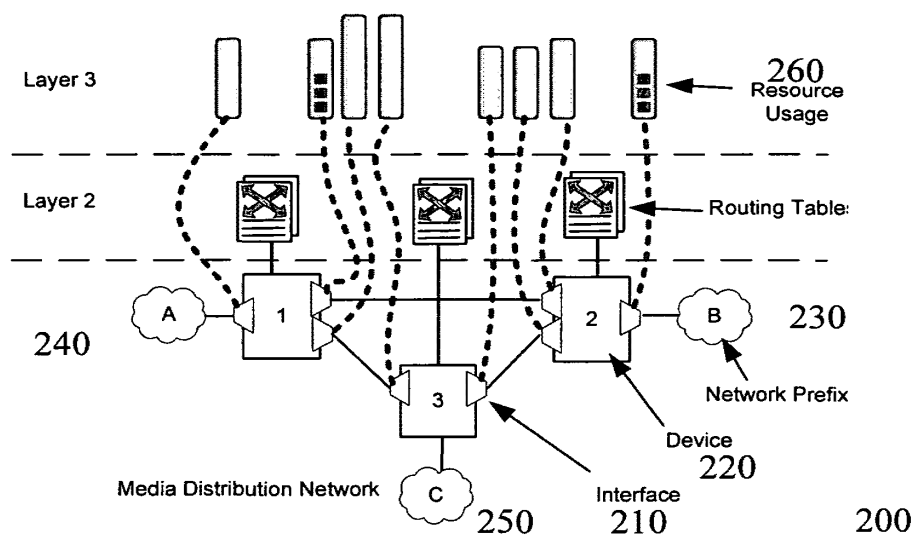


Fig. 2

3/4

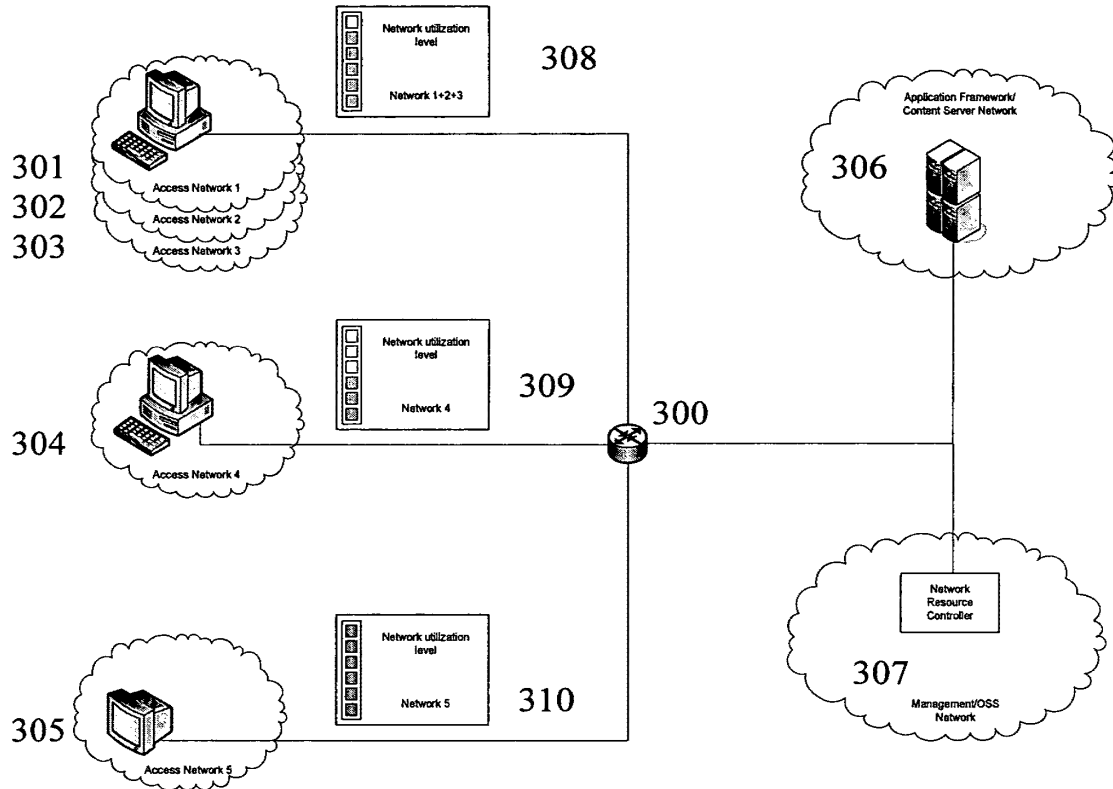


Fig. 3

4/4

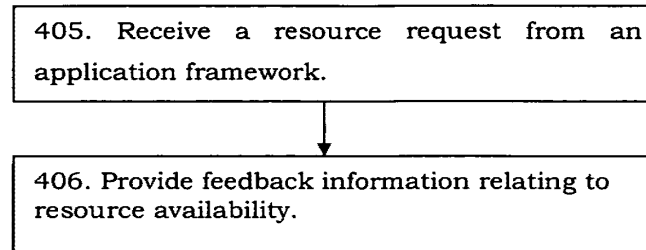


Fig 4b

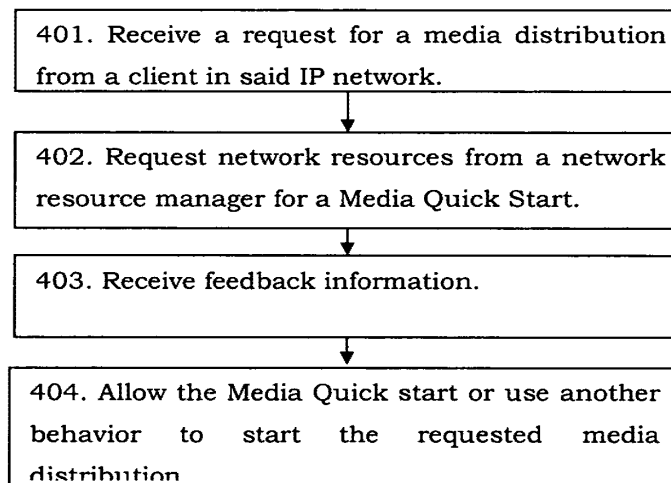


Fig. 4a

IN THE U.S. PATENT AND TRADEMARK OFFICE

In re application of

Jim SUNDQVIST et al.

Conf.

Application No. **NEW NON-PROVISIONAL**

Group

Filed December 23, 2005

Examiner

METHOD AND ARRANGEMENTS IN AN IP NETWORK

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

December 23, 2005

Sir:

The following preliminary amendments and remarks are respectfully submitted in connection with the above-identified application.

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims which begin on page 3 of this paper.

Remarks begin on page 9 of this paper.

An **Appendix** is attached following the signature page of this paper.

AMENDMENTS TO THE SPECIFICATION:

Please cancel the originally-filed Abstract of the Disclosure, and add the accompanying new Abstract of the Disclosure which appears on a separate sheet in the Appendix.

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS:

- 1.(original) A network resource manager comprising a resource utilization map adapted to managing network resources in an IP network, the network resource manager comprising means for receiving a resource request from an application framework to start a media multicast distribution by using a media quick start and means for, in response to said request, providing feedback information relating to resource availability such that the application framework can select to allow the Media Quick start or to use another behavior to start the media multicast distribution based on the received feedback information.
- 2.(original) The network resource manager according to claim 1, wherein the resource utilization map is arranged to take best effort traffic into account.
- 3.(original) The network resource manager according to claim 2, wherein the best effort traffic is taken into account by means of provisioning means for ensuring that best effort traffic can not affect the resource situation for the requested media stream.
- 4.(original) The network resource manager according to claim 2, wherein the best effort traffic is taken into account by means of traffic measurement.
- 5.(original) The network resource manager according to claim 4, wherein the best effort traffic is taken into account by means of

provisioning means for ensuring that best effort traffic can not affect the resource situation for the requested media stream.

6.(original) An application framework connectable to an IP network, the application framework comprises means for receiving a request for a media distribution requiring a multicast distribution from a client in said IP network, means for requesting network resources from a network resource manager for a Media Quick Start, to start the multicast distribution, means for receiving feedback information relating to network resource availability from the network resource manager, and means for allowing the Media Quick start or to use another behavior to start the media distribution based on the received feedback information.

7.(original) The application framework according to claim 6, wherein said another behavior is to temporarily deny the requested Media Quick Start.

8.(original) The application framework according to claim 6, wherein said another behavior is to deny the use of Media Quick Start to start the media distribution.

9.(original) The application framework according to claim 6, wherein said another behavior is to use the feedback information provided by the resource manager to signal to the client that a Media Quick Start unicast stream for the requested media distribution is not available due to resource shortage in the IP network but the client is still allowed to subscribe to the multicast distribution.

10.(original) A system comprises a network resource manager comprising a resource utilization map adapted to manage network resources in an IP network, an application framework comprising means for receiving a request for a media distribution requiring a multicast distribution from a client in said IP network, and means for requesting network resources from a network resource manager for a Media Quick Start, to start the requested media distribution, the network resource manager comprises means for providing the application framework with feedback information relating to network resource availability from the network resource manager, and the application framework comprises means for receiving said feedback information and means for allowing the Media Quick start or to use another behavior to start the requested media distribution based on the received feedback information.

11.(original) The system according to claim 10, wherein said another behavior is to temporarily deny the Media Quick Start.

12.(original) The system according to claim 10, wherein said another behavior is to deny the Media Quick Start.

13.(original) The system according to claim 10, wherein said another behavior is to use the feedback information provided by the resource manager to signal to a client that a Media Quick Start unicast stream for the requested media is not available due to resource shortage in the network but the client is still allowed to subscribe to the multicast version of the media.

14.(original) A method for a network resource manager comprising a resource utilization map adapted to managing network resources in an IP network, wherein the method comprises the steps of:

- receiving a resource request from an application framework to start a media multicast distribution by using a media quick start, and in response to said request,
- providing feedback information relating to resource availability such that the application framework can select to allow the Media Quick start or to use another behavior to start the media multicast distribution based on the received feedback information.

15.(original) A computer program product directly loadable into the internal memory of a computer within a server or router in an IP network, comprising the software code portions for performing the steps of claim 14.

16.(original) A computer program product stored on a computer usable medium, comprising readable program for causing a computer, within a server or router in an IP network, to control an execution of the steps of claim 14.

17.(original) A method for an application framework connectable to an IP network, wherein the method comprises the steps of:

- receiving a request for a media distribution requiring a multicast distribution from a client in said IP network,
- requesting network resources from a network resource manager for a Media Quick Start, to start the requested media distribution,
- receiving feedback information relating to network resource availability from the network resource manager, and
- allowing the Media Quick start or using another behavior to start the requested media distribution based on the received feedback information.

18.(original) The method according to claim 17, wherein said another behavior is to temporarily deny the requested Media Quick Start.

19.(original) The method according to claim 17, wherein said another behavior is to deny the requested Media Quick Start.

20.(original) The method according to claim 17, wherein said another behavior is to use the feedback information provided by the resource manager to signal to the client that a Media Quick Start unicast stream for the requested media distribution is not available due to resource shortage in the IP network but the client is still allowed to subscribe to the multicast distribution.

21.(currently amended) A computer program product directly loadable into the internal memory of a computer within an application framework in an IP network, comprising the software code portions for performing the steps of claim 17 ~~any of claims 17-20~~.

22.(currently amended) A computer program product stored on a computer usable medium, comprising readable program for causing a computer, within an application framework in an IP network, to control an execution of the steps of claim 17 ~~any of claims 17-20~~.

23.(original) An Application-Specific Integrated Circuit for providing network resource information in an UP network, wherein the Integrated Circuit comprises means for receiving a resource request from an application framework to start a media multicast distribution by using a media quick start and means for, in response to said request, providing feedback information relating to resource availability by using a

network resource utilization map such that the application framework can select to allow the Media Quick start or to use another behavior to start the media multicast distribution based on the received feedback information.

24.(original) An Application-Specific Integrated Circuit for starting a multicast media distribution in an IP network, wherein the Integrated Circuit comprises means for receiving a request for a media distribution requiring a multicast distribution from a client in said IP network, means for requesting network resources from a network resource manager for a Media Quick Start, to start the requested media distribution, means for receiving feedback information relating to network resource availability from the network resource manager, and means for allowing the Media Quick start or to use another behavior to start the requested media distribution based on the received feedback information.

REMARKS

Claims 1-24 remain in this application.

Entry of the above amendments is earnestly solicited.
An early and favorable first action on the merits is earnestly requested.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON



Benoit Castel, Reg. No. 35,041
745 South 23rd Street
Arlington, VA 22202
Telephone (703) 521-2297
Telefax (703) 685-0573
(703) 979-4709

BC/gw

APPENDIX:

The Appendix includes the following item(s):

- ☒ - a new or amended Abstract of the Disclosure
- ☐ - a Replacement Sheet for Figure of the drawings
- ☐ - a Substitute Specification and a marked-up copy of the originally-filed specification
- ☐ - a terminal disclaimer
- ☐ - a 37 CFR 1.132 Declaration
- ☐ - a Substitute Specification and a marked-up copy of the originally-filed specification
- ☐ - a verified English translation of foreign priority document

Abstract

An IP network includes a network resource manager having a resource utilization map adapted to manage network resources in an IP network and an application framework having elements for receiving a request for a multicast distribution from a client in the IP network, and elements for requesting network resources from a network resource manager for a Media Quick Start, to start the requested multicast distribution. Further, the network resource manager includes elements for providing the application framework with feedback information relating to network resource availability from the network resource manager, and the application framework includes elements for receiving the feedback information and elements for allowing the Media Quick start or to use another behavior to start the requested multicast distribution based on the received feedback information.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875 Effective December 8, 2004

Application or Docket Number

11315293

APPLICATION AS FILED - PART I

(Column 1)

(Column 2)

SMALL ENTITY

OR

OTHER THAN
SMALL ENTITY

FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A
EXAMINATION FEE (37 CFR 1.16(e), (p), or (q))	N/A	N/A
TOTAL CLAIMS (37 CFR 1.16(i))	24 minus 20 =	4
INDEPENDENT CLAIMS (37 CFR 1.16(h))	7 minus 3 =	4
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).	
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))		

RATE (\$)	FEE (\$)
N/A	150.00
N/A	\$250
N/A	\$100
X\$ 25 =	
X100 =	
+180=	
TOTAL	

RATE (\$)	FEE (\$)
N/A	300.00
N/A	\$500
N/A	\$200
X\$50 =	
X200 =	
+360=	
TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED - PART II

(Column 1)

(Column 2)

(Column 3)

SMALL ENTITY

OR

OTHER THAN
SMALL ENTITY

AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	*	Minus	**	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=
	Application Size Fee (37 CFR 1.16(s))				
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					

RATE (\$)	ADDITIONAL FEE (\$)
X\$ 25 =	
X100 =	
+180=	
TOTAL ADD'L FEE	

RATE (\$)	ADDITIONAL FEE (\$)
X\$50 =	
X200 =	
+360=	
TOTAL ADD'L FEE	

AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	*	Minus	**	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=
	Application Size Fee (37 CFR 1.16(s))				
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					

RATE (\$)	ADDITIONAL FEE (\$)
X\$ 25 =	
X100 =	
+180=	
TOTAL ADD'L FEE	

RATE (\$)	ADDITIONAL FEE (\$)
X\$50 =	
X200 =	
+360=	
TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PATENT APPLICATION SERIAL NO _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

12/28/2005 RHEBRAHT 00000087 11315293

01 FC:1011	300.00 OP
02 FC:1111	500.00 OP
03 FC:1311	200.00 OP
04 FC:1202	200.00 OP
05 FC:1201	800.00 OP

PTO-1556
(5/87)

U.S. Government Printing Office: 2002 — 486-247/88033

Application Data Sheet

Application Information

Application Type::	Regular
Subject Matter::	Utility
Suggested Classification::	
Suggested Group Art Unit::	
CD-ROM or CD-R?::	None
Number of CD disks::	0
Number of Copies of CDs::	0
Sequence Submission?::	None
Computer Readable Form (CRF)::	No
Number of copies of CRF::	0
Title::	METHOD AND ARRANGEMENTS IN AN IP NETWORK
Attorney Docket Number::	1505-1090
Request for Early Publication?::	No
Request for Non-Publication?::	No
Suggested Drawing Figure::	3
Total Drawing Sheets::	4
Small Entity?::	No
Latin Name::	
Variety Denomination Name::	
Petition Included?::	No
Petition Type::	
Licensed US Gov't Agency::	
Contract or Grant Numbers::	
Secrecy Order in Parent Appl.?::	No

Applicant Information

Applicant Authority Type:: Inventor
Primary Citizenship Country:: SWEDEN
Status:: Full Capacity
Given Name:: JIM
Middle Name::
Family Name:: SUNDQVIST
Name Suffix::
City of Residence:: LULEA
State or Province of
Residence::
Country of Residence:: SWEDEN
Street of Mailing REGNVÄGEN 80
Address::
City of Mailing Address:: LULEA
State or Province of Mailing Address::
Country of Mailing Address:: SWEDEN
Postal or Zip Code of Mailing Address:: S-973 32

Applicant Authority Type:: Inventor
Primary Citizenship Country:: SWEDEN
Status:: Full Capacity
Given Name:: ERIK
Middle Name::
Family Name:: LUNDGREN
Name Suffix::
City of Residence:: LULEA
State or Province of
Residence::
Country of Residence:: SWEDEN
Street of Mailing DOCENTVÄGEN 22: 192
Address::
City of Mailing Address:: LULEA

State or Province of Mailing Address::
Country of Mailing Address:: SWEDEN
Postal or Zip Code of Mailing Address:: S-977 52

Correspondence Information

Correspondence Customer 00466
Number::

Representative Information

Representative Customer	00466
Number::	

Domestic Priority Information

Application::	Continuity Type::	Parent Application::	Parent Filing Date::

Foreign Priority Information

Country::	Application Number::	Filing Date::	Priority Claimed::

Assignment Information

Assignee Name::
Street of Mailing
Address::
City of Mailing Address::
State or Province of Mailing Address::
Country of Mailing Address::
Postal or Zip Code of Mailing Address::

UTILITY/PLANT PATENT APPLICATION TRANSMITTALAttorney Docket No. **1505-1090**

(Only for new nonprovisional applications under 37 CFR 1.53(b))

To the Director of Patents

Transmitted herewith for filing is the patent application of:

Inventors: **Jim SUNDQVIST, Erik LUNDGREN**

Corresponding to Patent Application No. _____ filed on _____, the entirety of which application is hereby expressly incorporated by reference in the accompanying application.

Title: **METHOD AND ARRANGEMENTS IN AN IP NETWORK**

Enclosed are:

- ☒ **28** Pages of Specification containing **24** claims, **4** Sheets of Drawings and an Abstract of the Disclosure.
- ☐ Submission of English translation of prior provisional application under 37 CFR 1.78(a)(5)
- ☐ Newly executed Oath or Declaration/Power of Attorney
- ☐ Copy of Oath or Declaration/Power of Attorney from a prior application (continuation/divisional)
- ☐ The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied as indicated in the preceding box, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
- ☐ Deletion of inventor(s). A signed statement attached deleting inventor(s) named in the prior application (see 37 CFR 1.63 (d)(2) and 1.33(b))
- ☒ Application Data Sheet under 37 C.F.R. § 1.76
- ☐ Assignment Papers (cover sheet & document(s))
- ☐ An assignment to _____ for parent application no. _____ was recorded on _____ at Reel _____, Frame _____
- ☐ Information Disclosure Statement (IDS) w/PTO-1449 - ☐ Copy of IDS citations
- ☒ Preliminary Amendment
- ☒ Itemized Return Receipt Postcard
- ☐ Certified Copy of Priority Document(s)
- ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)
- ☐ Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
- a. ☐ Computer Readable Form (CRF)
- b. Specification Sequence Listing on:
- i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ paper
- c. ☐ Statement verifying identity of above copies
- ☐ Other Attachment: _____

113002 U.S. PTO
11/315293

Y&T December 23, 2005

UTILITY/PLANT PATENT APPLICATION TRANSMITTAL (continued)	Attorney Docket No. 1505-1090
If a CONTINUING APPLICATION, check appropriate box, and supply requisite information below and in a preliminary amendment or in an Application Data Sheet under 37 CFR 1.76: ☐ Continuation ☐ Divisional ☐ Continuation-in-part of Prior Appln. # Prior Application Information: Examiner: Tech Center:	
CORRESPONDENCE INFORMATION	
Customer Number: 00466	Correspondence Address: Young & Thompson 745 South 23 rd Street, Second Floor Arlington, VA 22202 Telephone (703) 521-2297 Facsimile (703) 979-4709

☐ Applicant claims small entity status under 37 C.F.R. § 1.27

The filing fee has been calculated as follows:

The filing fee has been calculated as follows:

BASIC FILING FEES				Fee Description	Fee Paid
Large Entity		Small Entity			
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1011	300	2011	150	Utility filing fee	\$300.00
1111	500	2111	250	Utility search fee	\$500.00
1311	200	2311	100	Utility examination fee	\$200.00
1013	200	2013	100	Plant filing fee	\$0.00
1113	300	2113	150	Plant search fee	\$0.00
1313	160	2313	80	Plant examination fee	\$0.00
SIZE FEE size fee each additional 50 sheets in excess of 100				Additional Sheets $28 - 100 = \frac{0}{50} = 0 \times$	Fee From Below <u>\$125.00</u> \$0.00
EXTRA CLAIM FEES Independent Claims				Extra Claims $7 - 3 = 4 \times$	<u>\$200.00</u> \$800.00
Total Claims				<u>24</u> - 20 = 4 X	<u>\$50.00</u> \$200.00
Multiple Dependent					\$0.00
Large Entity		Small Entity			
Fee Code	Fee (\$)	Fee Code	Fee (\$)	Fee Description	
1081	250	2081	125	Utility Size fee sheets in excess of 100	
1083	250	2083	125	Plant Size fee sheets in excess of 100	
1201	200	2201	100	Independent claims in excess of 3	
1202	50	2202	25	Claims in excess of 20	
1203	360	2203	180	Multiple dependent claim	
ADDITIONAL FEES					
Fee Code	Fee (\$)	Fee Description			
8021	40	Recording each patent assignment per property			
TOTAL					\$2,000.00

- ☒ A Check in the amount of **\$2,000.00** to cover all fees is attached.
- ☐ The Director is hereby authorized to charge indicated fees and credit any overpayment to Deposit account No. 25-0120 in the name of Young & Thompson, as described below. A duplicate copy of this sheet is enclosed.
- ☒ The Director is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fee required under 37 C.F.R. §§ 1.16 or 1.17.


 Benoit Castel, Reg. No. 35,041
 745 South 23rd Street
 Arlington, VA 22202
 Telephone (703) 521-2297

BC/gw
 Date: **December 23, 2005**

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875 Effective December 8, 2004

Application or Docket Number

11315293

APPLICATION AS FILED - PART I

(Column 1)

(Column 2)

SMALL ENTITY

OR

OTHER THAN
SMALL ENTITY

FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A
SEARCH FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A
EXAMINATION FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A
TOTAL CLAIMS (37 CFR 1.16(f))	24 minus 20 =	4
INDEPENDENT CLAIMS (37 CFR 1.16(h))	7 minus 3 =	4
APPLICATION SIZE FEE (37 CFR 1.16(e))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).	
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(i))		

RATE (\$)	FEE (\$)
N/A	150.00
N/A	\$250
N/A	\$100
X\$ 25	
X100	
+180=	
TOTAL	

RATE (\$)	FEE (\$)
N/A	300.00
N/A	\$500
N/A	\$200
X\$50	
X200	
+360=	
TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED - PART II

1275-06

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR
	Total (37 CFR 1.16(g))	24	24
	Independent (37 CFR 1.16(h))	7	7
	Application Size Fee (37 CFR 1.16(s))		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(i))		

RATE (\$)	ADDITIONAL FEE (\$)
X\$ 25	
X100	
+180=	
TOTAL ADD'L FEE	

RATE (\$)	ADDITIONAL FEE (\$)
X\$50	
X200	
+360=	
TOTAL ADD'L FEE	

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR
	Total (37 CFR 1.16(g))		
	Independent (37 CFR 1.16(h))		
	Application Size Fee (37 CFR 1.16(s))		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(i))		

RATE (\$)	ADDITIONAL FEE (\$)
X\$ 25	
X100	
+180=	
TOTAL ADD'L FEE	

RATE (\$)	ADDITIONAL FEE (\$)
X\$50	
X200	
+360=	
TOTAL ADD'L FEE	

- * If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
- ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
- *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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 NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/315,293	12/23/2005	Jim Sundqvist	1505-1090

CONFIRMATION NO. 1382

FORMALITIES
 LETTER

00466
 YOUNG & THOMPSON
 745 SOUTH 23RD STREET
 2ND FLOOR
 ARLINGTON, VA 22202

Date Mailed: 01/31/2006

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

*Filing Date Granted***Items Required To Avoid Abandonment:**

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 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.*
Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

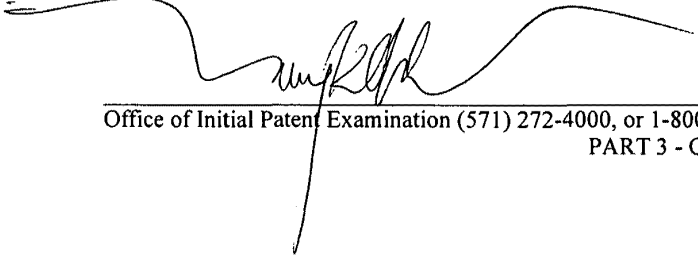
Total additional fee(s) required for this application is **\$130** for a Large Entity

- **\$130** Surcharge.

Replies should be mailed to: Mail Stop Missing Parts

Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

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



Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199, or 1-800-972-6382
PART 3 - OFFICE COPY



ZFW#

PATENT
Attorney Docket No. 1505-1090

IN THE U.S. PATENT AND TRADEMARK OFFICE

In re application of

Attn: Appln. Processing Div.
Special Processing and
Correspondence Branch

Jim SUNDQVIST, et al.

Confirmation No.: 1382

Application No. 11/315,293

Group Art Unit: 2661

Filed: December 23, 2005

Examiner: Unknown

Title: **METHOD AND ARRANGEMENTS IN AN IP NETWORK**

RESPONSE TO NOTICE TO FILE MISSING PARTS

Mail Stop Missing Parts

Assistant Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the accompanying Notice to File Missing Parts of Nonprovisional Application dated January 31, 2006, we enclose herewith the executed declaration which was omitted at the time of filing the above-captioned application, which was filed on December 23, 2005.

Please charge the surcharge of \$130.00 to Deposit Account No. 25-0120. A duplicate copy of this paper is enclosed for this purpose.

Respectfully submitted,

YOUNG & THOMPSON

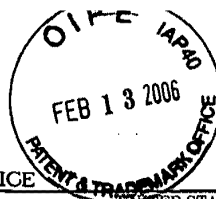
Benoit Castel

Benoit Castel, Reg. No. 35,041
745 South 23rd Street
Arlington, VA 22202
Telephone (703) 521-2297
Telefax (703) 685-0573
(703) 979-4709

BC/pmt
Date: **February 13, 2006**



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 NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/315,293	12/23/2005	Jim Sundqvist	1505-1090

00466
 YOUNG & THOMPSON
 745 SOUTH 23RD STREET
 2ND FLOOR
 ARLINGTON, VA 22202

CONFIRMATION NO. 1382

FORMALITIES
 LETTER

Date Mailed: 01/31/2006

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

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 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.*
Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:)

- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$130** for a Large Entity

- \$130** Surcharge.

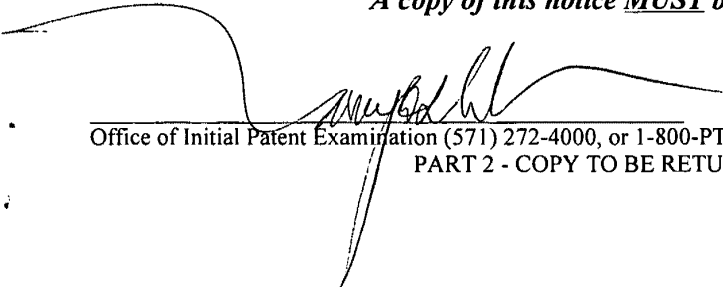
Replies should be mailed to: Mail Stop Missing Parts

02/14/2006 HALI11 00000128 250120 11315293

01 FC:1051 130.00 DA

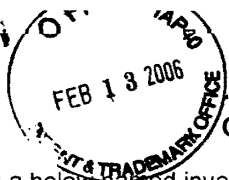
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

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



Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199, or 1-800-972-6382

PART 2 - COPY TO BE RETURNED WITH RESPONSE



1505-1090

Attorney Docket No. P07349US00

COMBINED DECLARATION AND POWER OF ATTORNEY

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 ARRANGEMENTS IN AN IP NETWORK**

the specification of which: (check one)

REGULAR OR DESIGN APPLICATION

- ☐ is attached hereto.
- ☒ was filed on December 23, 2005 as application Serial No. _____
and was amended on _____ (if applicable).

PCT FILED APPLICATION ENTERING NATIONAL STAGE

- ☐ was described and claimed in International application No. _____ filed on _____
and as amended on _____ (if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

PRIORITY CLAIM

I hereby claim foreign priority benefits under 35 USC 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)

Country	Application Number	Date of Filing (day, month, year)	Priority Claimed

I hereby claim the benefit under Title 35, United States Code §119(e) of any United States provisional patent application(s) listed below:

Application No.	Filing Date	Status (patented, pending abandoned)
-----------------	-------------	--------------------------------------

(Complete this part only if this is a continuing application.)

I hereby claim the benefit under 35 USC 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 USC 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

Application No.	Filing Date	Status (patented, pending abandoned)
-----------------	-------------	--------------------------------------

Ex.1002

POWER OF ATTORNEY

The undersigned hereby authorizes the U.S. attorney or agent named herein to accept and follow instructions from **Dr Ludvig Brann Patentbyrå AB** as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

As a named inventor, I hereby appoint the registered patent attorneys represented by Customer No. **00466** to prosecute this application and transact all business in the Patent and Trademark Office connected therewith, including: **Robert J. PATCH, Reg. No. 17,355, Andrew J. PATCH, Reg. No. 32,925, Robert F. HARGEST, Reg. No. 25,590, Benoît CASTEL, Reg. No. 35,041, Thomas W. PERKINS, Reg. No. 33,027, Roland E. LONG, Jr., Reg. No. 41,949, Eric JENSEN, Reg. No. 37,855, and Liam MCDOWELL, Reg. No. 44,231,**

c/o YOUNG & THOMPSON
Second Floor
745 South 23rd Street
Arlington, Virginia 22202

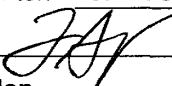
Customer Number

00466

Address all telephone calls to Young & Thompson at 703/521-2297. Telefax: 703/685-0573.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

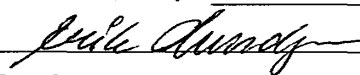
Full name of sole or first inventor: **Jim SUNDQVIST**

Inventor's signature:  Date: 9 Jan, 2006

Residence: LULEA, Sweden Citizenship: Swedish

Post Office Address: Regnvägen 80, SE-973 32 LULEA, Sweden

Full name of second joint inventor, if any: **Erik LUNDGREN**

Inventor's signature:  Date: January 9th, 2006

Residence: LULEA, Sweden Citizenship: Swedish

Post Office Address: Docentvägen 22:192, SE-977 52 LULEA, Sweden

Full name of third joint inventor, if any: _____

Inventor's signature: _____ Date: _____

Residence: _____ Citizenship: _____

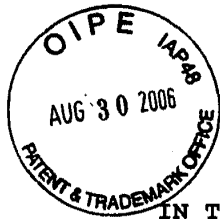
Post Office Address: _____

Full name of fourth joint inventor, if any: _____

Inventor's signature: _____ Date: _____

Residence: _____ Citizenship: _____

Post Office Address: _____



PATENT
1505-1090

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicants: Jim SUNDQVIST et al. Confirmation: 1382
Serial No.: 11/315,293 Art Unit: 2616
Filed: December 23, 2005 Examiner: W. Chin
For: METHOD AND ARRANGEMENTS IN AN IP NETWORK

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

August 30, 2006

Sir:

This Information Disclosure Statement is being filed in compliance with Rules 1.97 and 1.98 and in fulfillment of the duty of disclosure under Rule 1.56. In accordance with USPTO rules, attached is a Form PTO-1449 listing the cited references, all of which are in the English language.

Copies of the cited U.S. patents and patent publications are not provided in view of the USPTO waiver of the requirement to do so under 37 CFR 1.98(a)(2)(i). Copies of the remaining references are enclosed.

This Information Disclosure Statement is being filed prior to issuance of a first action on the merits; therefore, no fee is required.

The Examiner is courteously requested to initial and return a copy of the accompanying Form PTO-1449 to confirm consideration of the references and their entry into the record.

Respectfully submitted,

YOUNG & THOMPSON

Robert J. Patch

Reg. No. 17,355

745 South 23rd Street
Arlington, VA 22202
703-521-2297 (telephone)
703-685-0573 (telecopier I)
703-979-4709 (telecopier II)

RJP:rk

[illegible]

RJP:rk

Y&T August 30, 2006



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
13.04.2005 Bulletin 2005/15

(51) Int Cl.7: **H04N 7/173**

(21) Application number: **04021617.8**

(22) Date of filing: **10.09.2004**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL HR LT LV MK

(72) Inventors:

- **Green, Dustin L.**
Redmond WA 98052 (US)
- **Baldwin, James A.**
Redmond WA 98052 (US)
- **Barrett, Peter T.**
Redmond WA 98052 (US)

(30) Priority: **10.10.2003 US 684138**

(71) Applicant: **MICROSOFT CORPORATION**
Redmond, WA 98052 (US)

(74) Representative: **Grünecker, Kinkeldey,**
Stockmair & Schwanhäusser Anwaltssozietät
Maximilianstrasse 58
80538 München (DE)

(54) **Fast channel change**

(57) In an exemplary server implementation, a server is configured to retain at least one independent frame for each video channel of multiple video channels that are being distributed using multicast communications and is adapted to respond to channel change requests from clients by transmitting the retained at least one independent frame of a requested video channel to a re-

questing client using a unicast communication. In an exemplary method implementation, a method for fast channel changing in a multicast video distribution architecture includes: detecting a channel change request that indicates a requested channel, the requested channel corresponding to a multicast group; and transmitting a retained intra frame for the requested channel as a unicast communication.

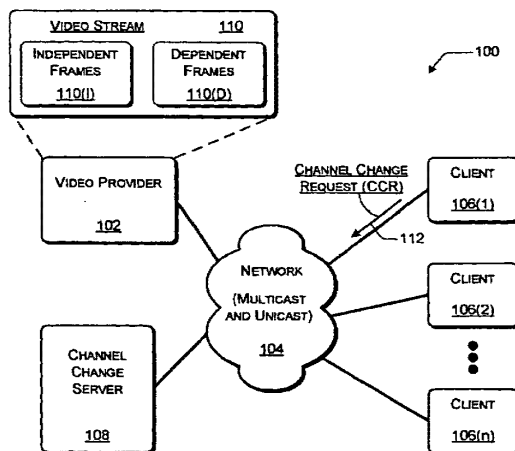


Fig. 1

Description**TECHNICAL FIELD**

[0001] This disclosure relates in general to changing channels in a digital video environment and in particular, by way of example but not limitation, to reducing the video presentation latency when changing from one video channel to another video channel in a digital multicast network.

BACKGROUND

[0002] Television-based entertainment systems are expanding the programming and services that they offer. In addition to television programming content such as that found on broadcast and traditional cable networks, television service providers are adding on-demand video, as well as other interactive services, features, and applications. The existence of these specific services, features, and applications, as well as the continuing increase in the breadth of available general programming content, drives the adoption of digital network technology for television-based entertainment systems.

[0003] Digital technology enables satellite and cable operators to increase the number and kinds of services that they offer to subscribers and thus their average revenue per subscriber. Unfortunately, although digital technology offers many advantages to subscribers as compared to traditional analog networks, it also has a number of drawbacks. For example, changing channels in a digital television service typically takes longer than in an analog television service. This channel changing latency annoys and frustrates users of the digital television service.

[0004] This channel changing latency and other drawbacks of digital technology lead to higher rates of subscriber chum, which means that a large percentage of subscribers that try digital television service switch back to traditional analog service within a short time period. Switching subscribers from analog to digital service involves expenditures for network operators that range from broad, general marketing costs down to individual incentives and installation expenses. Furthermore, network operators usually have greater opportunity and/or ability to sell add-on services (e.g., extra channels, pay-per-view, etc.) in conjunction with digital network services. Consequently, reducing subscriber chum can financially benefit satellite and cable operators.

[0005] Accordingly, for e.g. television-based entertainment systems, there is a need for schemes and/or techniques to reduce the chum out of digital service and back to traditional analog service that results from subscribers being dissatisfied with the slower channel changing experienced with digital television service.

SUMMARY

[0006] In an exemplary server implementation, a server is configured to retain at least one independent frame for each video channel of multiple video channels that are being distributed using multicast communications and is adapted to respond to channel change requests from clients by transmitting the retained at least one independent frame of a requested video channel to a requesting client using a unicast communication. In an exemplary method implementation, a method for fast channel changing in a multicast video distribution architecture includes: detecting a channel change request that indicates a requested channel, the requested channel corresponding to a multicast group; and transmitting a retained intra frame for the requested channel as a unicast communication.

[0007] Other method, system, approach, apparatus, server, device, media, procedure, arrangement, etc. implementations are described herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The same numbers are used throughout the drawings to reference like and/or corresponding aspects, features, and components.

[0009] FIG 1 illustrates an exemplary video distribution architecture that includes a network that is capable of both multicast and unicast communications.

[0010] FIG 2 illustrates a video distribution architecture that includes an exemplary channel change server that is capable of providing an intra frame in a unicast message.

[0011] FIG 3A illustrates a video distribution architecture that includes an exemplary channel change server that is capable of synchronizing a joining to a multicast group for a client using a join command.

[0012] FIG 3B illustrates a video distribution architecture that includes an exemplary channel change server that is capable of synchronizing a joining to a multicast group for a client using a join command and that is capable of providing a smoother initial video presentation experience.

[0013] FIG 4A illustrates a first exemplary mechanism for implementing a join command.

[0014] FIG. 4B illustrates a second exemplary mechanism for implementing a join command.

[0015] FIG 5 is a flow diagram that illustrates an exemplary method for fast channel changing with a combination multicast and unicast network.

DETAILED DESCRIPTION

[0016] FIG 1 illustrates an exemplary video distribution architecture 100 that includes a network 104 that is capable of both multicast and unicast communications. Network 104 is implemented with multiple network elements (not separately shown in FIG 1). Each network

element may be capable of facilitating both multicast and unicast communications, or each network element may be capable of facilitating either multicast or unicast communications. Furthermore, network 104 may include some network elements that participate in both multicast and unicast communications and other network elements that participate in either multicast or unicast communications (but not necessarily both).

[0017] As illustrated, a video provider 102, a channel change server 108, and one or more clients 106(1), 106(2) ... 106(n) are coupled to network 104. Video provider 102 is capable of providing video for multiple channels to clients 106 utilizing a multicast scheme over network 104. Likewise, clients 106 are capable of receiving video for multiple channels from video provider 102 via a multicast scheme over network 104. Video as used herein may optionally include audio and/or associated audio/video presentation control information.

[0018] In a described implementation, video provider 102 receives, stores, and/or otherwise has access to video information for multiple channels as represented by the illustrated video stream 110 for a given particular channel. Each video stream 110 is comprised of independent frames 110(I) and dependent frames 110(D). Independent frames 110(I) may be decoded without reference to other video frames. Independent frames 110(I) include, for example, intra (I) frames. In contradistinction, dependent frames 110(D) are decoded with reference to one or more other video frames. Dependent frames 110(D) include, for example, predicted (P) frames and bidirectional (B) frames. Consequently, because independent frames 110(I) may be decoded without waiting for any subsequent frames, independent frames 110(I) may be decoded more quickly and/or sooner than dependent frames 110(D), at least for a video stream 110 that is being received in real-time.

[0019] Generally, video stream 110 is distributed from video provider 102 over network 104 to selected clients 106 using a multicast scheme. For example, video provider 102 may correspond to a multicast source, network 104 may include multiple multicast replication points, and clients 106 may correspond to multiple multicast receivers. Furthermore, each video stream 110 for a particular video channel may correspond to a multicast stream in a multicast video distribution scheme.

[0020] In operation, each given client 106 that requests to receive a particular video channel is joined to a multicast group corresponding to that particular video channel. Thereafter, network 104 forwards a duplicate of the associated video stream 110 for the particular video channel that corresponds to the multicast group to which the given client 106 has been joined. Network 104 forwards duplicates of video stream 110 to selected clients 106 via one or more replication points (not separately shown in FIG 1).

[0021] When a given client 106 (e.g., client 106(1)) wishes to change channels, client 106(1) transmits a channel change request (CCR) 112 toward a video dis-

tribution headend or similar server or system. Channel change request 112 includes, in addition to an identifier of client 106(1), an indication of the requested video channel. As illustrated, video provider 102 and channel change server 108 separately or jointly comprise a video distribution headend. Channel change request 112 precipitates a multicast group change to a multicast group corresponding to the requested video channel.

[0022] After the multicast group change, video stream 110 can then be directed to the requesting client 106(1). However, a long channel changing latency may be experienced by the user of client 106(1) if client 106(1) begins receiving video stream 110 during a time period of dependent frames 110(D), which cannot be independently decoded. Client 106(1) waits to decode video until a next independent frame 110(I) is received by client 106(1).

[0023] In a described implementation, channel change server 108 responds to channel change request 112 to ameliorate this channel changing latency. Specifically, channel change server 108 is adapted to unicast an independent frame 110(I) for the requested video channel to client 106(1). More specifically, channel change server 108 is adapted to transmit a retained independent frame 110(I) for the video stream 110 that is associated with the requested video channel to client 106(1) in a unicast communication. This retained independent frame 110(I) may then be decoded (and displayed) relatively quickly without regard to other frames 110(I or D) and without having to wait for the next independent frame 110(I).

[0024] Channel change server 108 may operate in any one or more of three exemplary modes when unicasting a retained independent frame. In a first mode, a retained independent frame comprises a cached previous independent frame. This first mode is described further below with reference to FIG 2. In a second mode, a retained independent frame comprises a cached previous (or possibly buffered) independent frame. This second mode is described further below with reference to FIG 3A. In a third mode, a retained independent frame comprises a buffered independent frame. This third mode is described further below with reference to FIG. 3B. The second and third modes are implementations that can also involve synchronized joining of clients to a relevant multicast group.

[0025] FIG 2 illustrates a video distribution architecture 200 that includes an exemplary channel change server 108 that is capable of providing an intra frame in a unicast message 208. With respect to video distribution architecture 100 (of FIG 1), video provider 102, channel change server 108, and clients 106(1, 2 ... n) remain connected to network 104. However, additional details regarding network 104 are provided.

[0026] As illustrated, network 104 includes at least one replication point 202. Network 104 usually includes many such replication points 202. In fact, multiple replication points 202 are typically located between a multi-

cast source (e.g., video provider 102 and/or channel change server 108) and a multicast receiver (e.g., any client of clients 106). In other words, although only one replication point 202 is explicitly shown, video stream 110 may be communicated (e.g., forwarded and/or duplicated) by multiple replication points 202 between video provider 102 and clients 106.

[0027] In a described implementation, replication points 202 are realized as any of many different types of network elements or nodes. For example, replication points 202 may be routers, switches, and so forth. As multicast-capable nodes, replication points 202 are adapted to facilitate group membership, to duplicate/forward multicast communications, to handle multicast streams as identified by source and group address (S, G), to perform other multicast-related functions, some combination or subset thereof, and so forth. For example, replication points 202 may be capable of implementing communications in accordance with a multicast routing protocol (e.g., protocol independent multicast - sparse mode (PIM-SM)), in accordance with a group management protocol (e.g., internet group management protocol (IGMP)), and so forth.

[0028] IGMP is used by receiver hosts (e.g., at least clients 106) and replication points 202 to notify each other about conditions and changes to group membership. PIM-SM is used to propagate forwarding state information between and among replication points 202. IGMP defines messages that are used to join clients 106 to a group and to notify replication points 202 that a client 106 is leaving a group. Although an implementation is described primarily in the context of IGMP, other multicast protocols may alternatively be employed.

[0029] Video stream 110 is illustrated as an exemplary stream of I, P, and B frames. Video stream 110 may be coded using any video compression algorithm or technology, such as the Moving Pictures Expert Group 4th standard (MPEG-4: ISO/IEC 14496-1/2/3). The video frame series shown in FIG 2 is "IBBPBBPBBPBB"; however, any video frame series may be present. In fact, the frame series for video stream 110 may be changing in an unknown and/or unpredictable fashion.

[0030] Channel change server 108 includes one or more processors 206 and at least one memory 204. Memory 204 includes processor-executable instructions that may be executed by processor 206 to perform function(s) as described further below. These processor-executable instructions may comprise hardware, firmware, software, some combination thereof, and so forth. Modules having processor-executable instructions that are stored as part of memory 204 include: I frame cacher 214, cached I frames 216, channel change request detector 218, and channel change request handler 220. These modules are described further herein below.

[0031] As noted generally above with reference to video stream 110, frames can be independently decoded, but P and B frames usually cannot. P frames reference

up to one other frame, and B frames reference up to two other frames. When a particular client 106 joins a new multicast group corresponding to a different video channel, the particular client 106 is unable to begin decoding video stream 110 (or display any video for the user) until an I frame is received. Under an MPEG-4 video coding paradigm, the average delay between a channel change request 112 and receipt of an I frame during normal stream flow can be 1-2 seconds. This delay can lengthen to 5-10 seconds with next generation coding paradigms. Channel change server 108 can reduce this average delay and thereby ameliorate user frustrations arising from long channel changing delays.

[0032] In a described implementation, client 106(1) initially determines that a video channel change is desired (e.g., as a result of user input) and/or being demanded. Client 106(1) formulates a channel change request 112 that indicates a requested channel and identifies (perhaps implicitly) client 106(1). Channel change request 112 is transmitted upstream (e.g., as a unicast message) through one or more replication points 202.

[0033] Channel change request detector 218 configures channel change server 108 to be monitoring network 104 for channel change requests 112. When channel change request 112 from client 106(1) is detected, channel change request handler 220 is activated to respond to it. Specifically, channel change request handler 220 responds by sending a previous I frame for the requested channel to client 106(1) in a unicast message.

[0034] In order to be able to send previous I frames for requested channels to clients 106, channel change server 108 secures access to such previous I frames by retaining them at least temporarily. Specifically, I frame cacher 214 tracks each video stream 110 that is associated with each video channel and stores at least the immediately most recent previous I frame for each video stream 110. These most recent previous I frames are stored as cached I frames 216.

[0035] As illustrated in FIG 2, the activation time of channel change request 112 is indicated along video stream 110 as time of CCR 212. This time of CCR 212 falls between two I frames. Hence, retained I frame 210, which comprises a cached or previous I frame in this mode, has already been stored at cached I frames 216 by I frame cacher 214. Channel change request handler 220 extracts retained I frame 210 from cached I frames 216. Channel change request handler 220 also formulates a unicast message (UM) that includes retained I frame 210 and transmits it as retained I frame UM 208 toward client 106(1).

[0036] Client 106(1) receives retained I frame UM 208 and can decode and display retained I frame 210 thereof while awaiting the next I frame of video stream 110 that is associated with the requested channel. The faster that retained I frame UM 208 is received by client 106(1), the shorter the delay between when a user requests a channel change and when a full (initially static) video frame

is displayed and the less likely that transmission of retained I frame 210 in retained I frame UM 208 is to interfere with the reception of current and possibly more-relevant (e.g., newer) frames of video stream 110. Hence, transmission bandwidth at least between client 106(1) and the replication point 202 that is most proximate thereto can be an issue. Addressing this transmission bandwidth issue is described below with reference to FIGS. 3A and 3B.

[0037] FIG 3A illustrates a video distribution architecture 300A that includes an exemplary channel change server 108 that is capable of synchronizing a joining to a multicast group for client 106(1) using a join command. With respect to video distribution architecture 200 (of FIG 2), video provider 102, channel change server 108, and clients 106(1, 2 ... n) remain connected to network 104. However, video provider 102 provides video streams 110 via channel change server 108. Although shown separately, video provider 102 and channel change server 108 (e.g., in FIGS. 1-3B) may be co-located and/or combined into a single server or system.

[0038] In a described implementation, channel change server 108 is adapted to buffer video stream 110 to delay it in time before multicast streaming distribution thereof. Channel change server 108 is capable of synchronizing a joining to a new channel to just prior to a new I frame for a video stream 110 that is associated with the new channel by "predicting" the occurrence of a next I frame. This quasi-prediction is accomplished using the time delay aspect of the buffered portion of video stream 110.

[0039] As illustrated, channel change server 108 includes memory 204 that has processor-executable instructions, which may be executed by processor 206 to perform function(s) as described further below. Modules having processor-executable instructions that are stored as part of memory 204 include: video stream bufferer 304, buffered video stream 306, join command issuer 308, and synchronization determiner 310. The functions of modules 304, 306, 308, and 310 may be implemented in conjunction with or separately from those of modules 214, 216, 218, and 220 (of FIG 2).

[0040] Channel change server 108 accepts video stream 110 (for each video channel) from video provider 102. Video stream bufferer 304 creates a buffered portion 312(T) of video stream 110 between a receive point (RP) and a send point (SP). Each currently-buffered buffered portion 312 is stored as buffered video stream 306. Buffered portion 312(T) corresponds to a current time "T". The receive point corresponds to the point along video stream 110 at which channel change server 108 is currently receiving from video provider 102. The send point corresponds to the point along video stream 110 at which channel change server 108 is currently sending toward clients 106.

[0041] In a described implementation, client 106(1) transmits upstream (e.g., as a unicast message) channel change request 112, possibly through one or more

replication points 202 depending on the upstream path. The activation time of CCR 212 is indicated with respect to video stream 110 and buffered portion 312(T). Retained I frame 210 may be sent in retained I frame UM 208 by channel change request handler 220 (as described above with reference to FIG 2). In this mode, retained I frame 210 comprises a cached or buffered I frame. If the retained I frame 210 happens to be within buffered portion 312(T), it may be retrieved directly from buffered video stream 306, possibly even prior to being cached as part of cached I frames 216 if I frames are not cached until they are sent at the send point SP.

[0042] Because full decoding of true motion video does not start until reception of the next upcoming I frame, transmission of intervening P and/or B frames can be considered unnecessary bandwidth usage. To avoid such bandwidth squandering and to increase the likely speed at which retained I frame UM 208 is received by client 106(1), synchronization determiner 310 is capable of causing client 106(1) to be joined to the multicast group corresponding to the requested channel just in time to receive the next decodable frame. This may, for example, amount to as little "excess bandwidth" utilization as a few packets before the next I frame to as much "excess bandwidth" as multiple frames. In this mode, the next decodable frame comprises another I frame.

[0043] Specifically, synchronization determiner 310 ascertains whether the next I frame is present within the current buffered portion 312 of video stream 110. At time of CCR 212, the next decodable frame 314 is not within buffered portion 312(T). However, after "X" unit(s) of time, the next decodable frame 314 is within buffered portion 312(T+X). When synchronization determiner 310 ascertains that the next decodable frame 314 is within the current buffered portion 312, synchronization determiner 310 determines that it is time to issue a join command and thus activates or prompts join command issuer 308.

[0044] Join command issuer 308, once activated, issues a join command over network 104 (not explicitly indicated in FIG 3A for clarity). The join command causes a join message 302 to be received at replication point 202. Join message 302 notifies replication point 202 that client 106(1) is to begin receiving the multicast stream that corresponds to the requested channel by joining client 106(1) to the multicast group for that multicast stream. This join message 302 may be transmitted from client 106(1) or join command issuer 308 of channel change server 108. The former is described further below with reference to FIG 4A, and the latter is described further below with reference to FIG. 4B. In the latter implementation, the join command that is issued by join command issuer 308 may comprise join message 302.

[0045] In a described implementation, the size of buffered portion 312 relates to an expected (including a known) time that is consumed when joining a client 106 to a multicast group of a multicast channel. This time

may include a time period to effectuate a leave operation. By way of example, buffered portion 312 may correspond to a worst case (e.g., absolute or reasonable worst case) scenario for effectuating a join operation for any of the relevant clients 106. Alternatively, the size of buffered portion 312 may correspond to an average time to effectuate a multicast join operation, may be tailored for each individual or designated set of clients 106 if conditions of network 104 vary spatially or temporally, and so forth.

[0046] FIG 3B illustrates a video distribution architecture 300B that includes an exemplary channel change server 108 that is capable of synchronizing a joining to a multicast group for client 106(1) using a join command and that is capable of providing a smoother initial video presentation experience. Video distribution architecture 300A can result in a video gap or discontinuity that is experienced by a user of a client 106. This video gap/discontinuity results from the consecutive display of two non-consecutive I frames, which have multiple intervening undisplayed non-I frames. Video distribution architecture 300B ameliorates this video gap/discontinuity by smoothing the video presentation as described below.

[0047] For the sake of clarity, video stream bufferer 304, join command issuer 308, and synchronization determiner 310 are not shown in FIG 3B. However, a longer segment of video stream 110 is illustrated. Buffered portion 312(T*) is longer than buffered portion 312(T) (of FIG 3A). Buffered portion 312(T*) includes a joining time 316 and an I frame interval duration 318, as described below.

[0048] In a described implementation for this third mode, channel change server 108 is adapted to buffer video stream 110 to delay it in time, before multicast streaming distribution thereof, by at least the maximum distance between I frames plus the maximum join-time for client 106(1) to become joined to the multicast group corresponding to the requested channel. Channel change server 108 is capable of synchronizing a joining to a new channel to just after a new I frame for a video stream 110 that is associated with the new channel by "predicting" the occurrences of I frames. This quasi-prediction is accomplished using the time delay aspect of the buffered portion 312(T*) (e.g., the delay window) of video stream 110.

[0049] Channel change server 108 is adapted to retain I frames within buffered portion 312(T*). The retained I frames may be retained by I frame cacher 214 as cached I frames 216 or as recorded pointers/indexes to I frames that are in the buffered window. Alternatively, the retained I frames may be retained within buffered portion 312(T*) without using an I frame cacher 214. In a described implementation for this mode, retained I frame 210 comprises a buffered I frame.

[0050] When client 106(1) requests a channel change via a CCR 112, channel change server 108 provides the oldest retained I frame 210 within the delay window of buffered portion 312(T*) for which client 106(1) still has

time to receive a retained I frame UM 208 and to join the multicast group in time to receive the frame immediately subsequent to the oldest retained I frame 210. In this manner, client 106(1) receives a contiguous set of frames, with the first frame being a retained I frame 210 arriving via a retained I frame UM 208 and the (initial) subsequent frames being non-I frames arriving via the multicast group. Client 106(1) pauses on the retained I frame 210 because it is sent "ahead of time", and client 106(1) then begins full motion video when it is time to play the immediately subsequent frame that is obtained from the delayed multicast stream.

[0051] Joining time 316 corresponds to the time consumed when joining a client 106 to a multicast group, as described above with reference to FIG 3A. I frame interval duration 318 corresponds to the greatest possible time period between successive I frames for the given coding scheme. As illustrated, a first time of CCR 212' is shown arriving just as joining time 316 is about to start. Consequently, a first retained I frame 210', which is a buffered I frame in this implementation of the third mode, and a first next decodable frame 314' are the first two frames that a client 106 receives to start video decoding. A second time of CCR 212" is shown arriving after expiration of joining time 316 with respect to retained I frame 210' but prior to expiration of a joining time 316 (not explicitly shown) with respect to retained I frame 210". Consequently, a second retained I frame 210", and a second next decodable frame 314" are the first two frames that a client 106 receives to start video decoding for second time of CCR 212".

[0052] FIG 4A illustrates a first exemplary mechanism 308*A for implementing a join command. Exemplary mechanism 308*A involves participation by client 106 as well as channel change server 108 and replication point 202. Specifically, channel change server 108 transmits a join instruction UM 402 to client 106 via replication point 202. Join instruction UM 402 stipulates to client 106 when to transmit its join message responsive to the determination made by synchronization determiner 310 (of FIGS. 3A and 3B) of channel change server 108. At the appointed stipulated time, client 106 transmits join message 302A to replication point 202 so that client 106 is joined to the multicast group corresponding to the requested channel in time to receive the next decodable frame 314 and without receiving a significant amount of earlier non-I (or inter) frame(s) or otherwise non-decodable frame(s).

[0053] This joining delay of the multicast stream facilitates bandwidth availability for the unicast delivery of retained I frame 210 (of FIGS. 2, 3A, and 3B). Replication point 202 may be, for example, the replication point 202 that is closest to client 106 and capable of multicasting the desired video stream 110.

[0054] To the extent that the join operation is precipitated by a join message 302A that is transmitted from client 106, exemplary mechanism 308*A comports with a more-typical multicast joining procedure. However,

the logistics involved are non-trivial inasmuch as three network elements are involved in the instigation of the join message and because setting time constraints (e.g., as reflected by the size of buffered portion 312) becomes concomitantly more difficult and/or more extreme for worst case analysis. The joining procedure can be simpler and more certain if client 106 is not obligated to participate.

[0055] FIG 4B illustrates a second exemplary mechanism 308*B for implementing a join command. Exemplary mechanism 308*B involves participation by channel change server 108 and replication point 202. Specifically, channel change server 108 transmits a join message 302B to replication point 202. Join message 302B is transmitted responsive to the determination made by synchronization determiner 310 and likely involves less lead time for effectuating the joining operation with sufficient clearance to receive the next decodable frame 314. Join message 302B notifies replication point 202 that client 106 is to be joined to the multicast group corresponding to the requested channel. Exemplary mechanism 308*B entails enabling non-receiver hosts, such as sender/source hosts, to be capable of precipitating join operations on behalf of receiver hosts.

[0056] FIG 5 is a flow diagram 500 that illustrates an exemplary method for fast channel changing with a combination multicast and unicast network. Flow diagram 500 includes thirteen (13) blocks 502-526. Although the actions of flow diagram 500 may be performed in other environments and with a variety of e.g. software schemes, FIGS. 2, 3A-3B, and 4A-4B are used in particular to illustrate certain aspects and examples of the method.

[0057] For example, the actions of blocks 502-526 may be performed by a channel change server 108 and a client 106, possibly in conjunction with one or more replication points 202 of a network 104. As illustrated, channel change server 108 performs the actions of blocks 502-516, and client 106 performs the actions of blocks 518-526.

[0058] At block 502, a video stream is accepted. For example, channel change server 108 may accept one or more video streams 110 from an associated video provider 102. At block 504, a portion of the accepted video stream is buffered. For example, video stream buffer 304 may delay each video stream 110 that is associated with each channel to create buffered portion 312 for each video stream 110. The buffered portions 312 may be stored as a set of buffered video streams 306 with frames that enter at the receiving point (RP) and "move" toward the sending point (SP).

[0059] At block 506, at least one I frame is retained. For example, I frame cacher 214 of channel change server 108 may retain the retained frame (e.g., retained I frame 210) of each video stream 110 that is associated with each channel as a set of cached I frames 216 or a set of indexes/pointers to frames in a buffered portion 312(T*). Alternatively, I frames may be retained by being

buffered at known or determinable locations of buffered portion 312(T*). As indicated by the dashed arrow that diverges from point 528, the actions of blocks 502-506 are ongoing for channel change server 108.

5 [0060] At block 518, video is being received via multicast communication. For example, client 106 may be receiving video stream 110 from video provider 102 and/or channel change server 108 as a multicast stream over one or more replication points 202 of network 104.
10 At block 520, a channel change request is transmitted as a unicast message. For example, client 106 may transmit a channel change request 112 as a unicast message toward channel change server 108. This channel change request 112 is effectively a request to switch
15 from a first multicast group corresponding to a first video channel to a second multicast group corresponding to a second video channel, with the requested second video channel being indicated by channel change request 112.

20 [0061] At block 508, a channel change request is detected. For example, channel change request detector 218 of channel change server 108 may detect channel change request 112. If video distribution architecture 200 is implemented, channel change server 108 may be
25 monitoring links of and/or interfaces to network 104 in the vicinity of video provider 102 for channel change requests 112, or video provider 102 may be forwarding channel change requests 112 (or channel change server 108 may be the intended recipient of channel change
30 requests 112). If video distribution architecture 300A or 300B is implemented, channel change server 108 may be the intended recipient of channel change requests 112, and so forth.

[0062] At block 510, a retained I frame for the requested channel is retrieved. For example, channel change
35 request handler 220 accesses cached I frames 216 and/or buffered portion 312(T*) of buffered video stream 306 to retrieve the retained I frame (e.g., retained I frame 210, including 210' and 210'') for the video stream 110 associated with the requested channel. At block 512, the
40 retained I frame for the requested channel is transmitted as a unicast message. For example, channel change request handler 220, after appropriate formulation, transmits retained I frame UM 208 toward client 106.

45 [0063] At block 522, the retained I frame for the requested channel is received as a unicast message. For example, client 106 may receive retained I frame UM 208, which is an example of a unicast communication, even though client 106 usually receives video streams
50 110 as multicast streams during standard video channel reception. At block 524, the retained I frame for the requested channel is displayed. For example, client 106 extracts the retained I frame for the requested channel from the retained I frame UM 208 and causes the retained I frame to be displayed. Depending on the time
55 period until the next decodable frame 314 (including 314' and 314'') is due, this static I frame presentation may continue for a noticeable time (e.g., up to 1-2 sec-

onds in a typical MPEG-4 video coding implementation).

[0064] At block 514, the client's joining to the multicast group that corresponds to the requested channel is synchronized with regard to the next decodable frame. For example, for video distribution architectures 300A and 300B, synchronization determiner 310 of channel change server 108 may ascertain when the next decodable frame 314 is due to be sent to (and thereby when next decodable frame 314 is likely to be received or will be received in a worst-case scenario by) client 106. This next decodable frame 314 ascertainment may be performed with reference to buffered portion 312 (including buffered portion 312(T*) and joining time 316 thereof) for the video stream 110 that is associated with the requested channel. Once the timing of next decodable frame 314 is ascertained, synchronization determiner 310 determines the appropriate timing for the multicast joining operation of client 106 to the multicast group corresponding to the requested channel.

[0065] At block 516, a join command is issued for the requesting client. For example, join command issuer 308 may issue a join command with respect to client 106 responsive to a synchronization determination by synchronization determiner 310. The join command may comprise a join instruction unicast message 402 that is sent to client 106 to prompt client 106 to transmit a join message 302A at an appointed time to a replication point 202 (e.g., exemplary mechanism 308*A for implementing a join command). Alternatively, the join command may comprise a join message 302B that is sent "directly" to a replication point 202 on behalf of client 106 (e.g., exemplary mechanism 308*B for implementing a join command).

[0066] At block 526, video for the requested channel is received via multicast communication. For example, client 106 may receive video stream 110 that is associated with the requested channel via a corresponding multicast streaming group over network 104 using multiple replication points 202. In other words, after a replication point 202 has caused client 106 to be joined to the corresponding multicast streaming group responsive to a join message 302, at least that one replication point 202 duplicates (as necessary) and forwards video stream 110 to client 106.

[0067] The actions of blocks 512 and 516 may, in particular, be performed in a myriad of orders. For example, the issuance of block 516 may occur after the transmission of block 512, or the issuance and transmission of blocks 516 and 512 may occur substantially simultaneously or at least without consideration of the order of either. Alternatively, the issuance of block 516 may be performed after the transmission of block 512 unless a next I frame is of such temporal proximity (e.g., closer than a predetermined threshold period) that waiting to issue the join command jeopardizes the ability of a channel changing client to receive the next I frame.

[0068] The actions, aspects, features, components, etc. of FIGS. 1-5 are illustrated in diagrams that are di-

vided into multiple blocks. However, the order, interconnections, layout, etc. in which FIGS. 1-5 are described and/or shown is not intended to be construed as a limitation, and any number of the blocks can be combined, rearranged, augmented, omitted, etc. in any manner to implement one or more systems, methods, devices, procedures, media, apparatuses, servers, arrangements, etc. for fast channel changing. Furthermore, although the description herein includes references to specific implementations, the illustrated and/or described implementations can be implemented in any suitable hardware, software, firmware, or combination thereof and using any suitable video distribution architecture(s), network element(s) and organization(s), video encoding standard(s), multicast and unicast scheme(s), and so forth.

[0069] With particular reference to FIGS. 2 and 3A-3B, a video provider 102 and/or a server 108 may include a variety of processor-accessible media. Such media may be any available media that is accessible by a computing or other (e.g., electronic) device. Such media may include both volatile and non-volatile media, removable and non-removable media, and storage (e.g., memory 204) and transmission media (e.g., links or nodes of network 104). The media may include processor-executable instructions.

[0070] Implementations for fast channel changing may be described in the general context of processor-executable instructions. Generally, processor-executable instructions include routines, programs, protocols, objects, interfaces, components, data structures, etc. that perform and/or enable particular tasks and/or implement particular abstract data types. Fast channel changing, as described in certain implementations herein, may also be practiced in distributed processing environments where tasks are performed by remotely-linked processing devices that are connected through a communications link and/or network. Especially but not exclusively in a distributed computing environment, processor-executable instructions may be located in separate storage media, executed by different processors, and/or propagated over transmission media.

[0071] Although systems, media, devices, methods, procedures, apparatuses, techniques, schemes, approaches, procedures, arrangements, and other implementations have been described in language specific to structural, logical, algorithmic, and functional features and/or diagrams, it is to be understood that the invention defined in the appended claims is not necessarily limited to the specific features or diagrams described. Rather, the specific features and diagrams are disclosed as exemplary forms of implementing the claimed invention.

Claims

1. A method for fast channel changing in a multicast video distribution architecture, the method compris-

ing:

detecting a channel change request that indicates a requested channel, the requested channel corresponding to a multicast group; and
transmitting a retained intra frame for the requested channel as a unicast communication.

2. The method as recited in claim 1, further comprising:

caching at least one previous intra frame for each channel of a plurality of channels as a set of cached intra frames; and
retrieving, responsive to the detecting, the retained intra frame for the requested channel from the set of cached intra frames, the retained intra frame comprising a previous intra frame.

3. The method as recited in claim 1, wherein:

the detecting comprises detecting the channel change request from a particular client; and
the transmitting comprises transmitting the retained intra frame to the particular client.

4. The method as recited in claim 1, further comprising:

synchronizing a multicast joining operation to the multicast group corresponding to the requested channel with regard to a next decodable frame of the requested channel.

5. The method as recited in claim 4, further comprising:

buffering a video stream portion;

wherein the synchronizing comprises determining when the next decodable frame is present within the buffered video stream portion.

6. The method as recited in claim 4, further comprising:

buffering a video stream portion;

wherein the synchronizing comprises determining when the retained intra frame reaches a joining time of the buffered video stream portion.

7. The method as recited in claim 4, further comprising:

issuing a join command responsive to the synchronizing.

8. The method as recited in claim 7, wherein the issuing comprises:

transmitting a join instruction communication to a client that made the channel change request, the join instruction communication stipulating a time at which the client is to transmit a join message to a replication point.

9. The method as recited in claim 7, wherein the issuing comprises:

transmitting a join message to a replication point.

10. The method as recited in claim 1, further comprising:

caching at least one previous intra frame for each channel of a plurality of channels as a set of cached intra frames;
retrieving, responsive to the detecting, the retained intra frame for the requested channel from the set of cached intra frames, the retained intra frame comprising a previous intra frame;
buffering a video stream portion;
synchronizing a multicast joining operation to the multicast group corresponding to the requested channel based, at least partially, on whether a next intra frame is present within the buffered video stream portion; and
issuing a join command responsive to the synchronizing.

11. The method as recited in claim 1, further comprising:

buffering a video stream portion;
buffering at least two intra frames for each channel of a plurality of channels to produce buffered intra frames;
retrieving, responsive to the detecting, the retained intra frame for the requested channel from the buffered intra frames with regard to a joining time of the buffered video stream portion;
synchronizing a multicast joining operation to the multicast group corresponding to the requested channel based, at least partially, on whether a next decodable frame is outside the joining time; and
issuing a join command responsive to the synchronizing.

12. One or more processor-accessible media comprising processor-executable instructions that, when executed, direct an apparatus to perform the method as recited in claim 1.

13. A channel change server comprising:

cached intra frames for a plurality of video streams, each respective video stream of the plurality of video streams associated with a respective channel of a plurality of channels; a channel change request detector that is capable of detecting channel change requests from individual clients of a plurality of clients; and a channel change request handler that is configured to respond to a detected channel change request from a particular client of the plurality of clients by extracting a most recent intra frame of a video stream associated with a requested channel from the cached intra frames and by transmitting the extracted most recent intra frame to the particular client using a unicast communication;

wherein the channel change server is associated with multicast video distribution of the plurality of video streams.

14. The channel change server as recited in claim 13, further comprising:

an intra frame cacher that is adapted to extract intra frames from the plurality of video streams and to cache at least a most recent intra frame for each video stream of the plurality of video streams.

15. The channel change server as recited in claim 13, further comprising:

a join command issuer that is adapted to send a join message to a replication point to cause the replication point to join the particular client to a multicast group corresponding to the requested channel.

16. The channel change server as recited in claim 13, further comprising:

a join command issuer that is adapted to send a join instruction message to the particular client, the join instruction message stipulating an appointed time at which the particular client is to transmit a join message to a replication point.

17. The channel change server as recited in claim 13, further comprising:

a synchronization determiner that is adapted to synchronize a multicast joining operation for the particular client to a multicast group corresponding to the requested channel with regard

to a next intra frame of the video stream associated with the requested channel.

18. The channel change server as recited in claim 17, wherein the synchronization determiner is further adapted to synchronize the multicast joining operation for the particular client to the multicast group corresponding to the requested channel using a quasi-predicted time of the next intra frame of the video stream associated with the requested channel.

19. The channel change server as recited in claim 17, further comprising:

a time-delayed buffered portion of the video stream that is associated with the requested channel;

wherein the synchronization determiner is further adapted to synchronize the multicast joining operation for the particular client to the multicast group corresponding to the requested channel with regard to the time-delayed buffered portion of the video stream that is associated with the requested channel.

20. The channel change server as recited in claim 19, wherein a size of the time-delayed buffered portion corresponds to a likely or possible time period consumed when joining the particular client to the multicast group corresponding to the requested channel.

21. The channel change server as recited in claim 19, wherein the synchronization determiner is further adapted to determine that a join command is to be issued when the synchronization determiner ascertains that the next intra frame is present within the time-delayed buffered portion of the video stream that is associated with the requested channel.

22. The channel change server as recited in claim 19, wherein the synchronization determiner is further adapted to prompt issuance of a join command as soon as the next intra frame is ascertained to be present within the time-delayed buffered portion of the video stream that is associated with the requested channel even if the extracted most recent intra frame of the video stream associated with the requested channel has not been fully delivered to the particular client using the unicast communication.

23. A channel change server comprising:

retained intra frames for a plurality of video streams, each respective video stream of the plurality of video streams associated with a re-

spective channel of a plurality of channels;
 a channel change request detector that is capable of detecting channel change requests from individual clients of a plurality of clients; and
 a channel change request handler that is configured to respond to a detected channel change request from a particular client of the plurality of clients by extracting a retained intra frame of a video stream associated with a requested channel from the retained intra frames and by transmitting the extracted retained intra frame to the particular client using a unicast communication;

wherein the channel change server is associated with multicast video distribution of the plurality of video streams.

24. The channel change server as recited in claim 23, further comprising:

a video stream bufferer that is adapted to buffer each video stream of the plurality of video streams to create a plurality of respective buffered portions.

25. The channel change server as recited in claim 23, further comprising:

a join command issuer that is adapted to send a join message to a replication point to cause the replication point to join the particular client to a multicast group corresponding to the requested channel.

26. The channel change server as recited in claim 23, further comprising:

a join command issuer that is adapted to send a join instruction message to the particular client, the join instruction message stipulating an appointed time at which the particular client is to transmit a join message to a replication point.

27. The channel change server as recited in claim 23, further comprising:

a synchronization determiner that is adapted to synchronize a multicast joining operation for the particular client to a multicast group corresponding to the requested channel with regard to a next decodable frame of the video stream associated with the requested channel.

28. The channel change server as recited in claim 27, wherein the synchronization determiner is further adapted to synchronize the multicast joining oper-

ation for the particular client to the multicast group corresponding to the requested channel using a quasi-predicted time of the next decodable frame of the video stream associated with the requested channel.

29. The channel change server as recited in claim 27, further comprising:

a time-delayed buffered portion of the video stream that is associated with the requested channel;

wherein the synchronization determiner is further adapted to synchronize the multicast joining operation for the particular client to the multicast group corresponding to the requested channel with regard to the time-delayed buffered portion of the video stream that is associated with the requested channel.

30. The channel change server as recited in claim 29, wherein a size of the time-delayed buffered portion corresponds to a likely or possible time period consumed when joining the particular client to the multicast group corresponding to the requested channel.

31. The channel change server as recited in claim 29, wherein a size of the time-delayed buffered portion corresponds to a combination of a multicast joining time and an intra frame interval duration.

32. The channel change server as recited in claim 29, wherein a joining time of the time-delayed buffered portion corresponds to a likely or possible time period consumed when joining the particular client to the multicast group corresponding to the requested channel.

33. The channel change server as recited in claim 29, wherein the synchronization determiner is further adapted to determine that a join command is to be issued when the synchronization determiner ascertains that the next decodable frame is proximate to a joining time of the time-delayed buffered portion of the video stream that is associated with the requested channel.

34. The channel change server as recited in claim 29, wherein the synchronization determiner is further adapted to prompt issuance of a join command as soon as the next decodable frame is ascertained to be entering a joining time of the time-delayed buffered portion of the video stream that is associated with the requested channel even if the extracted retained intra frame of the video stream associated with the requested channel has not been fully deliv-

ered to the particular client using the unicast communication.

35. An arrangement for channel changing, comprising:

retention means for retaining at least one intra frame for each video stream of a plurality of video streams, each respective video stream associated with a respective channel of a plurality of channels;

detection means for detecting a channel change request from a client that indicates a requested channel, the channel change request from the client signifying a demand to switch from a first multicast group to a second multicast group that corresponds to the requested channel; and

handler means for handling the channel change request by transmitting a retained intra frame to the client via a unicast communication, the retained intra frame retained by the retention means from a respective video stream that is associated with the requested channel.

36. The arrangement as recited in claim 35, further comprising:

buffer means for buffering each respective video stream of the plurality of video streams to establish a respective buffered portion for each respective video stream; and

synchronization means for synchronizing a joining of the client to the second multicast group (i) with reference to a respective buffered portion for the respective video stream that is associated with the requested channel and (ii) with regard to a next decodable frame of the respective video stream that is associated with the requested channel.

37. The arrangement as recited in claim 36, further comprising:

issuance means for issuing a join command responsive to the synchronization means.

38. The arrangement as recited in claim 35, wherein the retention means comprises at least one of (i) buffering means for buffering the at least one intra frame for each video stream of the plurality of video streams and (ii) caching means for caching at least one intra frame for each video stream of the plurality of video streams.

39. The arrangement as recited in claim 35, wherein the arrangement comprises at least one server.

40. The arrangement as recited in claim 35, wherein the

arrangement comprises one or more processor-accessible media.

41. A server that is configured to retain at least one independent frame for each video channel of a plurality of video channels that are being distributed using multicast communications and that is adapted to respond to channel change requests from clients by transmitting the retained at least one independent frame of a requested video channel to a requesting client using a unicast communication.

42. The server as recited in claim 41, wherein the server is capable of multicasting the plurality of video channels to the clients.

43. The server as recited in claim 41, wherein the server is capable of synchronizing a multicast joining operation for the requesting client with regard to a next decodable frame of the requested video channel.

44. The server as recited in claim 43, wherein the next decodable frame of the requested video channel comprises a next independent frame.

45. The server as recited in claim 43, wherein the next decodable frame of the requested video channel comprises a next dependent frame.

46. The server as recited in claim 41, wherein the server is capable of synchronizing a multicast joining operation for the requesting client with regard to a next decodable frame of the requested video channel; and wherein the server is further adapted to refrain from transmitting the retained at least one independent frame of the requested video channel to the requesting client if transmission of the retained at least one independent frame jeopardizes timely reception of the next decodable frame of the requested video channel.

47. The server as recited in claim 41, wherein the server is further adapted to issue a join command irrespective of a complete or an incomplete delivery to the requesting client of the retained at least one independent frame of the requested video channel.

48. A system comprising:

at least one processor; and
one or more media including processor-executable instructions that are capable of being executed by the at least one processor, the processor-executable instructions adapted to direct the system to perform actions comprising:

multicasting a plurality of channels;
retaining at least one intra frame for each

channel of the plurality of channels; and transmitting a retained intra frame for a requested channel as a unicast communication responsive to a channel change request.

49. The system as recited in claim 48, wherein the system comprises a video provider and a channel change server.

50. The system as recited in claim 48, wherein the system comprises a video provider and a channel change server that are co-located.

51. The system as recited in claim 48, wherein the system comprises a channel change server that receives the plurality of channels from a video provider; and wherein the channel change server performs the action of multicasting the plurality of channels.

52. The system as recited in claim 48, wherein the processor-executable instructions are adapted to cause the system to perform a further action comprising:

synchronizing a multicast joining operation to a multicast group corresponding to the requested channel with regard to a next decodable frame of the requested channel.

53. The system as recited in claim 52, wherein the processor-executable instructions are adapted to cause the system to perform a further action comprising:

buffering a video stream portion of a video stream that is associated with the requested channel;

wherein the action of synchronizing comprises an action of determining when the next decodable frame is present within the buffered video stream portion of the video stream that is associated with the requested channel, the next decodable frame comprising a next intra frame.

54. The system as recited in claim 52, wherein the processor-executable instructions are adapted to cause the system to perform a further action comprising:

buffering a video stream portion of a video stream, which is associated with the requested channel, to a length that at least equals a sum of a multicast joining time and an intra frame interval duration;

wherein the action of synchronizing comprises an action of determining when the next decodable frame is entering the multicast joining time part

of the buffered video stream portion of the video stream, the next decodable frame comprising a next non-intra frame.

55. The system as recited in claim 52, wherein the processor-executable instructions are adapted to cause the system to perform a further action comprising:

issuing a join command responsive to the synchronizing.

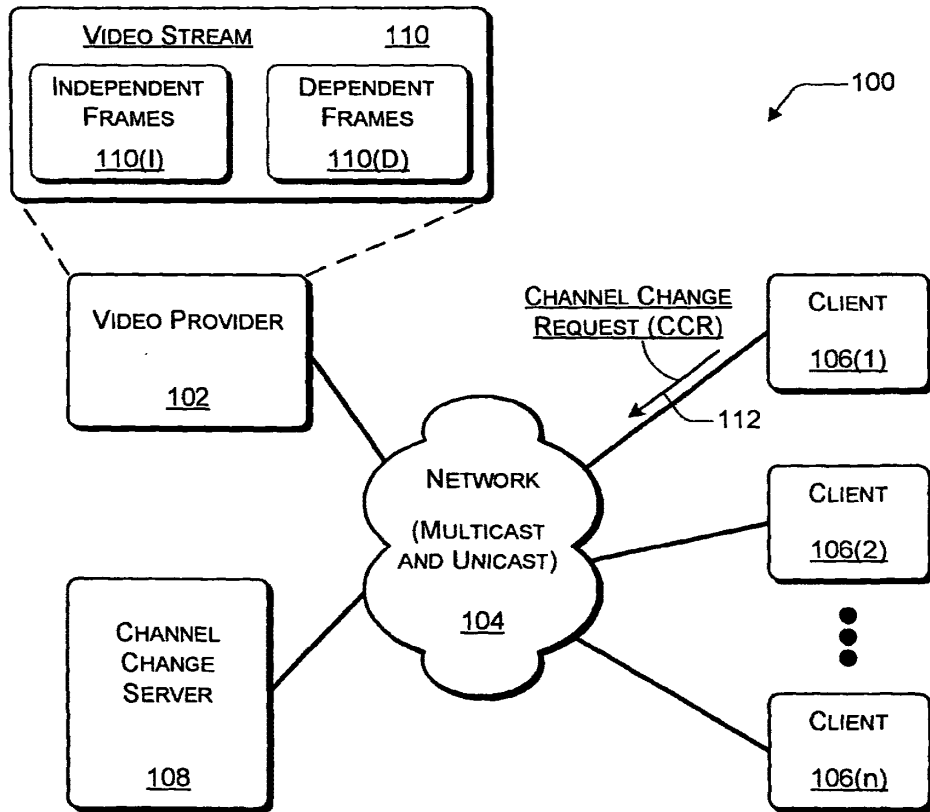


Fig. 1

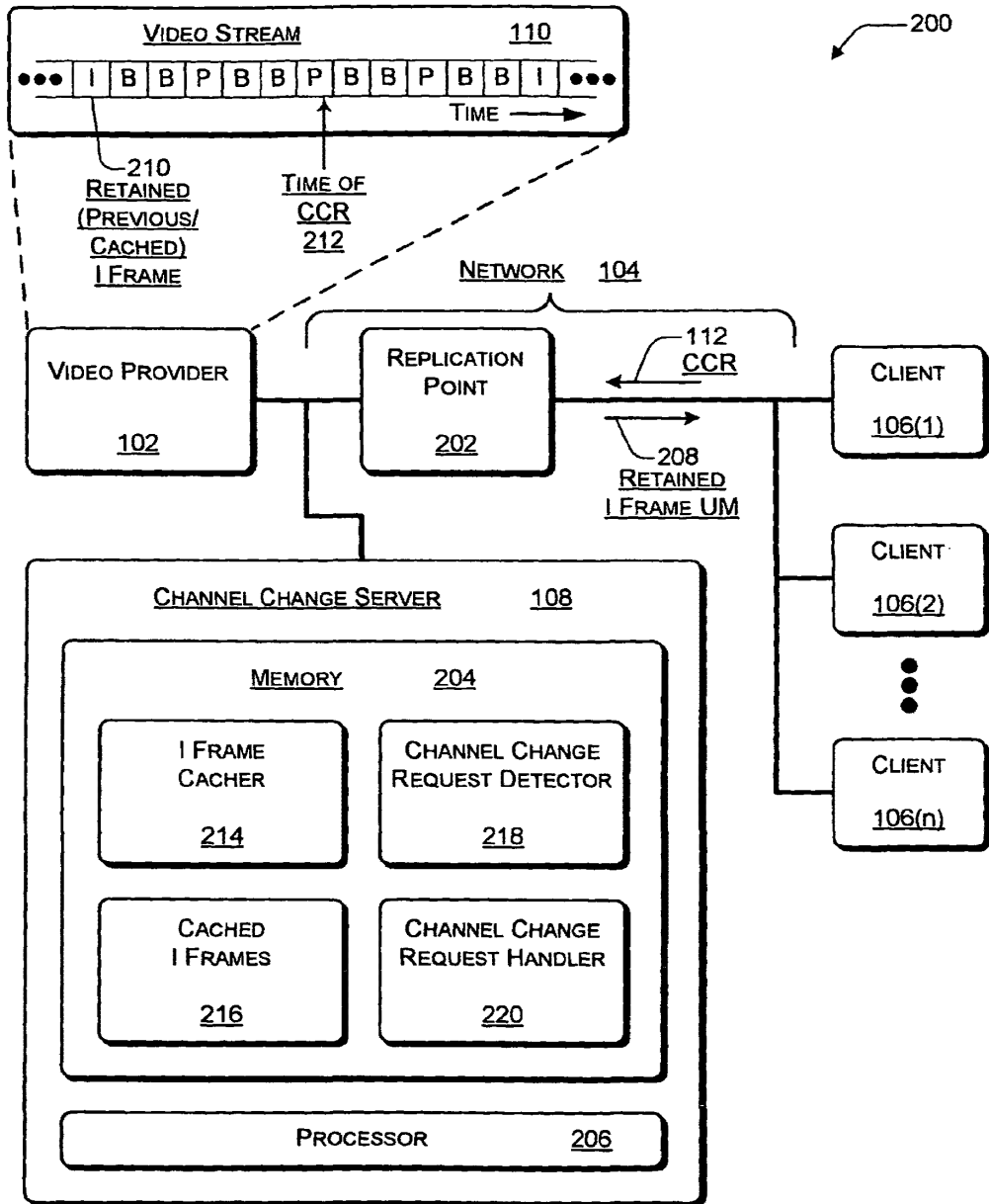


Fig. 2

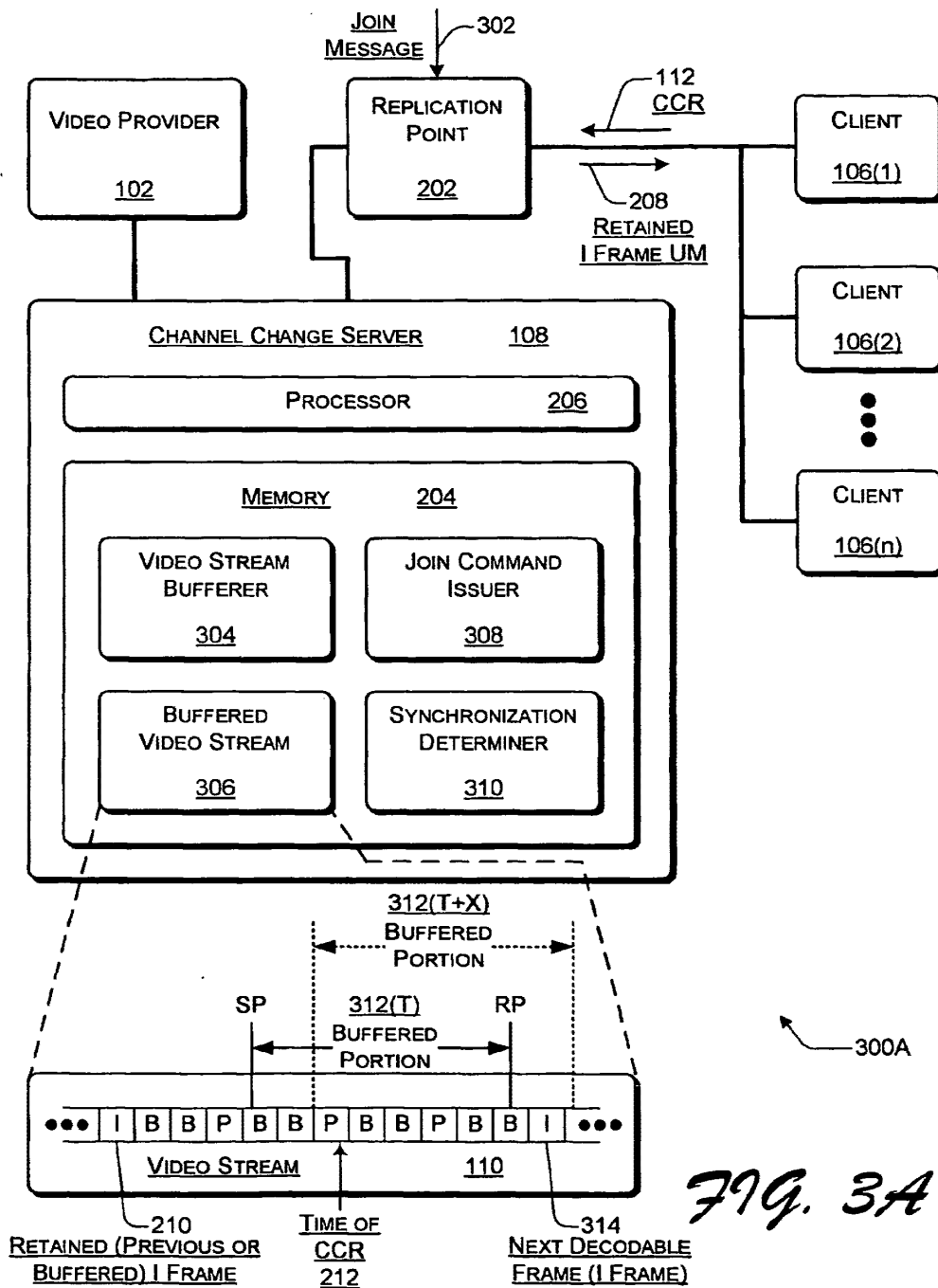


Fig. 3A

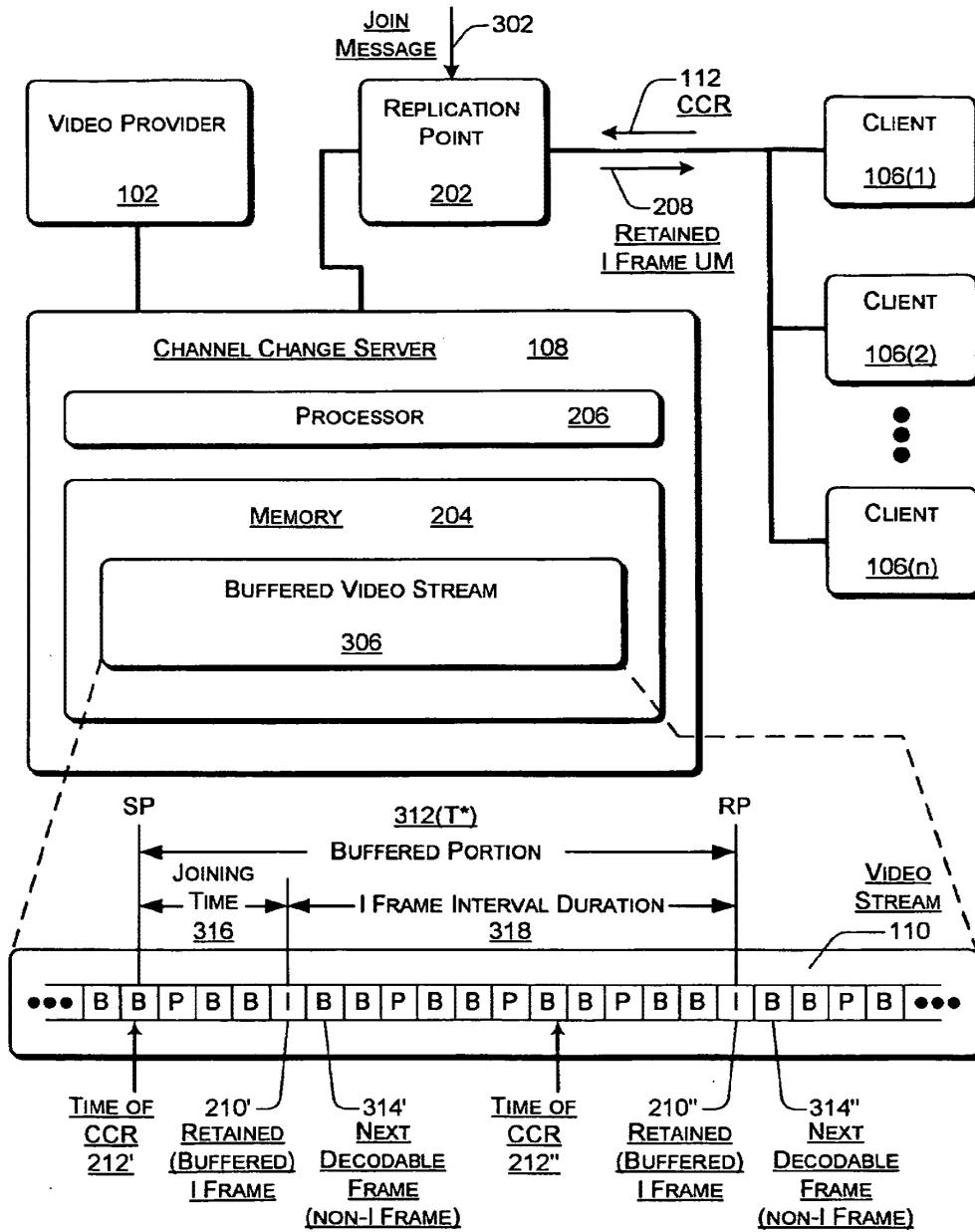


FIG. 3B

300B

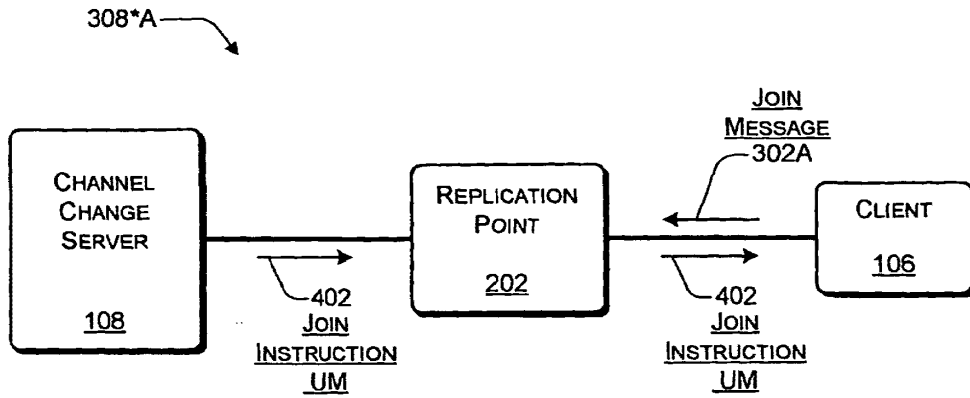


Fig. 4A

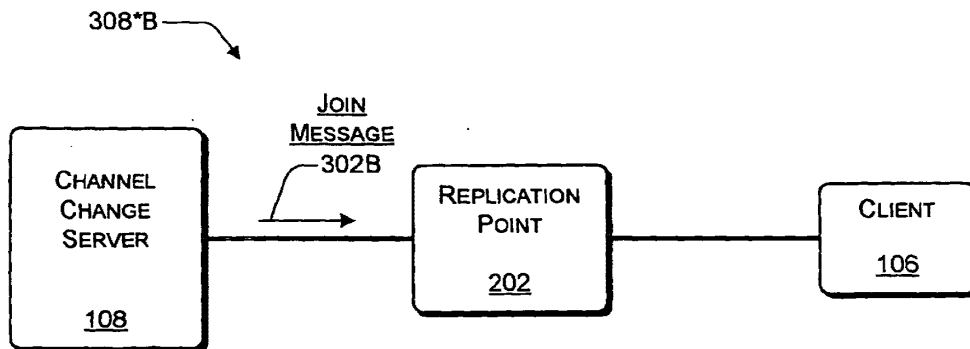


Fig. 4B

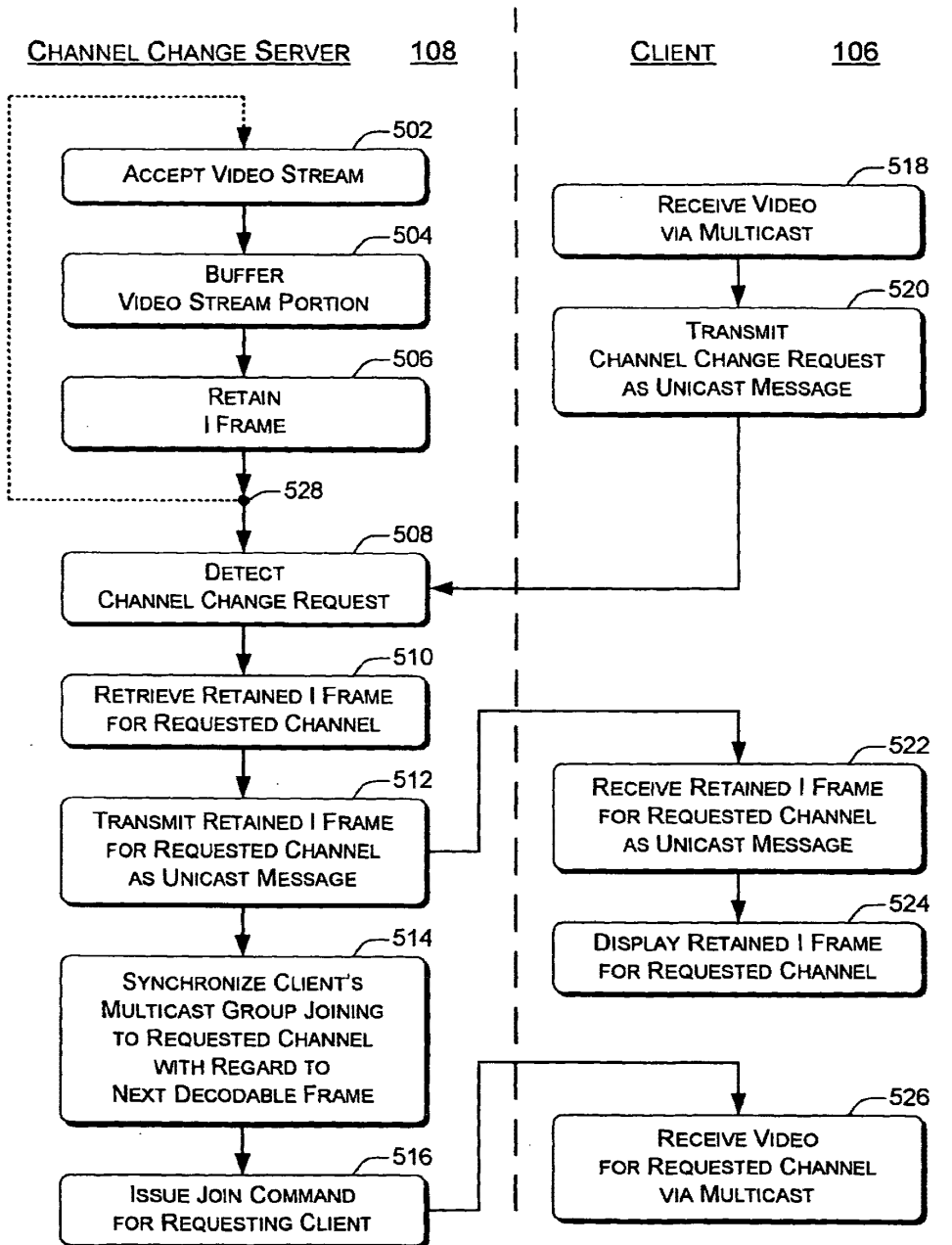


Fig. 5

500



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 02 1617

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	WO 01/03373 A1 (TELIA AB; BENGTTSSON, JOHAN, E; BERGSTEN, ANDERS; KALLA, THOMAS; KLITTB) 11 January 2001 (2001-01-11) * page 5, line 20 - page 8, line 19 * * page 9, line 7 - page 10, line 10 * * page 11, line 25 - page 12, line 21 * -----	1-3,12, 23,24, 35, 38-45, 48-51	H04N7/173
A	US 2002/114331 A1 (CHEUNG KWOK WAI ET AL) 22 August 2002 (2002-08-22) * paragraph [0066] * -----	1-55	
A	US 2002/124258 A1 (FRITSCH JEAN-GEORGES) 5 September 2002 (2002-09-05) * paragraph [0034] * -----	1-55	
A	US 2002/002708 A1 (ARYE RAM) 3 January 2002 (2002-01-03) * paragraph [0060] * * paragraph [0085] * -----	1-55	
A	US 6 418 473 B1 (ST. MAURICE SUSAN T ET AL) 9 July 2002 (2002-07-09) * column 2, line 13 - line 64 * -----	1-55	TECHNICAL FIELDS SEARCHED (Int.Cl.7) H04N
A	US 2002/107968 A1 (HORN GAVIN ET AL) 8 August 2002 (2002-08-08) * abstract * -----	1-55	
A	US 2002/040481 A1 (OKADA SHIGEYUKI ET AL) 4 April 2002 (2002-04-04) * paragraph [0061] * -----	1-55	
The present search report has been drawn up for all claims			
Place of search Berlin		Date of completion of the search 28 January 2005	Examiner Blais, D
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

1
EPO FORM 1503 03 02 (P4001)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 02 1617

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

28-01-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0103373 A1	11-01-2001	SE 521181 C2	07-10-2003
		EE 200100709 A	17-02-2003
		EP 1197037 A1	17-04-2002
		NO 20016167 A	28-02-2002
		SE 9902517 A	02-01-2001
US 2002114331 A1	22-08-2002	WO 0249359 A1	20-06-2002
		AU 1875701 A	24-06-2002
		CA 2431928 A1	20-06-2002
		EP 1342376 A1	10-09-2003
		HK 1040356 A2	17-05-2002
		TW 538641 B	21-06-2003
US 2002124258 A1	05-09-2002	NONE	
US 2002002708 A1	03-01-2002	AU 6529701 A	08-01-2002
		CN 1439227 T	27-08-2003
		EP 1297705 A1	02-04-2003
		JP 2004502356 T	22-01-2004
		WO 0201874 A1	03-01-2002
		AU 7017601 A	08-01-2002
		EP 1305944 A2	02-05-2003
		WO 0201782 A2	03-01-2002
		US 2002009143 A1	24-01-2002
US 6418473 B1	09-07-2002	AU 4902900 A	12-12-2000
		WO 0072594 A1	30-11-2000
US 2002107968 A1	08-08-2002	AU 2902902 A	18-06-2002
		TW 560189 B	01-11-2003
		WO 0247391 A1	13-06-2002
US 2002040481 A1	04-04-2002	JP 2002112138 A	12-04-2002
		TW 527838 B	11-04-2003

EPO FORM 10459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



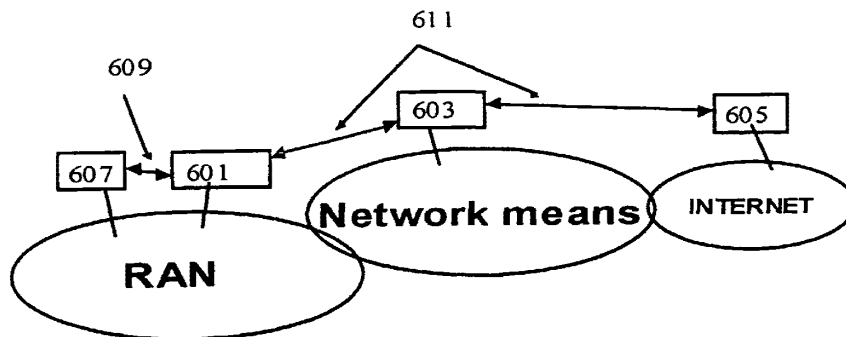
(43) International Publication Date
18 July 2002 (18.07.2002)

PCT

(10) International Publication Number
WO 02/056564 A1

- (51) International Patent Classification⁷: **H04L 29/06**, H04Q 7/20
- (21) International Application Number: PCT/SE01/02847
- (22) International Filing Date:
20 December 2001 (20.12.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/261,166 16 January 2001 (16.01.2001) US
- (71) Applicant (for all designated States except US): **OPERAX AB** [SE/SE]; Aurorum 7, S-977 75 Luleå (SE).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **NORRGÅRD, Joakim** [SE/SE]; Porsögården 24, S-977 54 Luleå (SE). **LARSSON, Anders** [SE/SE]; Professorsvägen 68A, S-977 51 Luleå (SE). **SCHULÉN, Olov** [SE/SE]; Jan Jonsvägen 19, S-945 91 Norrfjärden (SE).
- (74) Agent: **DR LUDWIG BRANN PATENTBYRÅ AB**; P.O. Box 17192, S-104 62 Stockholm (SE).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: NETWORK RESOURCE MANAGER IN A MOBILE TELECOMMUNICATION SYSTEM



(57) Abstract: The present invention relates to a method and arrangement for providing end-to-end Quality of Service within a mobile telecommunication system. The communication system comprises at least one network means e.g. a Core Network (CN) and at least one Radio Access Network (RAN) for Internet Protocol (IP) based transmission, wherein a Network Resource Manager (NRM) comprising a resource map is monitoring and/or controlling resources within the IP network.

WO 02/056564 A1

Title**Network Resource Manager in a Mobile Telecommunication System**Field of the invention

- 5 The present invention relates to a method in a communication system and to a network resource manager in a communication system according to the preambles of the independent claims.

In particular, it relates to a Network Resource Manager (NRM) and a method
10 thereof for providing an improved performance in a mobile telecommunication system comprising at least one network means e.g. a Core Network (CN) connected to at least one Radio Access Network (RAN), using Internet Protocol (IP) based transmission.

15 Background of the invention

Figure 1 shows a circuit switched mobile telecommunication system 100 according to the prior art. The system 100 comprises a CN 104 that comprises at least one Mobile Switching Center (MSC) and a RAN 102. The RAN 102 comprises at least one controlling unit 106 that is connected to
20 the MSC. The controlling unit 106 is a Base Station Controller (BSC) in a GSM system and a Radio Network Controller (RNC) in a UMTS system. Each controlling unit is further connected to at least one Base Station (BS) and each BS is respectively adapted to communicate over a radio interface 108 with at least one Mobile Terminal (MT). The MSC is also connected to a
25 Public Switched Telephone Network (PSTN) via a Gateway MSC (not shown in the figure). In a circuit switched system as shown in **figure 1**, voice and data sessions are guaranteed network resources via signalling, i.e. the Mobile Terminal (MT) signals its network resource demands to the system. If resources are available, a dedicated communication circuit that
30 guarantees resources for the session is set up through the network.

A current networking trend is to provide "IP (Internet Protocol) all the way" to wireline and wireless units. The objectives are to simplify infrastructure, to support a wide range of applications, and to support heterogeneous user demands on the communication service. This trend is applicable to wireless systems such as GSM (Global System for Mobile communication), GPRS (General Packet Radio Service), and UMTS (Universal Mobile Telecommunication System).

One step towards an all IP wireless system is to replace the traditional circuit switched technology by packet switched IP technology. By doing so, some of the network resource management mechanisms that are built into the system are no longer available and need to be replaced. The architectural components such as the MSC, Controller and the BS are still present but IP routers have replaced circuit switched network elements in order to provide IP based transmission. I.e., IP routers are introduced in network, e.g. within the CN and between the CN and the RAN and between and BS and a BSC in the RAN. In the wireless parts, the packet transfer over the radio interface (between a BS and a MT) is controlled by other protocols such as RLC, MAC and RRC that e.g. manage radio resources and provide reliable links.

In such a system, traffic circuits can be emulated by setting up IP tunnels between the logical components. The IP tunnels must provide a bearer service equivalent to that provided by the circuits in a circuit switched system.

The big challenge in this convergence lies in supporting multiple services with different Quality of Service (QoS) requirements that is providing e.g. an appropriate delay, jitter and packet loss guarantees for each service. To provide appropriate QoS, different types of resources (e.g. radio resources, network resources and power resources) have to be managed in the systems. Architectural components managing resources, e.g. in the Radio

Access Network (RAN) and the Core Network (CN), of these systems are defined in different standards.

As stated in the previous section the trend is that future telecommunication systems will be all IP multi-service systems. **Figure 2**, shows an example of a packet switched wireless system 200, e.g. a third generation (3G) UMTS system. The system comprises a CN with IP based transmission that comprises IP routers R and support nodes; a Serving GPRS Support Node (SGSN) that e.g. implements mobility functions and Gateway GPRS Support Node (GGSN) that implements interoperability with other systems, e.g. the Internet or PSTN. The system further comprises RANs that comprise a controlling unit 204, Base Stations BS and IP routers R. In the system 200, the SGSN, the GGSN, the controlling unit 204 e.g. an RNC and the BS (and other network elements) are interconnected by means of the IP routers R. This system is thus optimised for delivering IP packet switched services and its system architecture differs from the circuit switched architecture. Both the RAN and the CN are IP networks where logical functions (e.g. Radio Resource Management (RRM)) are distributed, e.g. in the RNC and in the SGSN.

The 3G wireless system needs to support multiple services (e.g. voice conversations, data transfers, streaming media, etc.) which have different transport QoS requirements. Sessions will often span over the RAN and the CN of the system and into other peering telecommunication systems (e.g. a PSTN).

Moreover, services in 3G systems usually utilize so called bearer services that have different QoS characteristics for transporting the service through the system. UMTS, defines e.g. four QoS classes (conversational, streaming, interactive, background) for the UMTS bearer service. A bearer service can also be layered and partitioned between system domains. **Figure 3** shows the UMTS Bearer Service as an example. It is based on two components, the

Radio Access Bearer (RAB) service and the CN bearer service. The UMTS Bearer Service ranges between the MT to the CN, and the (RAB) service from the MT to the CN (and the other way around) and the CN bearer service ranges within the CN.

5

It should be noted that the bearer services make use of IP based networks to provide the transport. To provide the appropriate bearer service, network resources within the IP network have to differentiate between traffic flows, and have to be managed so that resources are available when needed.

10 These requirements have to be met in all parts of the system to provide appropriate end-to-end QoS. There is a need of QoS management functions in the different system domains to implement the bearer service in each system domain. A UMTS system relies on a number of bearer service managers, e.g. a RAB service manager and a CN service manager, that
15 establish, modify and maintain their respective bearer service. The bearer service managers are located in different nodes (e.g. RNC, SGSN, GGSN) depending on in which system domain they manage the bearer service. The radio resources are thus managed by one or more bearer service managers (e.g. a RAB service manager) that handles the radio resources, i.e. the radio
20 resource manager may be a part of the RAB service manager.

In the sections above a UMTS system is used as reference for describing the need of network resource management functions in IP-based wireless systems. The description is, however, equally applicable for wireless systems based on other current and evolving standards e.g. cdma2000,

25 GSM/GPRS as well as evolving releases of the UMTS standard. Other systems and releases may be partitioned into other system domains, use other terminology for describing the transport service and characterise the transport in other ways, but they will still use IP networks for transport of different services. This implies that the systems need network resource
30 management functions for being able to provide transport services with certain QoS characteristics.

As described above, the present invention relates to systems using IP based transmission. There are some characteristics that are common for IP-based systems that relate to the nature of how IP networks work and how they are designed. These characteristics are discussed in the following.

5

The IP protocol is designed to be used in networks where different traffic flows share network resources equally. This means that the received QoS depends on the current load in the network. To provide QoS guarantees for specific traffic, QoS mechanisms are required. Mechanisms and methods applied for this purpose are described below.

10

Traffic in these systems will usually be forwarded according to routes set up by distributed and dynamic intra- and inter-domain routing protocols such as OSPF (Open shortest Path First) and BGP (Border Gateway Protocol).

15

These routing protocols automatically detect network failures and set up new routes to avoid the failure.

The network topologies in IP-based systems are less hierarchical than those in circuit switched systems. In 3G systems that are optimised for IP services the topology will be distributed, as can be understood from **figure 2**.

20

The packet switched nature of IP-based networks makes them very well suited for traffic aggregation. This will be used especially in RANs where link deployment can be very expensive. Redundant links will be used where network reliability is critical or to add resources between hot spot sites. Redundant links 206 can be seen in **figure 2**.

25

There are typically two known ways to provide QoS guarantees for bearer services in the RAN and the CN that use IP networks for transport; either to use QoS mechanisms such as Differentiated Service (DiffServ) or to over-dimension the network.

30

The (DiffServ) architecture is one QoS framework that can be applied to provide mechanisms for setting up traffic classes in the network to enable differentiation of network resources among services. At system set up, the different traffic classes are dimensioned to ensure that each class has sufficient resources. Dimensioning is based on service characteristics and assumed usage statistics.

For systems that provide one or a few services, over-dimensioning of the network is usually used to ensure sufficient resources. Service monitoring often complements over-dimensioning to discover where network resources are lacking and to trigger re-dimensioning of the network. For both the Diffserv capable and the "single service" network case described, dimensioning and re-dimensioning are done manually and there is no real-time control of the actual resource usage.

A solution based on dimensioning will work as long as the dimensioning assumptions hold. However, if the assumptions break, e.g. if the usage behaviour changes or a network link fails, some network links can get over-utilised causing degraded quality for some active sessions. **Figure 4** depicts a RAN comprising an RNC connected via IP routers to a number of BS and a number of MT. Figure 4A shows a normal operation while Figure 4B shows a scenario during a link failure 402 that results in insufficient resources on another link 404. It is possible to prevent this situation by over-dimensioning resources so that minor dimensioning mistakes can be handled. This will, on the other hand, cause the network to be under-utilised most of the time. The problem with the dimensioning method is that it is impossible to foresee all future events at the time of dimensioning and still achieve reasonable network utilisation. There is a need for a mechanism that keep track of how resources are used on each link in the network and that can reject setup of new bearer services over links where there are no resources left to fulfil QoS requirements. The same reasoning holds for the Diffserv case where network resources are provisioned to

different service classes based on assumption on traffic loads and characteristics. There is a need for a mechanism that manages and controls the resources in each traffic class.

- 5 The problems described above can be extended to the scenario when a Mobile Terminal (MT) in a wireless system moves and causes handover between base stations. As the terminal moves, the need for resources in different parts of the network changes. It is impossible to predict how the terminal will move and thereby where network resources will be needed. If
10 there is no entity in the system that controls and sets up resources, network links can get over-utilised at handover.

Figure 5 shows a RAN comprising a RNC connected to a number of BS via IP routers R and MT. "ok" means that a connection has sufficient resources and "nok" means that a connection has insufficient resource. "1" means a
15 first scenario and "2" means a subsequent second scenario. **Figure 5** illustrates another problem that occurs when sessions are denied to start even if resources are available in the system. Consider a situation when a terminal tries to start a session. The session can be denied due to lack of
20 network resources as in **figure 5a**, lack of radio resources as in **figure 5b**, or lack of both radio and network resources as in **figure 5c**. In some cases it would be possible to accept the session if the terminal changed its point of connection from the currently serving base station to another one.

- 25 These problems, implies that there is a need for a resource management mechanism that have full knowledge of resource usage/allocation and network topology in the IP network.

An additional requirement on the bearer service delivered by a wireless
30 system is that end-to-end QoS can be provided through all parts of the network. It is hard, if not impossible, to dimension all network parts in a system to meet all possible QoS requirements while not causing the

network to be under-utilised most of the time. The difficulty to provide end-to-end QoS by dimensioning grows as the network and system grows.

5 In EP 1 059 792, a radio resource management for the radio link in a wireless IP system is showed and it describes a method and system that maps IP QoS parameters or requests to radio resource requests. It also addresses procedures for applying the mapping and managing the radio resources.

10 EP 1 059 792 does not address resource management issues for an IP network of a wireless system.

Thus, an object of the present invention is to achieve automatic network resource management for providing appropriate end-to-end QoS for sensitive services throughout a wireless and IP transmission based communication network.

15 Another object of the present invention is to enable efficient monitoring of how network resources are used by bearer services/calls on a per link basis and over time without the need to make measurements in routers.

Summary of the invention

20 The above-mentioned objects are achieved by the present invention according to the independent claims by a method having the features of claim 1 and a Network Resource Manager having the features of claim 17 and claim 18.

25 Preferred embodiments are set forth in the dependent claims.

Thus, the above-described object is achieved by introducing at least one Network Resource Managers (NRM) into a cellular telecommunication

system e.g., within a RAN and/or within a network means e.g. a CN in accordance with the present invention. The NRM monitors and/or manages and/or reserves resources within the network with IP based transmission within the cellular telecommunication system and a bearer service manager, such as a RAB service manager, manages radio resources in the wireless part of the cellular telecommunication network. How the radio resource management function/entity internally manages the resources within the wireless part, is however beyond the scope of this invention. It is hence possible to obtain an end-to-end QoS throughout the cellular telecommunication system.

An advantage with the present invention is that it solves problems related to providing reliable end-to-end QoS in IP-based wireless systems. It improves utilisation of the system and ensures QoS.

Another advantage with the present invention is that resources can be committed on a per-call basis through the RAN without signalling along a bearer path through the RAN. Admission control on a per-call basis avoids fragmentation of resources, which occurs if resources are reserved for aggregated trunks. Fragmentation of resources decreases the total utilisation in the RAN.

A further advantage with the present invention is that aggregated trunks also can be provided in the RAN. In comparison to signalled solutions for providing trunks, a distinct advantage with NRM is that trunk resources can be pre-allocated depending on time (e.g., time of day, day of week) to cater for recurring variations.

A further advantage with the present invention is that multiple services (e.g., video, VPN (Virtual Private Network)) can be supported with maximum utilisation. Policies for precedence between services of different kind can be enforced at a per session level.

An advantage with the monitoring according to the present invention is that it provides feedback to the planning and provisioning process of the network operator.

5

A further advantage with monitoring according to the present invention is that it enables monitoring of how bearer service uses network resources on a per-link and over time basis. This characteristic allows usage of the present invention as both an active network resource manager and/or

10

Brief description of the appended drawings

Figure 1 illustrates a circuit switched wireless system

15

Figure 2 illustrates an IP-based packet switched wireless system.

Figure 3 illustrates bearer services in UMTS.

Figure 4 shows a link failure in a RAN causing degraded quality for active sessions.

Figure 5 shows examples of intelligent handover-scenarios.

Figure 6. shows Network Resource Manager (NRM) in a wireless system, according to the present invention.

Figure 7 shows a flowchart of a method for finding a BS with enough network and radio resources, according to the present invention.

Detailed description of preferred embodiments

Preferred embodiments of the present invention will now be described with references in particular to figures 6 and 7. According to the present

20

invention the Network Resource Manager (NRM) provides the following functionality:

- dynamic awareness of network topology and network characteristics,

- path-sensitive call admission control, that is parameter and/or measurement based,
- scheduling of resources over time,
- capability to handle resource requests for immediate and future use,
- 5 • resource signalling between resource manager entities,
- coupling of the described NRM entity with radio resource management function/entity that manages the radio resources within the RAN.

10 The NRM can be implemented in software or hardware and it can run as a standalone node or run on the same node as other functionality such as Radio Resource (RR) management functionality (e.g. the RNC). In **figure 6**, the NRM 601 is coupled 609 to a bearer service manager 607 that is responsible for radio resource management. Another NRM 603 is located in
15 the network means e.g. a CN and is responsible for the network resources within the network means e.g. a CN, and yet another NRM 605 is located within the Internet. The network means comprise the CN and future networks, e.g. an Internet, with corresponding functionality. More than one NRM may naturally be located in each respective node. Moreover, each NRM
20 603 may also be adapted to perform resource signalling 611 between another NRM 605. The NRM can also be integrated into other functionality (e.g. RR) to perform its described functions. The NRM may thus be distributed to run on multiple nodes (e.g. the RAN, the CN and the Internet) and/or distributed geographically over a network.

25 The NRM gains its dynamic topology awareness by retrieving routing information concerning the IP network, i.e. the topology of the IP network. In the case wherein the IP network is routed using a link-state routing protocol, the NRM participates in the routing and acts as a router, i.e. the
30 NRM peers (i.e. exchange information) with other routers, without advertising any routes of its own, to retrieve routing information of the IP network. The basic principle on which link-state routing protocols are built

ensures that all routers have the complete topology map. When participating in the routing protocol, the NRM receives the routing information as fast as any other router in the routing domain and can therefore detect changes in the topology instantly.

5

In the case when the IP network is routed using a distance vector protocol, or static routing, the method of peering cannot be used. In this case, the routing information is retrieved by measurements such as trace route and/or the use of Simple Network Management Protocol (SNMP) auto
10 discovery. SNMP is a set of protocols for managing complex networks. It is also possible to configure an NRM with a network topology statically. When the NRM has retrieved the routing information, it uses a network management protocol, such as SNMP, to collect information on the routers and their interfaces (e.g. the interface type and speeds). The information is
15 used by the NRM to complement the gained routing topology information and make sure that it has an accurate view of the routing topology.

The NRM combines the routing information and resource information it receives from call set-up requests to create a resource map (call setup
20 request is described further below). The resource map contains information on how much resources (e.g. bandwidth) that are available and reserved over time on a per link basis. The NRM uses the resource map to decide whether there are resources available or not (i.e. it performs a call admission control), for a call setup request from an entity/function. The call
25 admission control is path-sensitive, i.e. the NRM checks that resources are available along the path that will be used by the traffic concerned by a resource request. The call admission control can be based on resource information provided in previously made and present resource requests (e.g. parameter based call admission control) or it can be based on current
30 network load measurements, historical load data and future load predictions (e.g. measurement based call admission control). Measurements can be either collected from the network by the NRM or provided by network

elements (routers, switches, etc.) to the NRM. The call admission control can also be based on a combination of parameters and measurements.

By introducing a start and a stop time as a parameter in the resource request, resources can be scheduled over time. This allows the NRM to handle resource requests for both immediate and future use. A call setup request refers to a request made to an NRM from an entity/function that would like to reserve network resources. The requesting entity/function might use the network resources for providing appropriate service to a bearer service. Resource requests contain at least information about the end-points between which the resources are needed and the required amount of resources needed. The interaction between the NRM and the requesting entity/function can be implemented in a number of ways, e.g. via a communication protocol, inter process communication, functional calls between integrated software modules, etc. depending on how the NRM is running in the system.

The resource requesting entity/function in an IP-based wireless system is usually a bearer service manager or an equivalent entity/function that is responsible for controlling a bearer service spanning over an IP network. The bearer service manager may request network resources for a bearer service within a RAN, a CN or both.

An NRM controls network resources in a limited part of a network, in a network domain. These domains may be small (e.g. a few routers) or very large (e.g. tens of thousands of routers). Typically, an NRM controls a routing domain, i.e. an area of a network routed by one intra-domain routing protocol. In order to provide network resource management in large systems/networks where many NRMs are needed, NRMs can interact, i.e. signal resource request to each other. An NRM that makes a resource request to another NRM does this the same way as a non NRM makes request to an NRM. However, in some scenarios the NRMs are not required

to be able to signal to each other, e.g. when there is no need for inter-domain communication and one domain is controlled by one NRM. The NRM is further described in "Schelen, O. Quality of Service Agents in the Internet, Doctoral Thesis, Department of Computer Science and Electrical Engineering, Division of Computer Communication, Luleå University of Technology, Luleå 1998" and in the Swedish Patent Application 0102929-7 filed September 4, 2001.

Domains controlled by an NRM may or may not match system domains, e.g. a RAN or a CN. Thus, one or several NRMs may control one RAN and one or several NRMs may control one CN or an NRM may e.g. control one part of the RAN and one part of the CN in a network. There may also be system domains where other mechanisms than NRMs are used to control network resources. This means that there may be one or many entities/functions signalling resource requests to one NRM or one entity/function signalling requests to many NRMs.

The above described preferred embodiment of the present invention is exemplified in the following:

1. An event, e.g. an MT that initiates a call to a phone in a Public Switched Telephone Network (PSTN), triggers a request to one or multiple bearer service manager functions/entities to setup a bearer service within the wireless system. The bearer service manager can be located in different nodes (e.g. RNC, SGSN, GGSN, etc.) depending on the system domain (e.g. RAN part, CN part) it controls. The bearer service manager that controls the radio resources, the radio resource manager may be located in the RNC.
2. The bearer service manager sends a resource request to an NRM to guarantee that there are sufficient network resources in its system domain.
3. The NRM evaluates if resources are available in the network domain it controls. If the bearer service is spanning over domains controlled by other NRMs the first NRM communicate with these to find out if network

resources are available in those domains. If network resources are available the resources are allocated for the bearer service.

4. The NRM replies the result of the resource request to the bearer service manager.

5 5. The radio resource manager, e.g. a part of the RAB service manager has made sure that there are radio resources available in its system domain.

6. If enough radio and network resources are available resources are reserved from the MT to PSTN.

It is obvious for a man skilled in the art that it is possible to perform these
10 steps in another order, or add or delete some steps and still obtain the same result.

As a summary, when a service is about to start and resources are requested the NRM uses hence its knowledge of the network topology and resource
15 usage at each link in the network domain it controls to calculate if there are resources available to accept the resource request. A bearer service manager entity/function for example located in an RNC or SGSN, or equivalent communicating thus its resource needs to an NRM that ensures that network resources do not get over-utilised on any links and can
20 therefore provide appropriate QoS for a bearer service. NRMs in different network domains are, if required, also receiving the resource request to manage services spanning over multiple NRM controlled network domains. If acceptance of the request causes at least one link to be over-utilised the request is denied. Resources will thereby never be over-utilised on any
25 network link.

The NRM monitors the network topology and discovers instantly (i.e. as fast as the routing protocol adapts to link failure, or as fast probing can discover a link failure) topology changes, e.g. due to link failures. If this happens, the
30 NRM has the knowledge to calculate the resources needed to support active sessions. If it is not possible to support all active sessions in the new topology, the NRM can inform the system which sessions that should be

pre-empted to prevent over-utilisation of resources. As a result of path-sensitive admission control and network awareness, over-dimensioning is not needed to prevent the effects of link failures or dimensioning mistakes.

5 The NRM can use its capabilities to pre-allocate network resources to prevent over-utilisation of resources at handover from one radio base station to another. This is obtained by setting a threshold for admitting new calls that is lower than the maximum available resources. Essentially
10 resources for bearer services are pre-allocated in the IP network for being available in case of handover. It ensures that handover is given precedence to new calls at high load. The amount of resources set aside for handover defines a trade-off between the risk of dropping calls at handover and the risk of rejecting new calls. Management of handover is similar to how
15 normal NRM call admission is handled; topology awareness in NRM enables discovery of which links that will be used at handover, path-sensitive admission control can decide if there are resources available on potential links. Allocation of resources ahead of finalising handover can be used to ensure availability of resources. The exact algorithm to use for choosing
20 potential links and pre-allocating network resources is not within the scope of the present invention. It should be noted that the features of the NRM enables solving the handover problem with respect to the IP network.

If bearer service entities that manage the radio resources and network resources (e.g. the RAB manager and NRMs) are tightly coupled, as,
25 described below, they will have complete information about how radio and IP network resources are used and where resources are available in the system. This makes it possible to make joint optimisation of radio and IP network resources and direct a handover to where resources are available for a session which otherwise would have been denied.

30 **Figure 7** describes an example of iterations for finding a radio base station (BS) that can provide both radio and network resources. (A RAB manager is

used in this example, but it could naturally be another manager entity/function within the network that handles radio resources.)

- 701. Request to RAB manager.
- 702. RAB manager compiles a list of possible BSs in priority order.
- 5 703. A request for bearer resources (i.e. radio resources) to the BS on top of the list (with highest priority), for a path, is transmitted to NRM. NRM investigates whether it can fulfil the resource request.
- 704. Yes: If the answer is yes, available resources are allocated to the
10 BS with highest priority.
No: If the answer is no, the BS with the highest priority is removed from the list. If the list then is empty, no resources are available and the service cannot be maintained or started. If there are remaining BSs in the list, go back to step 3.
- 15 This logical function may be implemented within a Radio Access Bearer (RAB) manager entity/function for example located in a RNC or equivalent that has knowledge of the radio resource situation in the network. The interaction/coupling can be implemented in a number of ways, e.g. via a communication protocol, inter process communication, functional calls
20 between integrated software modules, etc.

The method may be implemented by means of a computer program product comprising the software code means for performing the steps of the method. The computer program product is run on processing means in a server
25 and/or a router in an IP network, and/or a Radio Network controller (RNC) and/or a Serving GPRS Support Node (SGSN), and/or Gateway GPRS Support Node (GGSN) within a telecommunication system. The computer program is loaded directly or from a computer usable medium, such as a floppy disc, a CD, the Internet etc. However, the method may also be
30 implemented by means of hardware.

Thus, end-to-end QoS is obtained in a wireless telecommunication system according to the present invention by letting NRMs control separate parts of the IP network, e.g. a first NRM controls resources within a RAN, and a second NRM controls resources within a CN. Several NRMs may control the
5 IP network resources within a RAN or a CN or a single NRM may control all IP network resources in a RAN and a CN. The NRMs and the bearer service manager, that controls the radio resources within the wireless part, communicate hence their resource needs between each other through the system in order to obtain end-to-end QoS.

10

The present invention is not limited to the above-described preferred embodiments. Various alternatives, modifications and equivalents may be used. Therefore, the above embodiments should not be taken as limiting the scope of the invention, which is defined by the appending claims.

Claims

1. A method for providing end-to-end Quality of Service (QoS) within a
5 mobile telecommunication system comprising at least one network
means, e.g. a Core Network (CN) connected to at least one Radio Access
Network (RAN), using Internet Protocol (IP) based transmission, wherein
the method comprising the step of:
-*handling* radio resources within RAN by using a radio resource manager,
10 **characterised** in that the method comprising the further step of:
-*controlling* IP network resources by using a Network Resource Manager
(NRM) comprising a resource map in order to provide said end-to-end
QoS.
- 15 2. Method according to any of claims 1, **characterised** in that the NRM is
used within the RAN and a CN.
3. Method according to any of claims 1, **characterised** in that the NRM is
used within the RAN.
- 20 4. Method according to any of claims 1, **characterised** in that the NRM is
used within the CN.
5. Method according any of claims 1-3, **characterised** in that the method
25 comprising the further step of:
-*communicating* resource information between the NRM and the radio
resource manager.
6. Method according to any of claims 1-5, **characterised** in that the
30 method comprising the further step of:
-*reserving* IP network resources by the NRM if said end-to-end QoS can
be fulfilled.

7. Method according to any of claims 1-6, **characterised** in that the method comprising the further step of:
-*pre-allocating* resources by the NRM in the IP network.
- 5
8. Method according to any of claims 1-7, **characterised** in that the method comprising the further step of:
-*signalling* resource information between the NRM and at least a second NRM used within at least a second network domain.
- 10
9. Method according to any of claims 1-8, **characterised** in that the method comprising the further step of:
-*monitoring* topology changes by using the NRM, that retrieves routing information concerning the IP network.
- 15
10. Method according to claim 9, **characterised** in that topology is monitored in order to be able to re-allocate IP network resources.
- 20
11. Method according to any of claims 1-10, **characterised** in that the method comprising the further step of:
-*performing* path-sensitive call admission control by using the resource map and checking that resources are available along a path.
- 25
12. Method according to claim 11, **characterised** in that the path-sensitive call admission control is parameter based.
- 30
13. Method according to claim 11, **characterised** in that the path-sensitive call admission control is measurement based.
14. Method according to any of claims 1-13, **characterised** in that the method comprising the further step:

-*scheduling* resources over time by introducing a start- and a stop time as a parameter in a resource request handled by the NRM.

- 5 15. A computer program product directly loadable into a processing means within a server and/or a router in an IP network, and/or a Radio Network controller (RNC) and/or a Serving GPRS Support Node (SGSN), and/or Gateway GPRS Support Node (GGSN) within a telecommunication system, comprising the software code portions for performing the steps of any of claims 1-14.
- 10 16. A computer program product stored on a computer usable medium, comprising readable program for causing a processing means within a server and/or a router in an IP network, and/or a Radio Network controller (RNC) and/or a Serving GPRS Support Node (SGSN), and/or
- 15 Gateway GPRS Support Node (GGSN) within a telecommunication system to control the execution of the steps of any of claims 1-14.
- 20 17. A Network Resource Manager (NRM) comprising a resource map within a mobile telecommunication system, comprising at least one network means, e.g. a Core Network (CN), connected to at least one Radio Access Network (RAN), using Internet Protocol (IP) based transmission and a radio resource manager comprising means for controlling radio resources within the RAN, is **characterised** in that NRM further comprises means for controlling resources within the IP network in order
- 25 to provide end-to-end Quality of Service (QoS).
- 30 18. A Network Resource Manager (NRM) comprising a resource map within a mobile telecommunication system, comprising at least one network means, e.g. a Core Network (CN), connected to at least one Radio Access Network (RAN), using Internet Protocol (IP) based transmission and a radio resource manager comprising means for controlling radio resources within the RAN, is **characterised** in that NRM further

comprises means for monitoring resources within the IP network in order to provide feedback to the network operator.

- 19.NRM according to any of claims 17-18, **characterised** in that it
5 comprises means for be used within the RAN and a CN.
- 20.NRM according to any of claims 17-18, **characterised** in that it
comprises means for be used IP network resources within the RAN.
- 10 21.NRM according to any of claims 17-18, **characterised** in that it
comprises means for be used within the CN.
- 22.NRM according to claim 17-20, **characterised** in that it comprises
means for communicating resource information with the radio resource
15 manager.
- 23.NRM according to any of claims 17,19-22, **characterised** in that it
comprises means for reserving IP network resources if it is possible to
fulfil said end-to-end QoS.
20
- 24.NRM according to any of claims 17,19-23, **characterised** in that it
comprises means for pre-allocating resources in the IP network part of
the telecommunication system.
- 25 25.NRM according to any of claims 17-24, **characterised** in that it
comprises means for communicating with at least a second NRM used
within at least a second IP network domain.
- 30 26.NRM according to any of claims 17-25; **characterised** in that it
comprises means for monitoring topology changes by retrieving routing
information concerning the IP network.

- 27.NRM according to claim 26, **characterised** in that topology is monitored in order to be able to reallocate access resources.
- 28.NRM according to any of claims 17-27, **characterised** in that it
5 comprises means for performing path-sensitive call admission control by using a resource map and checking that resources are available along a path.
- 29.NRM according to claim 28, **characterised** in that the path-sensitive call
10 admission control is parameter based.
- 30.NRM according to claim 28, **characterised** in that the path-sensitive call admission control is measurement based.
- 15 31.NRM according to any of claims 17-30, **characterised** in that it comprises means for scheduling resources over time by introducing a start- and a stop time as a parameter in a resource request.

1/6

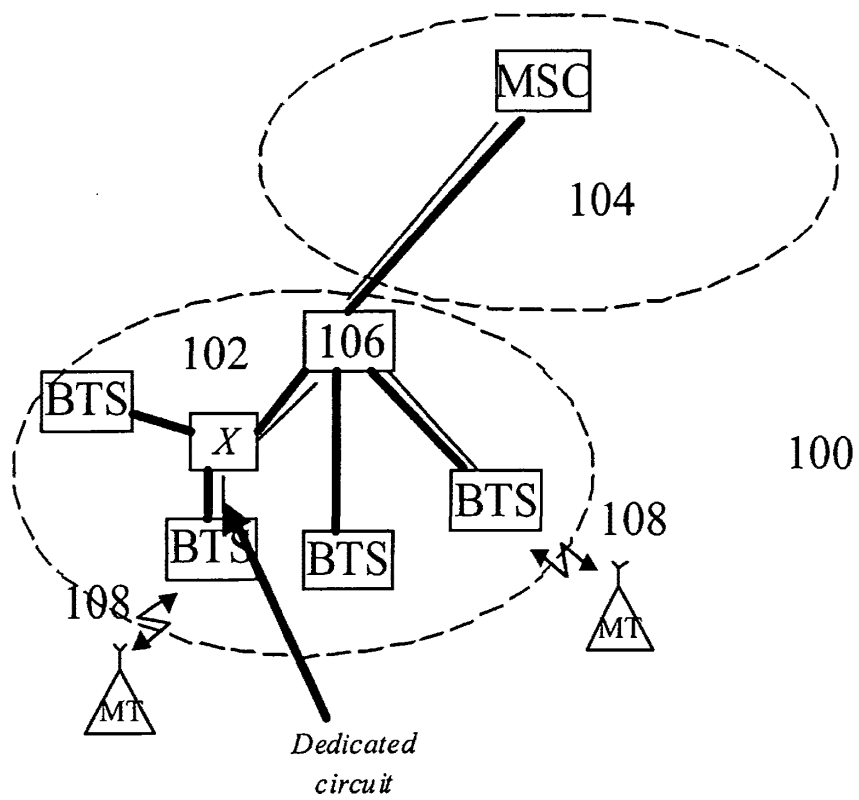


Fig. 1

2/6

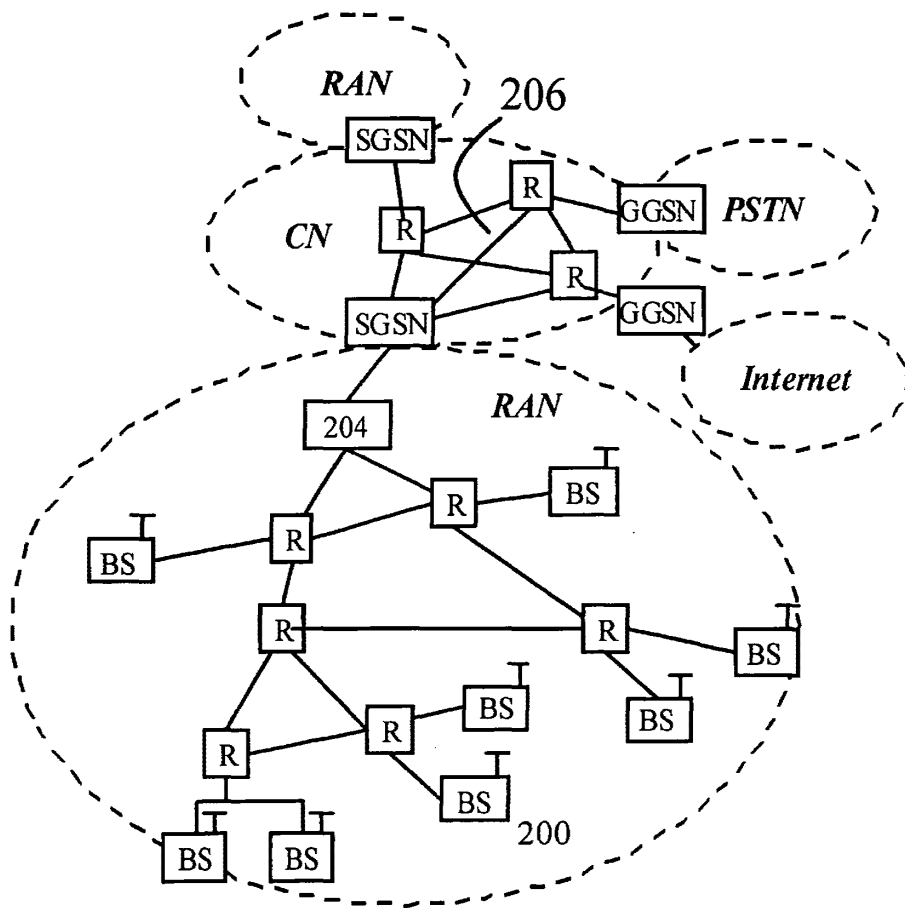


Fig. 2

3/6

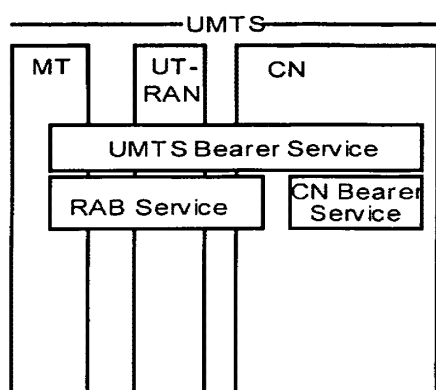


Fig.3

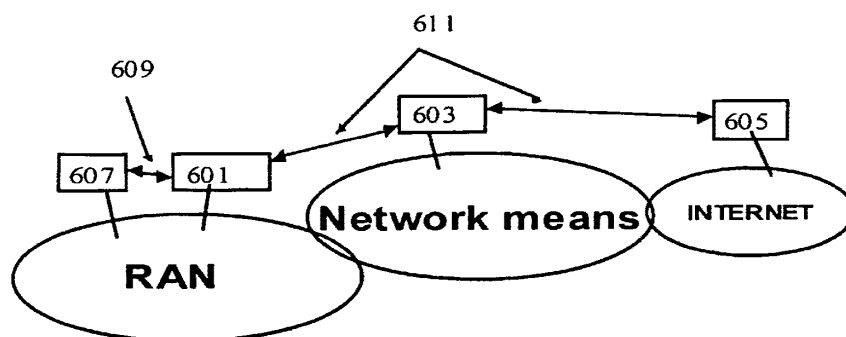


Fig.6

B. Operation after link failure

A. Normal operation

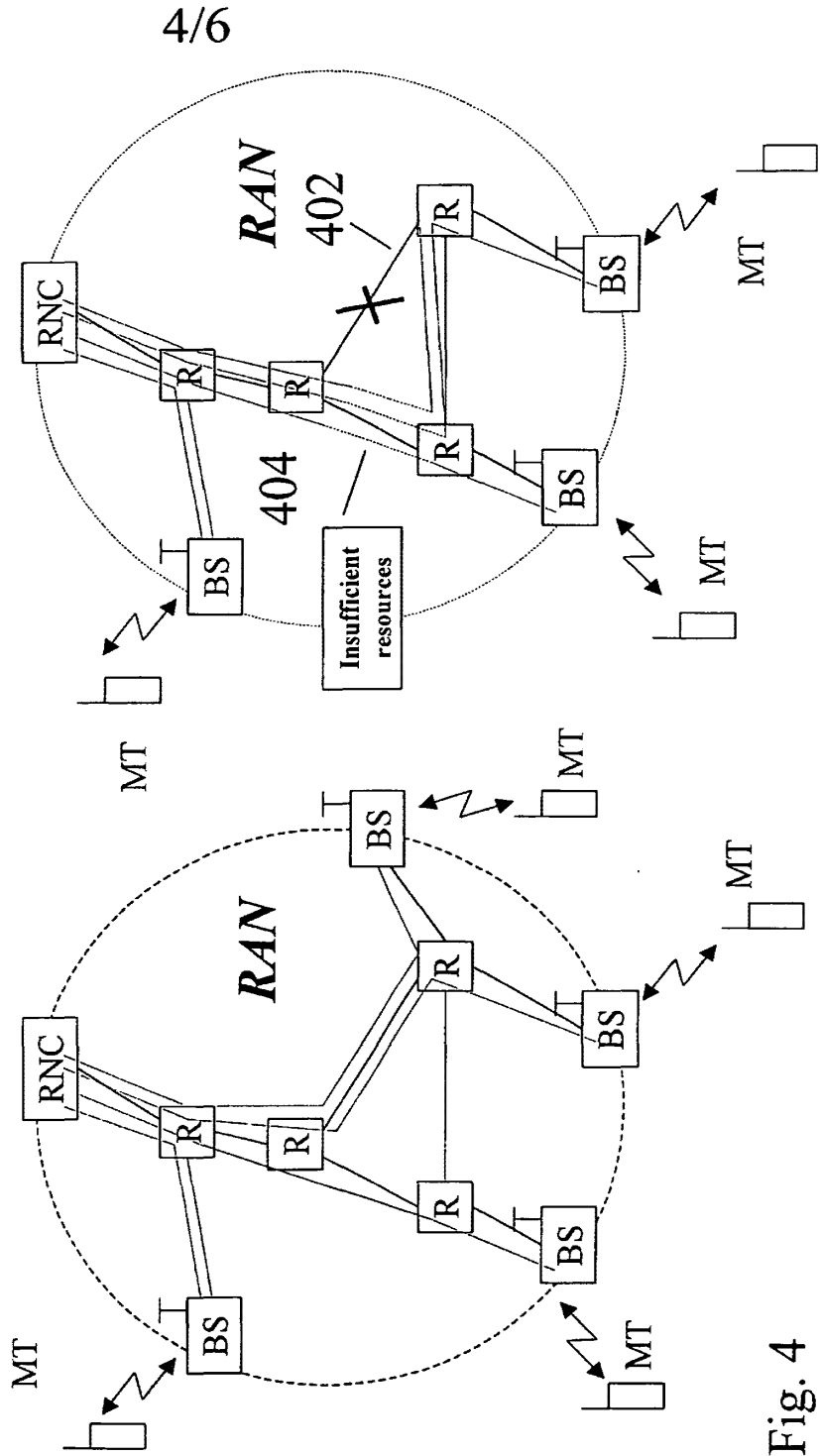


Fig. 4

5/6

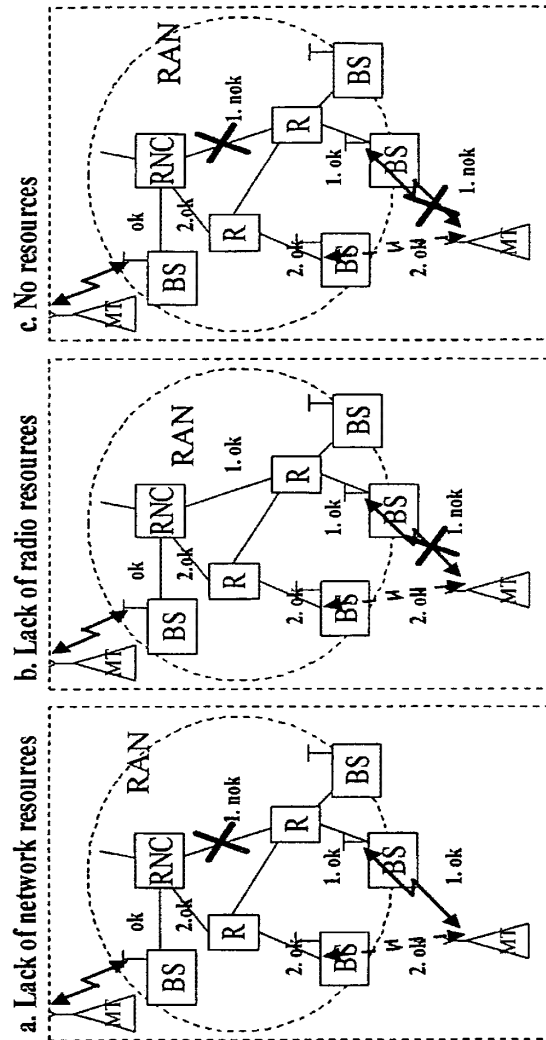


Fig. 5

6/6

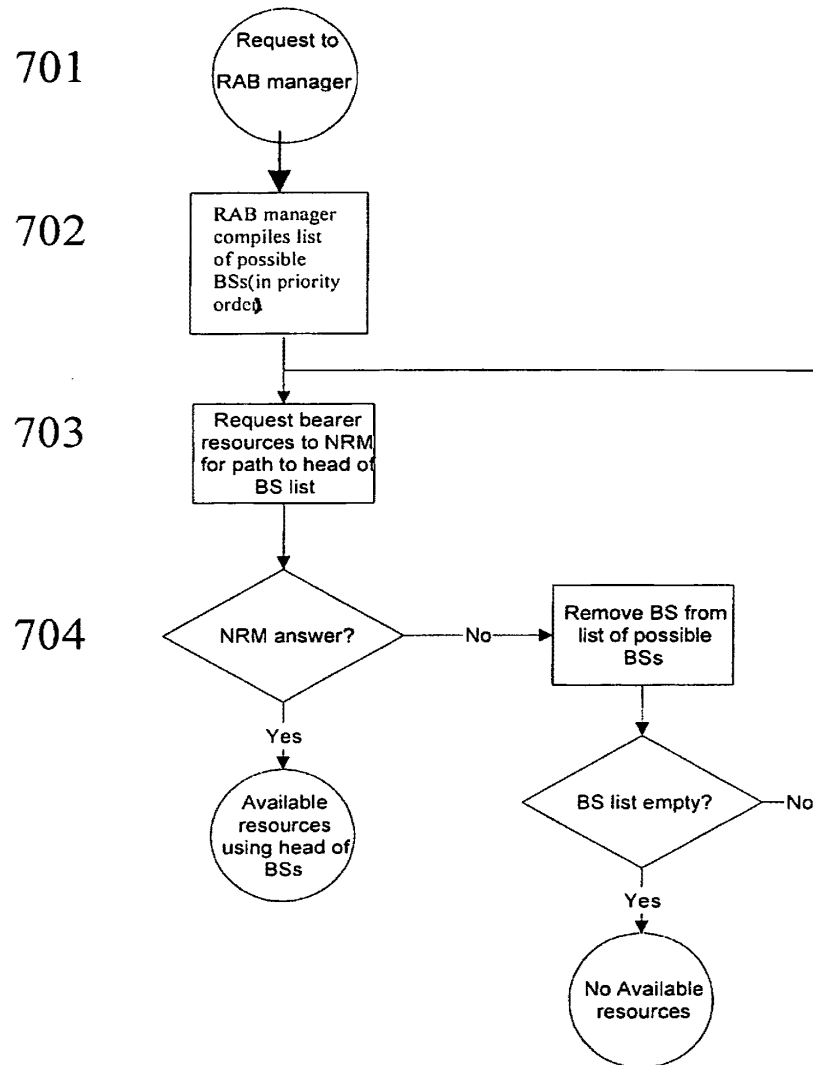


Fig. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 01/02847

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04L 29/06, H04Q 7/20

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)

IPC7: H04L, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, 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.
X	Doctoral Thesis "Quality of Service Agents in the Internet" Olov Schelén, Luleå Tekniska Universitet 1998:26 ISSN: 1402-1544 Pages 39-42 --	1-31
A	EP 1056246 A2 (AT & T CORP), 29 November 2000 (29.11.00), page 5, line 57 - page 6, line 4 --	1-31
A	EP 1059792 A2 (NORTEL NETWORKS LIMITED), 13 December 2000 (13.12.00), page 4, line 19 - page 5, line 2 --	1-31

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent 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

16 April 2002

Date of mailing of the international search report

30-04-2002

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer

Ann Börjeson/JAn
Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 01/02847

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 0159986 A2 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 16 August 2001 (16.08.01), see the whole document --	1-31
P,X	WO 0189234 A2 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 22 November 2001 (22.11.01), page 4, line 2 - page 10, line 23 --	1-31
P,A	WO 0154357 A1 (SIEMENS AKTIENGESELLSCHAFT), 26 July 2001 (26.07.01), page 2, line 1 - line 9 -- -----	1-31

Form PCT/ISA/210 (continuation of second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT
Information on patent family members

28/01/02

International application No.
PCT/SE 01/02847

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
EP	1056246	A2	29/11/00	CA	2308962 A	27/11/00
EP	1059792	A2	13/12/00	CA	2300697 A	11/12/00
WO	0159986	A2	16/08/01	AU	3427601 A	20/08/01
				US	2001032262 A	18/10/01
WO	0189234	A2	22/11/01	NONE		
WO	0154357	A1	26/07/01	AU	4041601 A	31/07/01

Form PCT/ISA/210 (patent family annex) (July 1998)



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 NUMBER	FILING OR 371(c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/315,293	12/23/2005	Jim Sundqvist	1505-1090

CONFIRMATION NO. 1382

466
YOUNG & THOMPSON
745 SOUTH 23RD STREET
2ND FLOOR
ARLINGTON, VA22202

Title: Method and arrangements in an IP network

Publication No. US-2007-0147344-A1

Publication Date: 06/28/2007

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 703-305-3028.

Pre-Grant Publication Division, 703-605-4283

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☒ Practitioners associated with the Customer Number:

25962

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☒ The address associated with Customer Number:

25962

OR

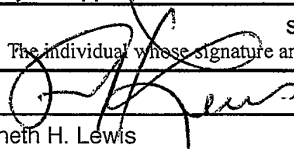
☐ Firm or Individual Name	Slater & Matsil, L.L.P.		
Address	17950 Preston Rd., Suite 1000		
City	Dallas	State	TX
Country	United States		
Telephone	972-732-1001	Email	knapp@slater-matsil.com

Assignee Name and Address:
NetSocket, Inc.
3701 W. Plano Pkwy., Suite 140
Plano, TX 75075

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	8 DEC 08
Name	Kenneth H. Lewis	Telephone	+1 214 427 7301
Title	President & C.E.O.		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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(b)Applicant/Patent Owner: Sundqvist, et al.Application No./Patent No.: 11/315,293 Filed/Issue Date: December 23, 2005Entitled: Method and Arrangements in an IP NetworkNetSocket, Inc., a corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest: or
2. ☐ an assignee of less than the entire right, title and interest.
(The extent (by percentage) of its ownership interest is _____ %)

In the patent application/patent identified above by virtue of either:

- 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.

OR

- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Jim Sundqvist and Erik Lundgren To: Operax AB
The document was recorded in the United States Patent and Trademark Office at
Reel 017257, Frame 0150, or for which a copy thereof is attached.
2. From: Operax AB To: Nya Operax AB
The document was recorded in the United States Patent and Trademark Office at
Reel 021978, Frame 0022, or for which a copy thereof is attached.
3. From: Nya Operax AB To: Operax AB
The document was recorded in the United States Patent and Trademark Office at
Reel 021991, Frame 0371, or for which a copy thereof is attached.
4. From: Operax AB To: NetSocket, Inc.
The document was recorded in the United States Patent and Trademark Office at
Reel 022007, Frame 0627, or for which a copy thereof is attached.

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

- ☐ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

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


Roger C. Knapp, Reg. No. 46,836

Printed or Typed Name

12-29-08
Date
972-732-1001

Telephone Number

Attorney for Applicants

Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt	
EFS ID:	4526593
Application Number:	11315293
International Application Number:	
Confirmation Number:	1382
Title of Invention:	Method and arrangements in an IP network
First Named Inventor/Applicant Name:	Jim Sundqvist
Customer Number:	00466
Filer:	Roger Clark Knapp/Natalie Swider
Filer Authorized By:	Roger Clark Knapp
Attorney Docket Number:	1505-1090
Receipt Date:	29-DEC-2008
Filing Date:	23-DEC-2005
Time Stamp:	13:07:27
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		NET-7349_POA.pdf	139731	yes	2
			89c2a7db009abc538bce9b344e4535c66985ec00		

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Power of Attorney	1	1
	Assignee showing of ownership per 37 CFR 3.73(b).	2	2
Warnings:			
Information:			
Total Files Size (in bytes):		139731	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.			



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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/315,293	12/23/2005	Jim Sundqvist	NET-7349

25962
SLATER & MATSIL, L.L.P.
17950 PRESTON RD, SUITE 1000
DALLAS, TX 75252-5793

CONFIRMATION NO. 1382
POA ACCEPTANCE LETTER



Date Mailed: 01/06/2009

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/29/2008.

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.

/hgray/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/315,293	12/23/2005	Jim Sundqvist	1505-1090

466
YOUNG & THOMPSON
209 Madison Street
Suite 500
ALEXANDRIA, VA 22314

CONFIRMATION NO. 1382
POWER OF ATTORNEY NOTICE



Date Mailed: 01/06/2009

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/29/2008.

- 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).

/hgray/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Sundqvist et al. Docket No.: NET-7349
Serial No.: 11/315,293 Art Unit: 2468
Filed: December 23, 2005 Examiner: Chang, Kai J.
For: Method and Arrangements in an IP Network

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22213

STATUS REQUEST

Dear Sir:

The above-identified application was filed on December 23, 2005, and received a filing receipt (copy attached) having a mailing date of February 21, 2006.

Status of the application is hereby respectfully requested.

Respectfully submitted,

January 19, 2010
Date

SLATER & MATSIL, L.L.P.
17950 Preston Rd., Suite 1000
Dallas, Texas 75252
Tel.: 972-732-1001
Fax: 972-732-9218

/Roger C. Knapp/
Roger C. Knapp
Attorney for Applicants
Reg. No. 46,836

Electronic Acknowledgement Receipt	
EFS ID:	6832400
Application Number:	11315293
International Application Number:	
Confirmation Number:	1382
Title of Invention:	Method and arrangements in an IP network
First Named Inventor/Applicant Name:	Jim Sundqvist
Customer Number:	25962
Filer:	Roger Clark Knapp/Kristin Hayes
Filer Authorized By:	Roger Clark Knapp
Attorney Docket Number:	NET-7349
Receipt Date:	19-JAN-2010
Filing Date:	23-DEC-2005
Time Stamp:	12:22:08
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	Request for status of Application	NET-7349_Status_Request.pdf	56938 8aa7db23fc395d8b11a290f327e682a9f9fa2e11	no	1

Warnings:

Information:

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

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.
11/315,293	12/23/2005	Jim Sundqvist	NET-7349	1382
25962 7590 04/09/2010 SLATER & MATSIL, L.L.P. 17950 PRESTON RD, SUITE 1000 DALLAS, TX 75252-5793			EXAMINER MATTIS, JASON E	
			ART UNIT 2461	PAPER NUMBER
			MAIL DATE 04/09/2010	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 11/315,293		Applicant(s) SUNDQVIST ET AL.	
	Examiner JASON E. MATTIS		Art Unit 2461	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 23 December 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) 1-24 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) 1-8, 10-12, 14-19 and 21-24 is/are rejected.

7) ☒ Claim(s) 9, 13 and 20 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 23 December 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892) 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.	4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____. 5) ☐ Notice of Informal Patent Application 6) ☐ Other: _____.
---	--

DETAILED ACTION

Drawings

1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities:

Page 15 line 8 of the specification makes reference to "the networks 310—304". This appears to contain a typo and should correctly read "the networks 301-304".

Page 16 line 6 of the specification contains a repeated phrase "means for means for". It is recommended that one of the "means for" be deleted.

Appropriate correction is required.

Claim Objections

3. Claim 23 objected to because of the following informalities: Claim 23 appears to contain a typo where by the term "UP network" is used instead of "IP network".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 15 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 15, line 3 of this claim contains the term "the software code portions". Since there is no prior mention of any software code portions in the claim language, this term lacks proper antecedent basis.

Regarding claim 21, lines 3-4 of this claim contain the term "the software code portions". Since there is no prior mention of any software code portions in the claim language, this term lacks proper antecedent basis.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 15 and 21 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

More specifically both claims 15 and 21 are directed towards a “computer program product... comprising the software code portions”. A computer program product comprising only software is not considered to fall within one of the statutory categories of invention since software, per se, is considered non-statutory subject matter. In order for the software to be considered statutory it must be physically embodied on a device, such as a computer readable medium and be executed by a device to perform a function. Although claims 15 and 21 contain language stating that the computer program product is “directly loadable into the internal memory of a computer”, this language is not positively stated and is merely an intended use of the computer program product.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 6-8, 10-12, 14-19, and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Segel et al. (U.S. Publication US 2007/0081459 A1) in view of Green et al. (U.S. Publication US 2005/0190781 A1).

With respect to claims 1 and 14, Segel et al. discloses a network resource manager and corresponding method of operating the network resource manager comprising a resource utilization map adapted to managing network resources in an IP network **(See page 1 paragraph 2, page 2 paragraph 13, page 4 paragraph 49, page 4 paragraph 54, page 4 paragraphs 61-67, and Figure 1 of Segel et al. for reference to a session admission control system, which is a network resource manager, comprising a network capacity data base storing information regarding existing provisioned capacity of a network and monitored traffic data, which comprises a resource utilization map, and for reference to the session admission control system managing network resources by performing admission control in an IP network environment)**. Segel et al. also discloses a means for receiving a resource request from an application framework to start a media multicast distribution **(See page 4 paragraph 50, page 4 paragraph 61 to page 5 paragraph 80, and Figure 1 of Segel for reference to an SAC policy decision node 2 of the session admission control system receiving a request from a requestor, which may be an application, to start a multicast media session)**. Segel et al. further discloses providing feedback information relating to resource availability in response to the

request **(See page 4 paragraphs 49-52 and page 4 paragraphs 54-55 of Segel et al. for reference to the session admission control system either granting the requesting application a resource reservation if resources are available or denying the requesting application a resource reservation if resources are not available, whereby the granting or denying is a type of feedback information).**

Although Segel et al. does disclose receiving a request to start a media multicast distribution, Segel et al. does not specifically disclose requesting a media quick start. Segel et al. also does not specifically disclose allowing the media quick start or using another behavior to start the media multicast distribution based on the received feedback information.

With respect to claims 6 and 17, Segel et al. discloses an application framework and corresponding method of operating the application framework connectable to an IP network and comprising a means for receiving a request for a media distribution requiring a multicast distribution from a client **(See page 1 paragraph 2, page 2 paragraph 13, page 4 paragraph 49, page 4 paragraph 54, page 4 paragraphs 61-67, and Figure 1 of Segel et al. for reference to an requestor, which may be an application, in an IP network receiving and forwarding a request to start a multicast media session from a server, which is a client).** Segel et al. also discloses a requesting network resources from a network resource manager **(See page 4 paragraph 50, page 4 paragraph 61 to page 5 paragraph 80, and Figure 1 of Segel for reference to an SAC policy decision node 2 of a session admission control system, which is a network resource manager, receiving a request from**

the requestor to start a multicast media session). Segel et al. further discloses receiving feedback information relating to resource availability from the network resource manager **(See page 4 paragraphs 49-52 and page 4 paragraphs 54-55 of Segel et al. for reference to the session admission control system either granting the requesting application a resource reservation if resources are available or denying the requesting application a resource reservation if resources are not available, whereby the granting or denying is a type of feedback information).** Although Segel et al. does disclose receiving a request to start a media multicast distribution, Segel et al. does not specifically disclose requesting a media quick start. Segel et al. also does not specifically disclose allowing the media quick start or using another behavior to start the media multicast distribution based on the received feedback information.

With respect to claim 10, Segel et al. discloses a system comprising a network resource manager comprising a resource utilization map adapted to managing network resources in an IP network **(See page 1 paragraph 2, page 2 paragraph 13, page 4 paragraph 49, page 4 paragraph 54, page 4 paragraphs 61-67, and Figure 1 of Segel et al. for reference to a session admission control system, which is a network resource manager, comprising a network capacity data base storing information regarding existing provisioned capacity of a network and monitored traffic data, which comprises a resource utilization map, and for reference to the session admission control system managing network resources by performing admission control in an IP network environment).** Segel et al. also discloses an

application framework receiving a request for a media distribution requiring a multicast distribution from a client (**See page 1 paragraph 2, page 2 paragraph 13, page 4 paragraph 49, page 4 paragraph 54, page 4 paragraphs 61-67, and Figure 1 of Segel et al. for reference to an requestor, which may be an application, in an IP network receiving and forwarding a request to start a multicast media session from a server, which is a client**). Segel et al. further discloses a requesting network resources form a network resource manager (**See page 4 paragraph 50, page 4 paragraph 61 to page 5 paragraph 80, and Figure 1 of Segel for reference to an SAC policy decision node 2 of a session admission control system, which is a network resource manager, receiving a request from the requestor to start a multicast media session**). Segel et al. also discloses receiving feedback information relating to resource availability from the network resource manager (**See page 4 paragraphs 49-52 and page 4 paragraphs 54-55 of Segel et al. for reference to the session admission control system either granting the requesting application a resource reservation if resources are available or denying the requesting application a resource reservation if resources are not available, whereby the granting or denying is a type of feedback information**). Although Segel et al. does disclose receiving a request to start a media multicast distribution, Segel et al. does not specifically disclose requesting a media quick start. Segel et al. also does not specifically disclose allowing the media quick start or using another behavior to start the media multicast distribution based on the received feedback information.

With respect to claims 7, 8, 11, 12, 18, and 19, Segel et al. does not specifically disclose temporarily denying the requested media quick start.

With respect to claims 1, 6- 8, 10-12, 14, and 17-19, Green et al., in the field of communications, discloses requesting a media quick start (**See page 5 paragraphs 96-101 and Figure 3 of Green et al. for reference to an application requesting a channel change with the channel change request including both a request for joining a multicast media steam as well as a request for a unicast acquisition stream, whereby the unicast acquisition stream is used by the application to decrease delay associated with presenting the multicast media stream, which is equivalent to performing a media quick start**). Green et al. also discloses allowing the media quick start or temporarily denying the media quick start and using another behavior to start the media multicast distribution based on feedback information (**See page 5 paragraphs 96-101, page 6 paragraphs 116-121, and Figures 3 and 4 of Green et al. for reference to allowing the use of the unicast acquisition stream to perform the media quick start when there is bandwidth available for the unicast acquisition stream and for reference to performing a different, lower quality media start operation that uses a different, low bit-rate unicast acquisition stream, when there is little or no spare bandwidth available for the regular unicast acquisition stream**). Conditionally performing a media quick start based on an amount of available resources has the advantage of reducing a presentation delay associated with a start of a multicast stream without negatively impacting the transfer of other streams when little or no spare bandwidth is available.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Green et al., to combine conditionally performing a media quick start, as suggested by Green et al., with the system and method of Segel et al., with the motivation being to reduce a presentation delay associated with a start of a multicast stream without negatively impacting the transfer of other streams when little or no spare bandwidth is available.

With respect to claims 15 and 16, the combination of Segel et al. and Green et al. discloses all the elements of claim 14, as shown above. Segel et al. does not specifically disclose a computer program product stored on a computer useable medium comprising code for causing a computer to execute the steps of claim 14.

With respect to claims 21 and 22, the combination of Segel et al. and Green et al. discloses all the elements of claim 17, as shown above. Segel et al. does not specifically disclose a computer program product stored on a computer useable medium comprising code for causing a computer to execute the steps of claim 17.

With respect to claim 23, the combination of Segel et al. and Green et al. discloses all the elements of claim 1, as shown above. Segel et al. does not specifically disclose implementing the network resource manager as an ASIC.

With respect to claim 24, the combination of Segel et al. and Green et al. discloses all the elements of claim 6, as shown above. Segel et al. does not specifically disclose implementing the application framework as an ASIC.

With respect to claims 15, 16, and 21-24, Green et al. discloses that a media stream transmission network may have elements that are implemented as a computer

program product stored on a computer useable medium comprising software code or implemented as an ASIC (**See page 7 paragraph 150, page 10 paragraph 203, pages 10-11 paragraphs 206-216, and Figure 11 of Green et al, for reference to implementing elements of a multimedia network using software stored in a memory of a computer or using an ASIC**). Using software and an ASIC has the advantage of providing a simple and cost effective manner to implement elements of a network.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Green et al., to combine using software and an ASIC, with the system and method of Segel et al., with the motivation being to provide a simple and cost effective manner to implement elements of a network.

9. Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Segel et al. in view of Green et al. and in further view of Wang et al. (U.S. Publication US 2005/0094643 A1).

With respect to claims 2-5, although Segel et al. does disclose monitoring network traffic (See page 4 paragraph 54 of Segel et al.), the combination of Segel et al. and Green et al. does not specifically disclose taking best effort traffic into account and ensuring that best effort traffic can not affect the resource situation for the requested media stream.

With respect to claims 2-5, Wang et al., in the field of communications, discloses taking best effort traffic into account and ensuring that best effort traffic can

not affect a resource situation for requested media streams (**See page 2 paragraphs 16-18 and page 2 paragraph 22 of Wang et al. for reference to a schedule executing several different QoS algorithms and independent bandwidth allocation management of different types of data to provide separate scheduling and bandwidth allocation for multimedia video/voice traffic and best effort traffic**).

Taking best effort traffic into account and ensuring that best effort traffic can not affect a resource situation for requested media streams has the advantage of separately provide QoS for different types of traffic while also more efficiently using link capacity.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Wang et al., to combine taking best effort traffic into account and ensuring that best effort traffic can not affect a resource situation for requested media streams, as suggested by Wang et al., with the system and method of Segel et al. and Green et al., with the motivation being to separately provide QoS for different types of traffic while also more efficiently using link capacity.

Allowable Subject Matter

10. Claims 9, 13, and 20 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sherer et al. (U.S. Publication US 2007/0107026 A1), Lennestal et al. (U.S. Publication US 2004/0122975 A1), and Guo et al. (U.S. Publication US 2002/0143852 A1) each disclose relevant systems and methods of control the transmission of multicast media streams.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON E. MATTIS whose telephone number is (571)272-3154. The examiner can normally be reached on M-F 8AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571)272-3155. 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.

Jason E Mattis
Primary Examiner
Art Unit 2461

JEM

/Jason E Mattis/
Primary Examiner, Art Unit 2461

Notice of References Cited	Application/Control No. 11/315,293	Applicant(s)/Patent Under Reexamination SUNDQVIST ET AL.	
	Examiner JASON E. MATTIS	Art Unit 2461	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2007/0081459 A1	04-2007	Segel et al.	370/230
*	B	US-2005/0190781 A1	09-2005	Green et al.	370/432
*	C	US-2005/0094643 A1	05-2005	Wang et al.	370/395.4
*	D	US-2007/0107026 A1	05-2007	Sherer et al.	725/097
*	E	US-2004/0122975 A1	06-2004	Lennest al.	709/245
*	F	US-2002/0143852 A1	10-2002	Guo et al.	709/201
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes 	Application/Control No. 11315293	Applicant(s)/Patent Under Reexamination SUNDQVIST ET AL.
	Examiner JASON E MATTIS	Art Unit 2461

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Text search including 370/229-240, 254-258, 351, 389-390, 400-401, 431-432, 477, 503; 709/various areas	4/7/10	JM
Inventor search	4/7/10	JM

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

--	--



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

BIB DATA SHEET

CONFIRMATION NO. 1382

SERIAL NUMBER 11/315,293	FILING or 371(c) DATE 12/23/2005 RULE	CLASS 370	GROUP ART UNIT 2461	ATTORNEY DOCKET NO. NET-7349		
APPLICANTS Jim Sundqvist, Lulea, SWEDEN; Erik Lundgren, Lulea, SWEDEN; ** CONTINUING DATA ***** none /JM/ 4/7/10 ** FOREIGN APPLICATIONS ***** none ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 01/30/2006						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and /JASON E MATTIS/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY SWEDEN	SHEETS DRAWINGS 4	TOTAL CLAIMS 24	INDEPENDENT CLAIMS 7
ADDRESS SLATER & MATSIL, L.L.P. 17950 PRESTON RD, SUITE 1000 DALLAS, TX 75252-5793 UNITED STATES						
TITLE Method and arrangements in an IP network						
FILING FEE RECEIVED 2130	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			

EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	2	media adj quick adj start	US-PGPUB; USPAT	OR	ON	2010/04/07 08:06
S2	0	quick adj start with mpeg	US-PGPUB; USPAT	OR	ON	2010/04/07 08:06
S3	3237	IPTV	US-PGPUB; USPAT	OR	ON	2010/04/07 08:07
S4	451	IPTV with multicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:08
S5	267	IPTV with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:08
S6	4	IPTV with first with frame with I	US-PGPUB; USPAT	OR	ON	2010/04/07 08:09
S7	34	(fast adj channel adj change).ti.	US-PGPUB; USPAT	OR	ON	2010/04/07 08:40
S8	12	(fast adj channel adj change).ti. and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:40
S9	10	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change).ti. and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:48
S10	7	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) with multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:54
S11	9	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) same multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:54
S12	32	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:55

S13	7	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) with (request\$3 or deny\$3) and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:55
S14	0	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) with (deny\$3 or disabl\$3) and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:57
S15	0	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) with (congestion) and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:57
S16	0	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) with (bandwidth) and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:57
S17	32	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:57
S18	0	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) and multicast with unicast and ((resource or bandwidth) near2 manager)	US-PGPUB; USPAT	OR	ON	2010/04/07 08:58
S19	21	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) and multicast with unicast and ((resource or bandwidth) near2 utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 08:58
S20	0	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) and (resource adj manager)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:10
S21	0	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) and (bandwidth adj manager)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:10

S22	795	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast with request\$)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:10
S23	95	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast with request\$) and Mpeg	US-PGPUB; USPAT	OR	ON	2010/04/07 09:10
S24	90	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast with request\$) and Mpeg and ((resource or bandwidth))	US-PGPUB; USPAT	OR	ON	2010/04/07 09:11
S26	0	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast with request\$) and Mpeg and ((resource or bandwidth) near2 (manager or scheduler))	US-PGPUB; USPAT	OR	ON	2010/04/07 09:11
S27	11	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast with request\$) and Mpeg and ((resource or bandwidth) with map)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:12
S28	5	("20020114331" "20030187986" "20050081244" "20050157742" "6714515"). pn.	US-PGPUB; USPAT	OR	ON	2010/04/07 09:13
S29	956	(@ad<"20051223" or @rlad<"20051223") and (MPEG) and unicast with multicast	US-PGPUB; USPAT	OR	ON	2010/04/07 09:50
S30	0	(@ad<"20051223" or @rlad<"20051223") and (MPEG) and unicast with multicast and (deny\$3 with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:51
S31	1096	(@ad<"20051223" or @rlad<"20051223") and (network with (bandwidth or resource) with map)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:52
S32	134	(@ad<"20051223" or @rlad<"20051223") and (network with (bandwidth or resource) with map) and MPEG	US-PGPUB; USPAT	OR	ON	2010/04/07 09:52

S33	83	(@ad<"20051223" or @rlad<"20051223") and (network with (bandwidth or resource) with map) and MPEG and multicast	US-PGPUB; USPAT	OR	ON	2010/04/07 09:52
S34	49	(@ad<"20051223" or @rlad<"20051223") and (network with (bandwidth or resource) with map) and MPEG and multicast and unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 09:53
S35	16031	(@ad<"20051223" or @rlad<"20051223") and (media near2 stream)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:54
S36	847	(@ad<"20051223" or @rlad<"20051223") and (media near2 stream) and unicast and multicast	US-PGPUB; USPAT	OR	ON	2010/04/07 09:54
S37	0	(@ad<"20051223" or @rlad<"20051223") and (media near2 stream) and unicast and multicast and (bandwidth adj map)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:55
S38	130	(@ad<"20051223" or @rlad<"20051223") and (media near2 stream) and unicast and multicast and (bandwidth with utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:55
S39	14	(@ad<"20051223" or @rlad<"20051223") and (media near2 stream) and unicast and multicast and (bandwidth with utilization with schedul\$3)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:55
S40	229	(@ad<"20051223" or @rlad<"20051223") and (broadband adj remote adj access adj server)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:01
S41	0	(@ad<"20051223" or @rlad<"20051223") and (broadband adj remote adj access adj server) with (request\$3 with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:01
S42	3	(@ad<"20051223" or @rlad<"20051223") and (MPEG) with (request\$3 with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:01
S43	1437	(@ad<"20051223" or @rlad<"20051223") and MPEG and (network with congestion)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:03

S44	161	(@ad<"20051223" or @rlad<"20051223") and MPEG and (network with congestion) with request\$3	US-PGPUB; USPAT	OR	ON	2010/04/07 10:04
S45	11	(@ad<"20051223" or @rlad<"20051223") and MPEG and (network with congestion) with request\$3 with (multicast or unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:04
S46	4111	(@ad<"20051223" or @rlad<"20051223") and (broadcast with network) and unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 10:05
S47	892	(@ad<"20051223" or @rlad<"20051223") and (broadcast with network) and unicast with request	US-PGPUB; USPAT	OR	ON	2010/04/07 10:06
S48	27	(@ad<"20051223" or @rlad<"20051223") and (broadcast with network) and unicast with request and ((bandwidth or resource or utilizaiton) with map)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:06
S49	90	(@ad<"20051223" or @rlad<"20051223") and (broadcast with network) and ((bandwidth or utilization) near2 map)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:12
S50	26	(@ad<"20051223" or @rlad<"20051223") and (broadcast with network) and ((utilization) near2 map)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:14
S51	17	(@ad<"20051223" or @rlad<"20051223") and (broadcast with network) and ((capacity) near2 map)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:15
S52	33	(@ad<"20051223" or @rlad<"20051223") and (Mpeg) and ((capacity) near2 map)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:16
S53	21	(@ad<"20051223" or @rlad<"20051223") and (Mpeg) and ((capacity) near2 map) not S51	US-PGPUB; USPAT	OR	ON	2010/04/07 10:17
S54	2	(@ad<"20051223" or @rlad<"20051223") and (Mpeg) and (congestion with reject)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:17

S55	10	(@ad<"20051223" or @rlad<"20051223") and (Mpeg) and (congestion with reject\$3)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:17
S56	2	(@ad<"20051223" or @rlad<"20051223") and (Mpeg) and (bandwidth with reject\$3)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:18
S57	183	(@ad<"20051223" or @rlad<"20051223") and (network with capacity with map)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:18
S58	17	(@ad<"20051223" or @rlad<"20051223") and (network with capacity near2 map)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:19
S59	12245	(@ad<"20051223" or @rlad<"20051223") and ((resource or bandwidth or capacity) near2 (manager or allocator or scheduler))	US-PGPUB; USPAT	OR	ON	2010/04/07 10:20
S60	551	(@ad<"20051223" or @rlad<"20051223") and ((resource or bandwidth or capacity) near2 (manager or allocator or scheduler)) and unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 10:20
S61	87	(@ad<"20051223" or @rlad<"20051223") and ((resource or bandwidth or capacity) near2 (manager or allocator or scheduler)) and unicast with request	US-PGPUB; USPAT	OR	ON	2010/04/07 10:20
S62	66	(@ad<"20051223" or @rlad<"20051223") and (reject\$3 with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:25
S63	4	(@ad<"20051223" or @rlad<"20051223") and (reject\$3 with unicast) and (link with utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:26
S64	172	(@ad<"20051223" or @rlad<"20051223") and (request\$3 with unicast) and (reject\$3 with request)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:28
S65	227	(@ad<"20051223" or @rlad<"20051223") and (request\$3 with unicast) and ((reject\$3 or deny\$3) with request)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:28

S66	17	(@ad<"20051223" or @rlad<"20051223") and (request\$3 with unicast) and ((reject\$3 or deny\$3) with request) with (capacity or bandwidth or utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:28
S67	271	(@ad<"20051223" or @rlad<"20051223") and (link with (free with capacity))	US-PGPUB; USPAT	OR	ON	2010/04/07 10:36
S68	0	(@ad<"20051223" or @rlad<"20051223") and (link with (free with capacity)) and ((deny or reject\$3) with request)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:37
S69	5386	(@ad<"20051223" or @rlad<"20051223") and (link with (utilization))	US-PGPUB; USPAT	OR	ON	2010/04/07 10:37
S70	209	(@ad<"20051223" or @rlad<"20051223") and (link with (utilization)) with request	US-PGPUB; USPAT	OR	ON	2010/04/07 10:37
S71	3	(@ad<"20051223" or @rlad<"20051223") and (link with (utilization)) with request with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 10:38
S72	2	(@ad<"20051223" or @rlad<"20051223") and (link with (capacity)) with request with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 10:38
S73	6570	(@ad<"20051223" or @rlad<"20051223") and (capacity with database)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:47
S74	1431	(@ad<"20051223" or @rlad<"20051223") and (capacity near2 database)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:47
S75	3	(@ad<"20051223" or @rlad<"20051223") and (capacity near2 database) and (request with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:47
S76	87	(@ad<"20051223" or @rlad<"20051223") and (capacity near2 database) and (request with session)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:47
S77	8	(@ad<"20051223" or @rlad<"20051223") and (capacity near2 database) and (request with multicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:47

S78	8	(@ad<"20051223" or @rlad<"20051223") and (capacity near2 database) and (multicast) with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 10:48
S79	1	("6404848").pn.	US-PGPUB; USPAT	OR	ON	2010/04/07 10:50
S80	1	("6778531").pn.	US-PGPUB; USPAT	OR	ON	2010/04/07 10:50
S81	3	(@ad<"20051223" or @rlad<"20051223") and (capacity near2 database) and (unicast with request)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:53
S82	354	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast) with bandwidth	US-PGPUB; USPAT	OR	ON	2010/04/07 11:40
S83	39	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast) with bandwidth with efficien\$3	US-PGPUB; USPAT	OR	ON	2010/04/07 11:40
S84	0	(@ad<"20051223" or @rlad<"20051223") and (multicast with use with less with (bandwidth or resource or capacity))	US-PGPUB; USPAT	OR	ON	2010/04/07 11:46
S85	0	(@ad<"20051223" or @rlad<"20051223") and (multicast with us\$3 with less with (bandwidth or resource or capacity))	US-PGPUB; USPAT	OR	ON	2010/04/07 11:46
S86	0	(@ad<"20051223" or @rlad<"20051223") and (multicast with existing with (bandwidth or resource or capacity))	US-PGPUB; USPAT	OR	ON	2010/04/07 11:46
S87	73	(@ad<"20051223" or @rlad<"20051223") and (multicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 11:46
S88	3	(@ad<"20051223" or @rlad<"20051223") and (multicast with use with less with (bandwidth or resource or capacity))	US-PGPUB; USPAT	OR	ON	2010/04/07 11:46
S89	108	(@ad<"20051223" or @rlad<"20051223") and (multicast with existing with (bandwidth or resource or capacity))	US-PGPUB; USPAT	OR	ON	2010/04/07 11:47

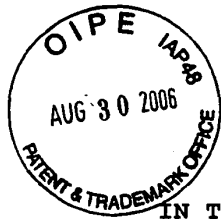
S90	18	(@ad<"20051223" or @rlad<"20051223") and (multicast with existing with (bandwidth or resource or capacity) with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 11:48
S91	8	(@ad<"20051223" or @rlad<"20051223") and (multicast with join with (bandwidth or resource or capacity) with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 11:49
S92	708	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast) with request	US-PGPUB; USPAT	OR	ON	2010/04/07 12:05
S93	36	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast) with request with (bandwidth or capacity or utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 12:06
S94	2	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast with request\$) and Mpeg and ((resource or bandwidth) near2 manager or scheduler)	US-PGPUB; USPAT	OR	ON	2010/04/07 12:17
S95	3272	(@ad<"20051223" or @rlad<"20051223") and (determin\$3 with network with capacity)	US-PGPUB; USPAT	OR	ON	2010/04/07 12:21
S96	25	(@ad<"20051223" or @rlad<"20051223") and (determin\$3 with network with capacity) and (request \$3 with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 12:21
S97	708	(@ad<"20051223" or @rlad<"20051223") and (multicast with unicast with request)	US-PGPUB; USPAT	OR	ON	2010/04/07 12:26
S98	36	(@ad<"20051223" or @rlad<"20051223") and (multicast with unicast with request) with (capacity or bandwidth or utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 12:26
S99	2	(@ad<"20051223" or @rlad<"20051223") and (multicast with new adj2 unicast with request)	US-PGPUB; USPAT	OR	ON	2010/04/07 13:01
S100	48	(@ad<"20051223" or @rlad<"20051223") and (multicast with new adj2 unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 13:02

S101	538	(@ad<"20051223" or @rlad<"20051223") and (video with best adj effort)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:00
S102	181	(@ad<"20051223" or @rlad<"20051223") and (video with best adj effort) and (link or node) with (capacity or usage or utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:01
S103	7	(@ad<"20051223" or @rlad<"20051223") and (video with best adj effort) same (link or node) with (capacity or usage or utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:01
S104	680	(@ad<"20051223" or @rlad<"20051223") and (multicast with unicast with stream)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:09
S105	39	(@ad<"20051223" or @rlad<"20051223") and (multicast with unicast with stream) with bandwidth	US-PGPUB; USPAT	OR	ON	2010/04/07 14:09
S106	1280	(@ad<"20051223" or @rlad<"20051223") and ((fast or quick) with channel with change)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:38
S107	233	(@ad<"20051223" or @rlad<"20051223") and ((fast or quick) near2 channel near2 change)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:38
S108	0	(@ad<"20051223" or @rlad<"20051223") and ((fast or quick) near2 channel near2 change) with (disabl\$3 or deny\$3 or disallow\$3 or unauthoriz\$3)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:39
S109	3	(@ad<"20051223" or @rlad<"20051223") and ((fast or quick) near2 channel near2 change) with (off)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:39
S110	5	(@ad<"20051223" or @rlad<"20051223") and ((fast or quick) near2 channel near2 change) with (disabl\$3 or deny\$3 or disallow\$3 or unauthoriz\$3 or reject\$3 or ban\$4 or refus \$3)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:42

S111	2	("6870876" "6549669").pn.	US-PGPUB; USPAT	OR	ON	2010/04/07 15:57
------	---	---------------------------	--------------------	----	----	---------------------

4/ 8/ 10 8:13:46 AM

C:\ Documents and Settings\jmattis\ My Documents\ EAST\ Workspaces\ 11315293.wsp



PATENT
1505-1090

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicants: Jim SUNDQVIST et al. Confirmation: 1382
Serial No.: 11/315,293 Art Unit: 2616
Filed: December 23, 2005 Examiner: W. Chin
For: METHOD AND ARRANGEMENTS IN AN IP NETWORK

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

August 30, 2006

Sir:

This Information Disclosure Statement is being filed in compliance with Rules 1.97 and 1.98 and in fulfillment of the duty of disclosure under Rule 1.56. In accordance with USPTO rules, attached is a Form PTO-1449 listing the cited references, all of which are in the English language.

Copies of the cited U.S. patents and patent publications are not provided in view of the USPTO waiver of the requirement to do so under 37 CFR 1.98(a)(2)(i). Copies of the remaining references are enclosed.

This Information Disclosure Statement is being filed prior to issuance of a first action on the merits; therefore, no fee is required.

The Examiner is courteously requested to initial and return a copy of the accompanying Form PTO-1449 to confirm consideration of the references and their entry into the record.

Respectfully submitted,

YOUNG & THOMPSON

Robert J. Patch

Reg. No. 17,355

745 South 23rd Street
Arlington, VA 22202
703-521-2297 (telephone)
703-685-0573 (telecopier I)
703-979-4709 (telecopier II)

RJP:rk

[illegible]

RJP:rk

Y&T August 30, 2006

<i>Index of Claims</i> 	Application/Control No. 11315293	Applicant(s)/Patent Under Reexamination SUNDQVIST ET AL.
	Examiner JASON E MATTIS	Art Unit 2461

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	04/08/2010								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	O								
	10	✓								
	11	✓								
	12	✓								
	13	O								
	14	✓								
	15	✓								
	16	✓								
	17	✓								
	18	✓								
	19	✓								
	20	O								
	21	✓								
	22	✓								
	23	✓								
	24	✓								

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Sundqvist, et al. Docket No.: NET-7349
Serial No.: 11/315,293 Art Unit: 2461
Filed: December 23, 2005 Examiner: Jason E. Mattis
For: Method and Arrangements in an IP Network

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Dear Sir:

The following amendments and remarks are presented in response to the Examiner's
Office Action mailed April 9, 2010. Please amend the above-referenced application as follows.

In the Specification:

Please amend the paragraph beginning on page 14, line 33, and ending on page 15, line 18, of the Specification as originally filed as follows:

Turning now to FIG. 3, showing a scenario where the present invention is applicable. FIG. 3 illustrates an access device 300 such as a multiservice edge router or BRAS having five connected access networks 310-305. The networks 301-303 are connected to the same network segment while the network 304 and the network 305 are connected straight to the access device 300. An application framework in this case combined with a content server network is further connected to the access device 300 and a management network 307 comprising a network resource manager is also connected to the access device 300. In the scenario of FIG. 3, the networks ~~[[310-304]]~~ 301-304 have enough resources ~~[[to]]~~ for a Media Quick Start, which is illustrated by the empty squares of the network resource utilization maps 308-309 provided by the network resource manager 307. The map 308 shows the resource utilization for the networks 301-303, the map 309 shows the resource utilization for the network 304 and the map 310 shows the resource utilization for the network 305. Thus the squares of the maps 308-310 of the resource manager 307 illustrates in this description the resource utilization map, which in reality is an internal data structure preferably.

Please amend the paragraph beginning on page 16, line 6, as originally filed as follows:

Thus the present invention relates to an application framework comprising ~~means for~~ means for receiving a request for a media distribution that requires a multicast distribution from a client in said IP network, means for requesting network resources from a network resource manager for a Media Quick Start, to start the

requested media distribution, means for receiving feedback information relating to network resource availability from the network resource manager, and means for allowing the Media Quick start or to use another behavior to start the requested media distribution based on the received feedback information.

In the Claims:

1-5. (Canceled)

6. (Currently Amended) An application framework connectable to an IP network, the application framework comprises means for receiving a request for a media distribution requiring a multicast distribution from a client in said IP network, means for requesting network resources from a network resource manager for a Media Quick Start, to start the multicast distribution, means for receiving feedback information relating to network resource availability from the network resource manager, and means for allowing the Media Quick start or to use another behavior to start the media distribution based on the received feedback information, wherein said another behavior is to use the feedback information provided by the resource manager to signal to the client that a Media Quick Start unicast stream for the requested media distribution is not available due to resource shortage in the IP network but the client is still allowed to subscribe to the multicast distribution.

7. (Currently Amended) The application framework according to claim 6, wherein said another behavior [[is]] further includes to temporarily deny the requested Media Quick Start.

8. (Currently Amended) The application framework according to claim 6, wherein said another behavior [[is]] further includes to deny the use of Media Quick Start to start the media distribution.

9. (Canceled)

10. (Currently Amended) A system comprises a network resource manager comprising a resource utilization map adapted to manage network resources in an IP network, an application framework comprising means for receiving a request for a media distribution requiring a multicast distribution from a client in said IP network, and means for requesting network resources from a network resource manager for a Media Quick Start, to start the requested media distribution, the network resource manager comprises means for providing the application framework with feedback information relating to network resource availability from the network resource manager, and the application framework comprises means for receiving said feedback information and means for allowing the Media Quick start or to use another behavior to start the requested media distribution based on the received feedback information, wherein said another behavior is to use the feedback information provided by the network resource manager to signal to a client that a Media Quick Start unicast stream for the requested media is not available due to resource shortage in the IP network but the client is still allowed to subscribe to a multicast version of the media.

11. (Currently Amended) The system according to claim 10, wherein said another behavior [[is]] further includes to temporarily deny the Media Quick Start.

12. (Currently Amended) The system according to claim 10, wherein said another behavior [[is]] further includes to deny the Media Quick Start.

13-16. (Canceled)

17. (Currently Amended) A method for an application framework connectable to an IP network, wherein the method comprises the steps of:

- receiving a request for a media distribution requiring a multicast distribution from a client in said IP network,
- requesting network resources from a network resource manager for a Media Quick Start, to start the requested media distribution,
- receiving feedback information relating to network resource availability from the network resource manager, and
- allowing the Media Quick start or using another behavior to start the requested media distribution based on the received feedback information, wherein said another behavior is to use the feedback information provided by the network resource manager to signal to the client that a Media Quick Start unicast stream for the requested media distribution is not available due to resource shortage in the IP network but the client is still allowed to subscribe to the multicast distribution.

18. (Currently Amended) The method according to claim 17, wherein said another behavior [[is]] further includes to temporarily deny the requested Media Quick Start.

19. (Currently Amended) The method according to claim 17, wherein said another behavior [[is]] further includes to deny the requested Media Quick Start.

20. (Canceled)

21. (Currently Amended) A computer program product embodied on a non-transitory computer-readable medium ~~directly loadable into the internal memory of a computer within an application framework in an IP network,~~ comprising [[the]] software code portions for performing the steps of claim 17.

22. (Previously Presented) A computer program product stored on a computer usable medium, comprising readable program for causing a computer, within an application framework in an IP network, to control an execution of the steps of claim 17.

23. (Canceled)

24. (Currently Amended) An Application-Specific Integrated Circuit for starting a multicast media distribution in an IP network, wherein the Integrated Circuit comprises means for receiving a request for a media distribution requiring a multicast distribution from a client in said IP network, means for requesting network resources from a network resource manager for a Media Quick Start, to start the requested media distribution, means for receiving feedback information relating to network resource availability from the network resource manager, and means for allowing the Media Quick start or to use another behavior to start the requested media distribution based on the received feedback information, wherein said another behavior is to use the feedback information provided by the resource manager to signal to the client that a Media Quick Start unicast stream for the requested media distribution is not available due to resource shortage in the IP network but the client is still allowed to subscribe to the multicast distribution.

REMARKS

Claims 6-8, 10-12, 17-19, 21, 22, and 24 are pending in the present application. Claims 1-5, 9, 13-16, 20, and 23 are canceled herein. Claims 6-8, 10-12, 17-19, 21, and 24 have been amended. No new matter has been added. Applicants respectfully request reconsideration of the claims in view of the following remarks.

As an initial matter, Applicants thank the Examiner for the indication that claims 9, 13, and 20 include allowable subject matter. As a result, Applicants have incorporated the features recited in claims 9, 13, and 20 into independent claims 6, 10, and 17, respectively. As noted below, Applicants have also included a similar feature in the other pending independent claims. As a result, Applicants believe that all pending claims are allowable.

The drawings were objected to because Figure 1 should assertedly be designated by a legend such as "Prior Art." In response, Applicants have submitted herewith a replacement sheet for Figure 1, which includes the legend "Prior Art." Accordingly, Applicants respectfully request that the objection to the Figures be withdrawn.

The Specification was objected to as assertedly containing certain informalities. In response, Applicants have amended the paragraphs as suggested by the Office Action.

Claim 23 was objected to assertedly containing a typo where by the term "UP network" is used instead of "IP network." In response, Applicants have canceled claim 23, thereby rendering this objection moot. Accordingly, Applicants respectfully request that the rejection of claim 23 be withdrawn.

Claims 15 and 21 have been rejected under 35 U.S.C. § 112, second paragraph, because the phrase "the software code" assertedly lacks proper antecedent basis. Applicants have

canceled claim 15 and amended claim 21 herein, rendering these rejections moot. Accordingly, Applicants respectfully request that the rejections of claims 15 and 21 be withdrawn.

Claims 15 and 21 have been rejected under 35 U.S.C. § 101 as assertedly being directed to non-statutory material. Applicants have canceled claim 15 and amended claim 21 herein, rendering these rejections moot. Accordingly, Applicants respectfully request that the rejections of claims 15 and 21 be withdrawn.

Claims 9, 13, and 20 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In response, Applicants have amended the independent claims 6, 10, and 17 to include all of the limitations of claims 9, 13, and 20, respectively. Accordingly, Applicants submit that claims 6, 10, and 17 are now allowable.

Claims 6-8, 10-12, 17-19, 21, 22, and 24 have been rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over U.S. Patent Publication No. 2007/0081459 A1 (hereinafter “Segel”) in view of U.S. Patent Publication No. 2005/0190781 A1 (hereinafter “Green”). Claims 2-5 have been rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Segel in view of Green and in further view of U.S. Patent Publication No. 2005/0094643 A1 (hereinafter “Wang”). Applicants respectfully traverse these rejections.

Applicants have amended claims 6, 10, and 17 to recite the limitation previously recited in claims 9, 13, and 20, respectively, which the Office Action indicated as being allowable. Applicants have also amended claim 24 to recite a similar limitation. Accordingly, Applicants respectfully request that the rejections of claims 6, 10, 17, and 24 be withdrawn.

Claims 7 and 8 depend from and add further features to claim 6. Claims 11 and 12 depend from and add further features to claim 10. Claims 18, 19, 21, and 22 depend from and

add further features to claim 17. It is respectfully submitted that these dependent claims are allowable by reason of depending from an allowable claim as well as for adding new features.

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Roger C. Knapp, Applicants' Attorney, at 972-732-1001, so that such issues may be resolved as expeditiously as possible. The Commissioner is hereby authorized to charge any fees that are due, or credit any overpayment, to Deposit Account No. 50-1065.

Respectfully submitted,

July 9, 2010
Date

/Roger C. Knapp/
Roger C. Knapp
Attorney for Applicants
Reg. No. 46,836

SLATER & MATSIL, L.L.P.
17950 Preston Rd., Ste. 1000
Dallas, Texas 75252
Tel.: 972-732-1001
Fax: 972-732-9218

1/4

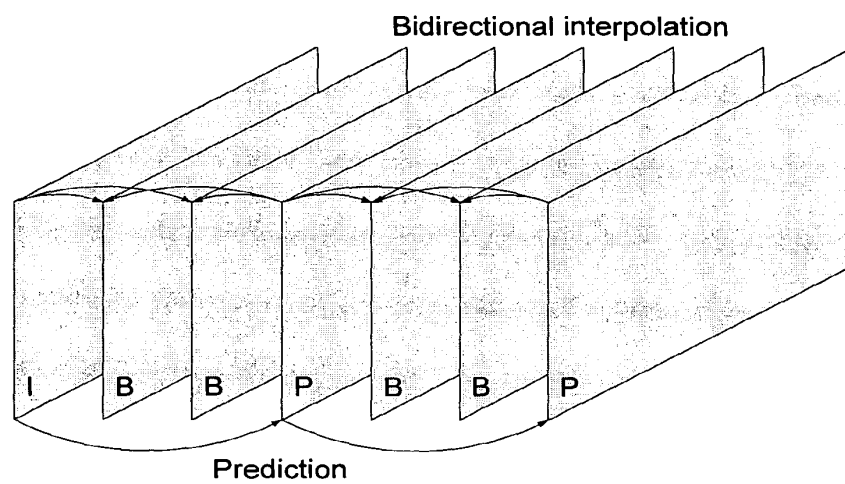


Fig. 1
(Prior Art)

Electronic Acknowledgement Receipt	
EFS ID:	7986758
Application Number:	11315293
International Application Number:	
Confirmation Number:	1382
Title of Invention:	Method and arrangements in an IP network
First Named Inventor/Applicant Name:	Jim Sundqvist
Customer Number:	25962
Filer:	Roger Clark Knapp/Courtney Danglade
Filer Authorized By:	Roger Clark Knapp
Attorney Docket Number:	NET-7349
Receipt Date:	09-JUL-2010
Filing Date:	23-DEC-2005
Time Stamp:	16:11:38
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		NET-7349_Amendment_PTO. pdf	97273 3f31657afca6a349fd2b8727bea563b7fa6e a924	yes	10

Multipart Description/PDF files in .zip description					
Document Description			Start	End	
Amendment/Req. Reconsideration-After Non-Final Reject			1	1	
Specification			2	3	
Claims			4	7	
Applicant Arguments/Remarks Made in an Amendment			8	10	
Warnings:					
Information:					
2	Drawings-only black and white line drawings	NET-7349_Replacement_Drawing_PTO.pdf	54100 55299ebbfb28fb35d349ff7069f649ccb28418b2	no	1
Warnings:					
Information:					
Total Files Size (in bytes):			151373		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 11/315,293		Filing Date 12/23/2005		☐ To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)			SMALL ENTITY ☐ OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A				
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =		OR	X \$ =				
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =			X \$ =				
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	07/09/2010	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 12	Minus	** 24	= 0	X \$ =	OR	X \$52=	0	
	Independent (37 CFR 1.16(h))	* 4	Minus	***7	= 0	X \$ =	OR	X \$220=	0	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE	OR	TOTAL ADD'L FEE	0	
AMENDMENT	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =	OR	X \$ =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =	OR	X \$ =		
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE	OR	TOTAL ADD'L FEE		
	* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.									

Legal Instrument Examiner:
/DORIS M. KING/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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

25962 7590 09/30/2010

SLATER & MATSIL, L.L.P.
17950 PRESTON RD, SUITE 1000
DALLAS, TX 75252-5793

EXAMINER

MATTIS, JASON E

ART UNIT

PAPER NUMBER

2461

DATE MAILED: 09/30/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/315,293	12/23/2005	Jim Sundqvist	NET-7349	1382

TITLE OF INVENTION: METHOD AND ARRANGEMENTS IN AN IP NETWORK

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	12/30/2010

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.

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)

25962 7590 09/30/2010

SLATER & MATSIL, L.L.P.
17950 PRESTON RD, SUITE 1000
DALLAS, TX 75252-5793

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.
11/315,293	12/23/2005	Jim Sundqvist	NET-7349	1382

TITLE OF INVENTION: METHOD AND ARRANGEMENTS IN AN IP NETWORK

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	12/30/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
MATTIS, JASON E	2461	370-352000

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, 1 _____ (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. 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 3.111. 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.
11/315,293	12/23/2005	Jim Sundqvist	NET-7349	1382
25962	7590	09/30/2010	EXAMINER	
SLATER & MATSIL, L.L.P. 17950 PRESTON RD, SUITE 1000 DALLAS, TX 75252-5793			MATTIS, JASON E	
			ART UNIT	PAPER NUMBER
			2461	
DATE MAILED: 09/30/2010				

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 1141 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 1141 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.

Issue Classification 	Application/Control No. 11315293	Applicant(s)/Patent Under Reexamination SUNDQVIST ET AL.
	Examiner JASON E MATTIS	Art Unit 2461

ORIGINAL						INTERNATIONAL CLASSIFICATION												
CLASS		SUBCLASS				CLAIMED					NON-CLAIMED							
370		432				H	0	4	J	3 / 26 (2006.01.01)								
CROSS REFERENCE(S)																		
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																	
370	230	477																

☐ 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	Final	Original
	1	7	17												
	2	8	18												
	3	9	19												
	4		20												
	5	10	21												
1	6	11	22												
2	7		23												
3	8	12	24												
	9														
4	10														
5	11														
6	12														
	13														
	14														
	15														
	16														

NONE		Total Claims Allowed:	
		12	
(Assistant Examiner)	(Date)		
/JASON E MATTIS/ Primary Examiner.Art Unit 2461	09/13/2010	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	7	3

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L7	5	("7720966" "7734796" "7054938" "6707791" "6163577").pn.	US-PGPUB; USPAT	OR	ON	2010/09/13 08:17
L8	8	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast with (unavailable or ("not" adj available)))	US-PGPUB; USPAT	OR	ON	2010/09/13 08:26
L9	0	(@ad<"20051223" or @rlad<"20051223") and (unicast with (unavailable or ("not" adj available))) and (channel near2 chang\$3)	US-PGPUB; USPAT	OR	ON	2010/09/13 08:29
L10	11	(@ad<"20051223" or @rlad<"20051223") and (unicast with (disabl\$3 or deny\$3 or disallow\$3 or unauthoriz\$3 or reject\$3 or refus\$3)) and (channel near2 chang\$3)	US-PGPUB; USPAT	OR	ON	2010/09/13 08:29
S1	2	media adj quick adj start	US-PGPUB; USPAT	OR	ON	2010/04/07 08:06
S2	0	quick adj start with mpeg	US-PGPUB; USPAT	OR	ON	2010/04/07 08:06
S3	3237	IPTV	US-PGPUB; USPAT	OR	ON	2010/04/07 08:07
S4	451	IPTV with multicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:08
S5	267	IPTV with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:08
S6	4	IPTV with first with frame with l	US-PGPUB; USPAT	OR	ON	2010/04/07 08:09
S7	34	(fast adj channel adj change).ti.	US-PGPUB; USPAT	OR	ON	2010/04/07 08:40
S8	12	(fast adj channel adj change).ti. and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:40
S9	10	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change).ti. and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:48

S10	7	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) with multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:54
S11	9	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) same multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:54
S12	32	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:55
S13	7	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) with (request\$3 or deny\$3) and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:55
S14	0	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) with (deny\$3 or disabl\$3) and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:57
S15	0	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) with (congestion) and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:57
S16	0	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) with (bandwidth) and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:57
S17	32	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) and multicast with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 08:57
S18	0	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) and multicast with unicast and ((resource or bandwidth) near2 manager)	US-PGPUB; USPAT	OR	ON	2010/04/07 08:58

S19	21	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) and multicast with unicast and ((resource or bandwidth) near2 utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 08:58
S20	0	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) and (resource adj manager)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:10
S21	0	(@ad<"20051223" or @rlad<"20051223") and (fast adj channel adj change) and (bandwidth adj manager)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:10
S22	795	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast with request\$)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:10
S23	95	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast with request\$) and Mpeg	US-PGPUB; USPAT	OR	ON	2010/04/07 09:10
S24	90	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast with request\$) and Mpeg and ((resource or bandwidth))	US-PGPUB; USPAT	OR	ON	2010/04/07 09:11
S26	0	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast with request\$) and Mpeg and ((resource or bandwidth) near2 (manager or scheduler))	US-PGPUB; USPAT	OR	ON	2010/04/07 09:11
S27	11	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast with request\$) and Mpeg and ((resource or bandwidth) with map)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:12
S28	5	("20020114331" "20030187986" "20050081244" "20050157742" "6714515"). pn.	US-PGPUB; USPAT	OR	ON	2010/04/07 09:13
S29	956	(@ad<"20051223" or @rlad<"20051223") and (MPEG) and unicast with multicast	US-PGPUB; USPAT	OR	ON	2010/04/07 09:50

S30	0	(@ad<"20051223" or @rlad<"20051223") and (MPEG) and unicast with multicast and (deny\$3 with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:51
S31	1096	(@ad<"20051223" or @rlad<"20051223") and (network with (bandwidth or resource) with map)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:52
S32	134	(@ad<"20051223" or @rlad<"20051223") and (network with (bandwidth or resource) with map) and MPEG	US-PGPUB; USPAT	OR	ON	2010/04/07 09:52
S33	83	(@ad<"20051223" or @rlad<"20051223") and (network with (bandwidth or resource) with map) and MPEG and multicast	US-PGPUB; USPAT	OR	ON	2010/04/07 09:52
S34	49	(@ad<"20051223" or @rlad<"20051223") and (network with (bandwidth or resource) with map) and MPEG and multicast and unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 09:53
S35	16031	(@ad<"20051223" or @rlad<"20051223") and (media near2 stream)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:54
S36	847	(@ad<"20051223" or @rlad<"20051223") and (media near2 stream) and unicast and multicast	US-PGPUB; USPAT	OR	ON	2010/04/07 09:54
S37	0	(@ad<"20051223" or @rlad<"20051223") and (media near2 stream) and unicast and multicast and (bandwidth adj map)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:55
S38	130	(@ad<"20051223" or @rlad<"20051223") and (media near2 stream) and unicast and multicast and (bandwidth with utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:55
S39	14	(@ad<"20051223" or @rlad<"20051223") and (media near2 stream) and unicast and multicast and (bandwidth with utilization with schedul\$3)	US-PGPUB; USPAT	OR	ON	2010/04/07 09:55

S40	229	(@ad<"20051223" or @rlad<"20051223") and (broadband adj remote adj access adj server)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:01
S41	0	(@ad<"20051223" or @rlad<"20051223") and (broadband adj remote adj access adj server) with (request\$3 with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:01
S42	3	(@ad<"20051223" or @rlad<"20051223") and (MPEG) with (request\$3 with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:01
S43	1437	(@ad<"20051223" or @rlad<"20051223") and MPEG and (network with congestion)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:03
S44	161	(@ad<"20051223" or @rlad<"20051223") and MPEG and (network with congestion) with request\$3	US-PGPUB; USPAT	OR	ON	2010/04/07 10:04
S45	11	(@ad<"20051223" or @rlad<"20051223") and MPEG and (network with congestion) with request\$3 with (multicast or unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:04
S46	4111	(@ad<"20051223" or @rlad<"20051223") and (broadcast with network) and unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 10:05
S47	892	(@ad<"20051223" or @rlad<"20051223") and (broadcast with network) and unicast with request	US-PGPUB; USPAT	OR	ON	2010/04/07 10:06
S48	27	(@ad<"20051223" or @rlad<"20051223") and (broadcast with network) and unicast with request and ((bandwidth or resource or utilizaiton) with map)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:06
S49	90	(@ad<"20051223" or @rlad<"20051223") and (broadcast with network) and ((bandwidth or utilization) near2 map)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:12
S50	26	(@ad<"20051223" or @rlad<"20051223") and (broadcast with network) and ((utilization) near2 map)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:14

S51	17	(@ad<"20051223" or @rlad<"20051223") and (broadcast with network) and ((capacity) near2 map)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:15
S52	33	(@ad<"20051223" or @rlad<"20051223") and (Mpeg) and ((capacity) near2 map)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:16
S53	21	(@ad<"20051223" or @rlad<"20051223") and (Mpeg) and ((capacity) near2 map) not S51	US-PGPUB; USPAT	OR	ON	2010/04/07 10:17
S54	2	(@ad<"20051223" or @rlad<"20051223") and (Mpeg) and (congestion with reject)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:17
S55	10	(@ad<"20051223" or @rlad<"20051223") and (Mpeg) and (congestion with reject\$3)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:17
S56	2	(@ad<"20051223" or @rlad<"20051223") and (Mpeg) and (bandwidth with reject\$3)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:18
S57	183	(@ad<"20051223" or @rlad<"20051223") and (network with capacity with map)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:18
S58	17	(@ad<"20051223" or @rlad<"20051223") and (network with capacity near2 map)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:19
S59	12245	(@ad<"20051223" or @rlad<"20051223") and ((resource or bandwidth or capacity) near2 (manager or allocator or scheduler))	US-PGPUB; USPAT	OR	ON	2010/04/07 10:20
S60	551	(@ad<"20051223" or @rlad<"20051223") and ((resource or bandwidth or capacity) near2 (manager or allocator or scheduler)) and unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 10:20
S61	87	(@ad<"20051223" or @rlad<"20051223") and ((resource or bandwidth or capacity) near2 (manager or allocator or scheduler)) and unicast with request	US-PGPUB; USPAT	OR	ON	2010/04/07 10:20

S62	66	(@ad<"20051223" or @rlad<"20051223") and (reject\$3 with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:25
S63	4	(@ad<"20051223" or @rlad<"20051223") and (reject\$3 with unicast) and (link with utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:26
S64	172	(@ad<"20051223" or @rlad<"20051223") and (request\$3 with unicast) and (reject\$3 with request)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:28
S65	227	(@ad<"20051223" or @rlad<"20051223") and (request\$3 with unicast) and ((reject\$3 or deny\$3) with request)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:28
S66	17	(@ad<"20051223" or @rlad<"20051223") and (request\$3 with unicast) and ((reject\$3 or deny\$3) with request) with (capacity or bandwidth or utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:28
S67	271	(@ad<"20051223" or @rlad<"20051223") and (link with (free with capacity))	US-PGPUB; USPAT	OR	ON	2010/04/07 10:36
S68	0	(@ad<"20051223" or @rlad<"20051223") and (link with (free with capacity)) and ((deny or reject\$3) with request)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:37
S69	5386	(@ad<"20051223" or @rlad<"20051223") and (link with (utilization))	US-PGPUB; USPAT	OR	ON	2010/04/07 10:37
S70	209	(@ad<"20051223" or @rlad<"20051223") and (link with (utilization)) with request	US-PGPUB; USPAT	OR	ON	2010/04/07 10:37
S71	3	(@ad<"20051223" or @rlad<"20051223") and (link with (utilization)) with request with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 10:38
S72	2	(@ad<"20051223" or @rlad<"20051223") and (link with (capacity)) with request with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 10:38
S73	6570	(@ad<"20051223" or @rlad<"20051223") and (capacity with database)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:47

S74	1431	(@ad<"20051223" or @rlad<"20051223") and (capacity near2 database)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:47
S75	3	(@ad<"20051223" or @rlad<"20051223") and (capacity near2 database) and (request with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:47
S76	87	(@ad<"20051223" or @rlad<"20051223") and (capacity near2 database) and (request with session)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:47
S77	8	(@ad<"20051223" or @rlad<"20051223") and (capacity near2 database) and (request with multicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:47
S78	8	(@ad<"20051223" or @rlad<"20051223") and (capacity near2 database) and (multicast) with unicast	US-PGPUB; USPAT	OR	ON	2010/04/07 10:48
S79	1	("6404848").pn.	US-PGPUB; USPAT	OR	ON	2010/04/07 10:50
S80	1	("6778531").pn.	US-PGPUB; USPAT	OR	ON	2010/04/07 10:50
S81	3	(@ad<"20051223" or @rlad<"20051223") and (capacity near2 database) and (unicast with request)	US-PGPUB; USPAT	OR	ON	2010/04/07 10:53
S82	354	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast) with bandwidth	US-PGPUB; USPAT	OR	ON	2010/04/07 11:40
S83	39	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast) with bandwidth with efficien\$3	US-PGPUB; USPAT	OR	ON	2010/04/07 11:40
S84	0	(@ad<"20051223" or @rlad<"20051223") and (multicast with use with less with (bandwidth or resource or capacity))	US-PGPUB; USPAT	OR	ON	2010/04/07 11:46
S85	0	(@ad<"20051223" or @rlad<"20051223") and (multicast with us\$3 with less with (bandwidth or resource or capacity))	US-PGPUB; USPAT	OR	ON	2010/04/07 11:46
S86	0	(@ad<"20051223" or @rlad<"20051223") and (multicast with existing with (bandwidth or resource or capacity))	US-PGPUB; USPAT	OR	ON	2010/04/07 11:46

S87	73	(@ad<"20051223" or @rlad<"20051223") and (multicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 11:46
S88	3	(@ad<"20051223" or @rlad<"20051223") and (multicast with use with less with (bandwidth or resource or capacity))	US-PGPUB; USPAT	OR	ON	2010/04/07 11:46
S89	108	(@ad<"20051223" or @rlad<"20051223") and (multicast with existing with (bandwidth or resource or capacity))	US-PGPUB; USPAT	OR	ON	2010/04/07 11:47
S90	18	(@ad<"20051223" or @rlad<"20051223") and (multicast with existing with (bandwidth or resource or capacity) with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 11:48
S91	8	(@ad<"20051223" or @rlad<"20051223") and (multicast with join with (bandwidth or resource or capacity) with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 11:49
S92	708	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast) with request	US-PGPUB; USPAT	OR	ON	2010/04/07 12:05
S93	36	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast) with request with (bandwidth or capacity or utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 12:06
S94	2	(@ad<"20051223" or @rlad<"20051223") and (unicast with multicast with request\$) and Mpeg and ((resource or bandwidth) near2 manager or scheduler)	US-PGPUB; USPAT	OR	ON	2010/04/07 12:17
S95	3272	(@ad<"20051223" or @rlad<"20051223") and (determin\$3 with network with capacity)	US-PGPUB; USPAT	OR	ON	2010/04/07 12:21
S96	25	(@ad<"20051223" or @rlad<"20051223") and (determin\$3 with network with capacity) and (request \$3 with unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 12:21
S97	708	(@ad<"20051223" or @rlad<"20051223") and (multicast with unicast with request)	US-PGPUB; USPAT	OR	ON	2010/04/07 12:26

S98	36	(@ad<"20051223" or @rlad<"20051223") and (multicast with unicast with request) with (capacity or bandwidth or utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 12:26
S99	2	(@ad<"20051223" or @rlad<"20051223") and (multicast with new adj2 unicast with request)	US-PGPUB; USPAT	OR	ON	2010/04/07 13:01
S100	48	(@ad<"20051223" or @rlad<"20051223") and (multicast with new adj2 unicast)	US-PGPUB; USPAT	OR	ON	2010/04/07 13:02
S101	538	(@ad<"20051223" or @rlad<"20051223") and (video with best adj effort)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:00
S102	181	(@ad<"20051223" or @rlad<"20051223") and (video with best adj effort) and (link or node) with (capacity or usage or utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:01
S103	7	(@ad<"20051223" or @rlad<"20051223") and (video with best adj effort) same (link or node) with (capacity or usage or utilization)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:01
S104	680	(@ad<"20051223" or @rlad<"20051223") and (multicast with unicast with stream)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:09
S105	39	(@ad<"20051223" or @rlad<"20051223") and (multicast with unicast with stream) with bandwidth	US-PGPUB; USPAT	OR	ON	2010/04/07 14:09
S106	1280	(@ad<"20051223" or @rlad<"20051223") and ((fast or quick) with channel with change)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:38
S107	233	(@ad<"20051223" or @rlad<"20051223") and ((fast or quick) near2 channel near2 change)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:38
S108	0	(@ad<"20051223" or @rlad<"20051223") and ((fast or quick) near2 channel near2 change) with (disabl\$3 or deny\$3 or disallow\$3 or unauthoriz\$3)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:39

S109	3	(@ad<"20051223" or @rlad<"20051223") and ((fast or quick) near2 channel near2 change) with (off)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:39
S110	5	(@ad<"20051223" or @rlad<"20051223") and ((fast or quick) near2 channel near2 change) with (disabl\$3 or deny\$3 or disallow\$3 or unauthoriz\$3 or reject\$3 or ban\$4 or refus\$3)	US-PGPUB; USPAT	OR	ON	2010/04/07 14:42
S111	2	("6870876" "6549669").pn.	US-PGPUB; USPAT	OR	ON	2010/04/07 15:57

9/ 13/ 10 8:35:48 AM

C:\ Documents and Settings\jmattis\ My Documents\ EAST\ Workspaces\ 11315293.wsp



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

BIB DATA SHEET

CONFIRMATION NO. 1382

SERIAL NUMBER 11/315,293	FILING or 371(c) DATE 12/23/2005 RULE	CLASS 370	GROUP ART UNIT 2461	ATTORNEY DOCKET NO. NET-7349		
APPLICANTS Jim Sundqvist, Lulea, SWEDEN; Erik Lundgren, Lulea, SWEDEN; ** CONTINUING DATA ***** none /JM/ 4/7/10 ** FOREIGN APPLICATIONS ***** none ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 01/30/2006						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and /JASON E MATTIS/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY SWEDEN	SHEETS DRAWINGS 4	TOTAL CLAIMS 24	INDEPENDENT CLAIMS 7
ADDRESS SLATER & MATSIL, L.L.P. 17950 PRESTON RD, SUITE 1000 DALLAS, TX 75252-5793 UNITED STATES						
TITLE Method and arrangements in an IP network						
FILING FEE RECEIVED 2130	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			

<i>Index of Claims</i> 	Application/Control No. 11315293	Applicant(s)/Patent Under Reexamination SUNDQVIST ET AL.
	Examiner JASON E MATTIS	Art Unit 2461

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant		☐ CPA		☐ T.D.		☐ R.1.47			
CLAIM		DATE							
Final	Original	04/08/2010	09/13/2010						
	1	✓							
	2	✓							
	3	✓							
	4	✓							
	5	✓							
1	6	✓	=						
2	7	✓	=						
3	8	✓	=						
	9	O							
4	10	✓	=						
5	11	✓	=						
6	12	✓	=						
	13	O							
	14	✓							
	15	✓							
	16	✓							
7	17	✓	=						
8	18	✓	=						
9	19	✓	=						
	20	O							
10	21	✓	=						
11	22	✓	=						
	23	✓							
12	24	✓	=						

Search Notes 	Application/Control No. 11315293	Applicant(s)/Patent Under Reexamination SUNDQVIST ET AL.
	Examiner JASON E MATTIS	Art Unit 2461

SEARCHED			
Class	Subclass	Date	Examiner
370	230, 432, 477	9/13/10	JM

SEARCH NOTES		
Search Notes	Date	Examiner
Text search including 370/229-240, 254-258, 351, 389-390, 400-401, 431-432, 477, 503; 709/various areas	4/7/10	JM
Inventor search	4/7/10	JM
Updated text search of previous areas	9/13/10	JM
Updated inventor search	9/13/10	JM

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
370	230, 432, 477	9/13/10	JM

--	--

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **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)

25962 7590 09/30/2010

SLATER & MATSIL, L.L.P.
17950 PRESTON RD, SUITE 1000
DALLAS, TX 75252-5793

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 (371) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/315,293	12/23/2005	Jim Sundqvist	NET-7349	1382

TITLE OF INVENTION: METHOD AND ARRANGEMENTS IN AN IP NETWORK

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	12/30/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
MATTIS, JASON E	2461	370-352000

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 Slater & Matsil, L.L.P.

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

NetSocket, Inc.

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Plano, TX

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)

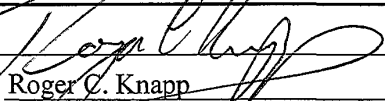
- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 50-1065 (enclose an extra copy of this form).

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


Typed or printed name Roger C. Knapp

Date December 30, 2010

Registration No. 46,836

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.

Electronic Patent Application Fee Transmittal				
Application Number:		11315293		
Filing Date:		23-Dec-2005		
Title of Invention:		METHOD AND ARRANGEMENTS IN AN IP NETWORK		
First Named Inventor/Applicant Name:		Jim Sundqvist		
Filer:		Roger Clark Knapp/Natalie Swider		
Attorney Docket Number:		NET-7349		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1510	1510
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1810

Electronic Acknowledgement Receipt	
EFS ID:	9139255
Application Number:	11315293
International Application Number:	
Confirmation Number:	1382
Title of Invention:	METHOD AND ARRANGEMENTS IN AN IP NETWORK
First Named Inventor/Applicant Name:	Jim Sundqvist
Customer Number:	25962
Filer:	Roger Clark Knapp/Natalie Swider
Filer Authorized By:	Roger Clark Knapp
Attorney Docket Number:	NET-7349
Receipt Date:	30-DEC-2010
Filing Date:	23-DEC-2005
Time Stamp:	11:52:14
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$1810
RAM confirmation Number	7364
Deposit Account	501065
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	NET-7349_IF.pdf	105158	no	1
			dbe7715fa4c135f57306f9d8223c53132cee c459		

Warnings:

Information:

2	Fee Worksheet (PTO-875)	fee-info.pdf	32062	no	2
			ef69f585280fe25c271a8a20ca9a63150de4 baf4		

Warnings:

Information:

Total Files Size (in bytes): 137220

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

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.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/315,293	02/08/2011	7885286	NET-7349	1382

25962 7590 01/19/2011
SLATER & MATSIL, L.L.P.
17950 PRESTON RD, SUITE 1000
DALLAS, TX 75252-5793

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 1446 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 Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Jim Sundqvist, Lulea, SWEDEN;
Erik Lundgren, Lulea, SWEDEN;

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.

CHANGE OF CORRESPONDENCE ADDRESS Patent Address to: Mail Stop Post Issue Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450	Patent Number	7,885,286 B2
	Issue Date	02/08/2011
	Application Number	11/315,293
	Filing Date	12/23/2005
	First Named Inventor	Sundqvist et al.
	Attorney Docket Number	NET-7349

Please change the Correspondence Address for the above-identified patent to:

☐ The address associated with Customer Number:

OR

☒ Firm or Individual Name Netsocket, Inc.

3701 W. Plano Pkwy, Suite 140

Address

City Plano

State TX

ZIP 75075

Country US

Telephone 214.427.7306

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.

☐

 Assignee of record of the entire interest. See 37 CFR 3.71.
 Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

☒
Attorney or agent of record. Registration Number 46,836

Signature

Typed or

Printed Name

Roger C. Knapp

Date

March 9, 2011

Telephone

972-732-1001

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐

*Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.33. 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 to 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.

Electronic Acknowledgement Receipt	
EFS ID:	9618102
Application Number:	11315293
International Application Number:	
Confirmation Number:	1382
Title of Invention:	METHOD AND ARRANGEMENTS IN AN IP NETWORK
First Named Inventor/Applicant Name:	Jim Sundqvist
Customer Number:	25962
Filer:	Roger Clark Knapp/Kristin Hayes
Filer Authorized By:	Roger Clark Knapp
Attorney Docket Number:	NET-7349
Receipt Date:	09-MAR-2011
Filing Date:	23-DEC-2005
Time Stamp:	11:30:21
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	NET-7349_ChangeOfAddress.pdf	59718 ce75e3485f527c6e916d531e5780edb96d08e1f	no	1

Warnings:

Information:

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.

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT3786034

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
NETSOCKET, INC.	03/14/2016
RECEIVING PARTY DATA	
Name:	ALLIACENSE LIMITED LLC
Street Address:	4880 STEVENS CREEK BLVD.
Internal Address:	SUITE 103
City:	SAN JOSE
State/Country:	CALIFORNIA
Postal Code:	95129
PROPERTY NUMBERS Total: 10	
Property Type	Number
Patent Number:	7606885
Patent Number:	7706300
Patent Number:	7827284
Patent Number:	7885286
PCT Number:	SE2001002847
PCT Number:	SE2002001490
PCT Number:	EP2001004062
PCT Number:	SE2003001767
PCT Number:	SE2003001490
PCT Number:	SE2006050468
CORRESPONDENCE DATA	
Fax Number:	(408)446-5444
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>	
Phone:	4088865441
Email:	emi@alliacense.com
Correspondent Name:	EMI RHODES
Address Line 1:	4880 STEVENS CREEK BLVD.
Address Line 2:	SUITE 103
Address Line 4:	SAN JOSE, CALIFORNIA 95129

ATTORNEY DOCKET NUMBER:	NETSOCKET REV2
NAME OF SUBMITTER:	EMI RHODES
SIGNATURE:	/EMI RHODES/
DATE SIGNED:	03/16/2016
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 11

source=160315 Revised Assignment#page2.tif

source=160315 Revised Assignment#page3.tif

source=160315 Revised Assignment#page4.tif

source=160315 Revised Assignment#page5.tif

source=160315 Revised Assignment#page6.tif

source=160315 Revised Assignment#page7.tif

source=150902 Netsocket Executed Assignment Sept 2, 2015#page1.tif

source=150902 Netsocket Executed Assignment Sept 2, 2015#page2.tif

source=150902 Netsocket Executed Assignment Sept 2, 2015#page3.tif

source=150902 Netsocket Executed Assignment Sept 2, 2015#page4.tif

source=150902 Netsocket Executed Assignment Sept 2, 2015#page5.tif

AMENDMENT #1 TO
LICENSING PROGRAM SERVICES AND COMMERCIALIZATION
AGREEMENT

Between

ALLIACENSE LIMITED, LLC

And

NETSOCKET, INC.

This Agreement is entered into between ALLIACENSE LIMITED, LLC, a Delaware limited liability corporation, having its principal place of business at 4880 Stevens Creek Boulevard, Suite 103, San Jose, California 95129 ("Alliacense"), and Netsocket, Inc., a Delaware corporation with its principal place of business at P.O. Box 8678627, Plano, Texas, 75086-7627 ("NETSOCKET"). Alliacense and NETSOCKET may be referred to individually as "Party" and collectively as the "Parties."

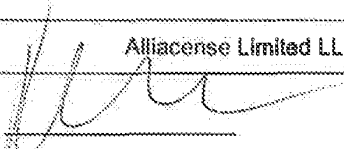
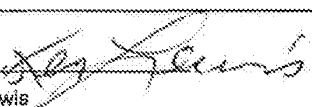
WHEREAS the Parties entered into that certain Licensing Program Services Agreement of 6 July 2015 (the "Services Agreement"), including among all other Addenda thereto, Addendum E of 2 September 2015 (the "Assignment"), together, the "Agreements"; and

WHEREAS the Parties desire to make certain additional patents subject to the Agreements.

NOW THEREFORE, for and in consideration of the mutual covenants herein contained as well as other good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the parties hereto covenant and agree that:

The Parties hereby agree that Schedule I of the Assignment, entitled, "Schedule of Project IP," shall be amended to include additional items, and replaced in its entirety with the attached, "Schedule I, Schedule of Project IP – Revision 2."

IN WITNESS WHEREOF, the Parties have hereunto set their hands and seal as of the date of the execution hereof by the last signatory hereto (the "Effective Date").

Alliacense Limited LLC	Netsocket, Inc.
By:  Mac Leckrone Title: President Date: <u>14</u> March 2016	By:  Ken Lewis Title: CEO Date: <u>14</u> March 2016

Confidential.
© Alliacense 2015.

2


NETSOCKET


Alliacense

Schedule I
Schedule of Project IP – Revision 2

Family	Country	Patent No.
1	Provisional	60/261,166
1	PCT	WO/2002/056564
1	US	7616691
1	CN	CN100380903
1	EP	EP1364456
1	JP	JP2004527934
1	KR	KR20040007434
1	AT	AT504133
2	Provisional	60/316,296
2	SE	SE519215
2	PCT	WO/2003/021888
2	US	7734796
2	EP	EP1423945
2	JP	JP3977331
2	CA	CA2459571
2	CN	CN1552143
2	KR	KR20040040448
2	TW	TWI245524
2	PT	PT1423945
2	AT	AT367696
2	DE	DE60221261
2	DK	DK1423945
2	ES	ES2290327
3	Provisional	60/229,544
3	PCT	WO/2002/021797
3	US	7696885
3	US	2006-0069779 A1
3	EP	EP1320971
3	JP	JP2004508772
3	AT	AT434326
3	AU	AU8458601

Confidential.
© Alliacense 2015.

3

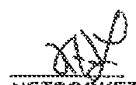

NETSOCKET


Alliacense

Family	Country	Patent No.
4	Provisional	60/197,006
4	PCT	WO/2001/080485
4	US	7190888
4	EP	EP1275226
4	CN	CN1183724
4	KR	KR100696003
4	JP	JP2003531519
4	DE	DE60102367
4	AT	AT262244
4	AU	AU6019001
4	ES	ES2217150
5	Provisional	60/361,306
5	PCT	WO/2003/075527
5	US	7706300
5	EP	EP1481514
5	JP	JP4018538
5	KR	KR20040102029
5	AT	AT399417
5	AU	AU2002307608
6	Provisional	60/435,347
6	Provisional	60/434,675
6	SE	SE0203872
6	US	7827284
6	PCT	WO/2004/057813
6	EP	EP1573986
6	JP	JP2006511165
6	KR	KR20050116794
6	AT	AT544264
6	AU	AU2003263720
7	Provisional	60/430,098
7	PCT	WO/2004/051944
7	US	7720886
7	EP	EP1579638
7	JP	JP2006508606
7	KR	KR20050085155

Confidential.
© Alliacense 2015.

4


NETSOCKET


Alliacense

Family	Country	Patent No.
7	AU	AU2003279659
8	SE	SE526535
8	US	60530900
8	PCT	WO/2005/082555
8	EP	EP1898119
8	US	US20070115918
9	Provisional	60/671,063
9	PCT	WO/2006/041373
9	EP	EP1888442
9	CA	CA2583293
9	JP	JP2008516521
9	KR	KR20070086339
9	US	US20090003194
10	PCT	WO/2003/084157
10	EP	EP1488578
10	JP	JP4018640
10	US	US20050157644
10	KR	KR20040105804
10	AT	AT424073
10	AU	AU2002248116
11	US	7885286
11	SE	SE0502885
11	PCT	WO/2007/073319
11	EP	EP1972108
12	Provisional	60/369,564
12	PCT	WO/2003/085514
12	EP	EP1480755
12	US	US2005125517
12	JP	JP4064353
12	KR	KR20050004831
12	AT	AT416214
12	AU	AU2002343306

Confidential.
© Alliacense 2015.

5


NETSOCKET


Alliacense

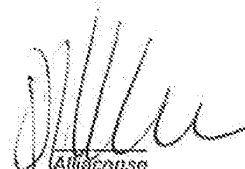
Family	Country	Patent No.
13	Provisional	60/530,902
13	SE	SE526257
13	PCT	WO/2005/062557
13	EP	EP1698123
13	US	US20070115856
13	AT	AT522049
14	Provisional	60/676,944
14	PCT	WO/2006/118500
14	EP	EP1878170
14	US	US20090304020
14	CA	CA2605126
14	CN	CN101171803
14	JP	JP2008541553
14	PCT	WO/2006/118502
14	EP	EP1878270
14	US	US20090323712
14	CA	CA2605129
14	CN	CN101185346
14	JP	JP2008541555

Together with all progenitors and progeny thereof and all additions, changes, amendments, modifications, actions, counterparts, continuations, continuations-in-part, extensions, reissues, divisionals and/or renewals of such progenitors and progeny," together with any counterparts thereof anywhere in the world, as well as all inventions disclosed in any such patents, progenitors, progeny, or counterparts.

Confidential.
© Alliacense 2015.

6


NETSOCKET


Alliacense

ADDENDUM E
FORM OF ASSIGNMENT

This assignment ("Assignment") is entered into between ALLIACENSE LIMITED, LLC, a Delaware limited liability corporation, having its principal place of business at 4880 Stevens Creek Boulevard, Suite 103, San Jose, California 95129 ("Assignee"), and Netsocket, Inc., a Delaware corporation with its principal place of business at P.O. Box 867627, Plano, Texas 75086-7627, of behalf of itself and its Affiliates, (collectively, "Assignor"). Assignee and Assignor may be referred to individually as "Party" and collectively as the "Parties."

NOW THEREFORE, for and in consideration of the mutual covenants herein contained as well as of other good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, and pursuant to that certain Commercialization Agreement between Assignee and Assignor dated June ___, 2015 (the "Agreement"), it is covenanted and agreed by and between the parties hereto that:

1. Subject Matter.

"Project IP" means the patents and applications scheduled at Schedule I, entitled "Schedule of Project IP," including all foreign counterparts, extensions, reissues, and/or renewals of such patents and patent applications.

2. Assignment.

2.1. Assignor hereby grants, sets-over, assigns, transfers, conveys, and acquits unto Assignee all of Assignor's right, title, and interest of whatsoever kind or nature, now existing or hereafter arising, in and to the Project IP, including but not limited to, with respect to the Project IP, the exclusive, worldwide right to:

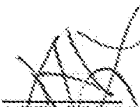
2.1.1. Regulate and control by license, sublicense, affiliation, or other agreement the practice and/or use of any and all of the Project IP;

2.1.2. Otherwise pursue the commercialization and enforcement of any and all claims of the Project IP, including the manufacture, sale, and use of any and all products and/or services and the practice of any and all methods and processes covered by any and all claims of any or all of the Project IP;

2.1.3. Sue on and collect for its own use and benefit all claims and/or entitlements with respect to damages by reason of past, present and future infringement or use of any and all of the Project IP; and,

Confidential.
© Alliacense 2015.

19


NETSOCKET
9/2/15


Alliacense

2.1.4. Pursue in its own name and for its own use and benefit all remedies of whatsoever kind or nature (including injunctive relief) relating to the past, present, or future infringement or use of any and all of the Project IP.

2.2. All costs for the registration of the assignment of the Project IP will be borne by Assignee.

2.3. By virtue of the grants of contained herein, Assignor acknowledges that it does not retain any rights, licenses or other benefits with respect to any or all of the Project IP.

3. Attachments.

- Schedule I: Schedule of Project IP

IN WITNESS WHEREOF, the parties have hereunto set their hands and seals as of June __, 2015.

NETSOCKET, INC. (ASSIGNOR)	ALLIACENSE LIMITED LLC (ASSIGNEE)
By: <u>[Signature]</u> Ken Lewis Title: CEO Date: <u>June 2015</u>	By: <u>[Signature]</u> MAC LOCKRONE Title: <u>President</u> Date: <u>6 June 2015</u>

2 SEPTEMBER 2015
[Signature]

July
[Signature]

Confidential.
© Alliacense 2015.

[Signature]
NETSOCKET
9/2/15
[Signature]
Alliacense

Schedule I
Schedule of Project IP

Family	Status	Country	Patent No.
1		Provisional	60/261,166
1		PCT	WO/2002/056564
1	Issued	US	7616601
1	Issued	CN	CN100380903
1	Issued	EP	EP1354456
1		JP	JP2004527934
1		KR	KR20040007434
1		AT	AT504133
2		Provisional	60/316,298
2	Issued	SE	SE519215
2		PCT	WO/2003/021888
2	Issued	US	7734796
2	Issued	EP	EP1423945
2	Issued	JP	JP3977331
2		CA	CA2459571
2	Rejected	CN	CN1552143
2		KR	KR20040040448
2		TW	TW245524
2		PT	PT1423945
2		AT	AT367696
2		DE	DE60221261
2		DK	DK1423945
2		ES	ES2290327
4		Provisional	60/197,006
4		PCT	WO/2001/080485
4	Issued	US	7190698
4	Issued	EP	EP1275226
4	Issued?	CN	CN1183724
4	Lapsed?	KR	KR100696003
4		JP	JP2003531519

Confidential.
© Alliacense 2015.

21

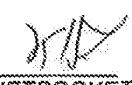

NETSOCKET


Alliacense

Family	Status	Country	Patent No.
4		DE	DE60102367
4		AT	AT262244
4		AU	AU6019001
4		ES	ES2217150
7		Provisional	60/430,088
7		PCT	WO/2004/051944
7	Issued	US	7720868
7		EP	EP1579638
7		JP	JP2006508605
7		KR	KR20050085155
7		AU	AU2003279659
8	Issued	SE	SE526535
8		US	60/530800
8		PCT	WO/2005/062555
8	Issued	EP	EP1898119
8	ABN	US	US20070115918
9		Provisional	60/871,083
9		PCT	WO/2008/041373
9	Issued	EP	EP1808442
9		CA	CA2583293
9		JP	JP2008516521
9		KR	KR20070085339
9	ABN	US	US20090003194
10		PCT	WO/2003/084157
10	Issued	EP	EP1488678
10	Issued	JP	JP4018640
10	ABN	US	US20050157644
10		KR	KR20040105804
10		AT	AT424073
10		AU	AU2002248116
12		Provisional	60/369,564

Confidential.
© Alliacense 2015.

22


NETSOCKET

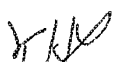

Alliacense

Family	Status	Country	Patent No.
12		PCT	WO/2003/085514
12	Issued	EP	EP1490765
12	ABN	US	US2005125517
12	Issued	JP	JP4064353
12		KR	KR20050004631
12		AT	AT418214
12		AU	AU2002343306
13		Provisional	60/530,902
13	Issued	SE	SE526257
13		PCT	WO/2005/062557
13	Issued	EP	EP1698123
13	ABN	US	US20070115856
13		AT	AT522049
14		Provisional	60/676,944
14		PCT	WO/2006/118500
14	Issued	EP	EP1878170
14	ABN	US	US20090304020
14		CA	CA2605126
14		CN	CN101171803
14		JP	JP2008541553
14		PCT	WO/2006/118502
14	Issued	EP	EP1878270
14	ABN	US	US20090323712
14		CA	CA2605129
14		CN	CN101185346
14		JP	JP2008541555

Together with all progenitors and progeny thereof and all additions, changes, amendments, modifications, actions, counterparts, continuations, continuations-in-part, extensions, reissues, divisionals and/or renewals of such progenitors and progeny," together with any counterparts thereof anywhere in the world, as well as all inventions disclosed in any such patents, progenitors, progeny, or counterparts.

Confidential.
© Alliacense 2015.

23


NETSOCKET


Alliacense

Electronic Acknowledgement Receipt	
EFS ID:	36667129
Application Number:	11315293
International Application Number:	
Confirmation Number:	1382
Title of Invention:	METHOD AND ARRANGEMENTS IN AN IP NETWORK
First Named Inventor/Applicant Name:	Jim Sundqvist
Customer Number:	25962
Filer:	Robin L. Barnes/Nicole Isenhardt
Filer Authorized By:	Robin L. Barnes
Attorney Docket Number:	NET-7349
Receipt Date:	23-JUL-2019
Filing Date:	23-DEC-2005
Time Stamp:	16:13:35
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
------------------------	----

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	POA373b20012601106.pdf	140538	no	3
			4bc6231e00718930e053308c13e8624235c7a728		

Warnings:

Information:	
Total Files Size (in bytes):	140538
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.	

**PATENT - POWER OF ATTORNEY
OR
REVOCATION OF POWER OF ATTORNEY
WITH A NEW POWER OF ATTORNEY
AND
CHANGE OF CORRESPONDENCE ADDRESS**

Patent Number	7,885,286
Issue Date	02/08/2011
First Named Inventor	Jim Sundqvist, Lulea, (SE)
Title	Method and Arrangement in an IP Network
Attorney Docket No.	200126.01106

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith:

OR
☒ I hereby appoint Practitioner(s) associated with the Customer Number Identified in the box at right as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

110123

OR
☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☒ The address associated with the above-identified Customer Number:

OR
☐ The address associated with the Customer Number Identified in the box at right:

OR

☐ Firm or
Individual Name

Address

City

Country

Telephone

State

Zip

Email

I am the:

☐ Inventor, having ownership of the patent.

OR

☒ Patent owner.

☒ Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____

SIGNATURE of Inventor or Patent Owner:

Signature	<i>Ken Lewis</i>	Date	21 JUL 2019
Name	Ken Lewis	Telephone	+1 214 763 7650
Title and Company	President and CEO, Netsocket, 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.

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.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Netsocket, Inc.

Application No./Patent No.: 7,885,286

Filed/Issue Date: 02/08/2011

Titled: Method and Arrangement in an IP Network

Netsocket, Inc., a corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)
the patent application/patent identified above, by virtue of either:

A. ☐ 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 a copy* is attached.

OR

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Sundqvist, Jim et al. To: Operax AB

The document was recorded in the United States Patent and Trademark Office at
Reel 017257, Frame 0150, or a copy* is attached.

2. From: Operax AB To: NYA Operax AB

The document was recorded in the United States Patent and Trademark Office at
Reel 021978, Frame 0022, or a copy* is attached.

3. From: NYA Operax AB To: Operax AB

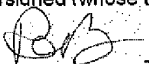
The document was recorded in the United States Patent and Trademark Office at
Reel 021991, Frame 0371, or a copy* is attached.

☒ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ *As required by 37 CFR 3.73(b)(1)(i), if a copy/copies is/are attached, 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.]

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


Signature

2019-07-23

Date

Robin L. Barnes

Printed or Typed Name

45936

Title or Registration Number

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.

Applicant/Patent Owner: Netsocket, Inc.
Application No./Patent No.: 7,885,286

Filed/Issue Date: 02/08/2011

Supplemental Sheet

4. From: Operax AB To: NETSOCKET, INC.

The document was recorded in the United States Patent and Trademark Office at
Reel 022007 Frame 0627

5. From: NETSOCKET, INC., a Delaware Corporation To: Comerica Bank, a Texas Banking Association

The document was recorded in the United States Patent and Trademark Office at
Reel 026829 Frame 0444

6. From: Comerica Bank To: NETSOCKET, INC.

The document was recorded in the United States Patent and Trademark Office at
Reel 036612 Frame 0637

7. From: NETSOCKET, INC. To: Alliacense Limited LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 038109 Frame 0515

8. From: Alliacense Limited, LLC To: NETSOCKET, INC.

The document was recorded in the United States Patent and Trademark Office at
Reel 049803 Frame 0043

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))				
Patent Number	Issue Date	Application Number	Filing Date	Docket Number (if applicable)
7885286	08-Feb-2011	11315293	23-Dec-2005	
CAUTION: Maintenance fee (and surcharge, if any) payment must correctly identify: (1) the patent number and (2) the application number of the actual U.S. application leading to issuance of that patent to ensure the fee(s) is/are associated with the correct patent. 37 CFR 1.366(c) and (d).				
Applicants claims the following fee status:				
☒ Small Entity				
☐ Micro Entity				
☐ Regular Undiscounted				
Applicants selects the following :				
☐ 3 1/2		☒ 7 1/2		☐ 11 1/2
PETITION FEE The petition fee required by 37 CFR 1.17(m) (Fee Code 1558/2558) must be paid as a condition of accepting unintentionally delayed payment of the maintenance fee.				
MAINTENANCE FEE (37 CFR 1.20(e)-(g)) The appropriate maintenance fee must be submitted with this petition.				
STATEMENT THE UNDERSIGNED CERTIFIES THAT THE DELAY IN PAYMENT OF THE MAINTENANCE FEE TO THIS PATENT WAS UNINTENTIONAL				
PETITIONER(S) REQUEST THAT THE DELAYED PAYMENT OF THE MAINTENANCE FEE BE ACCEPTED AND THE PATENT REINSTATED				
THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES 37 CFR 1.378(c) states: "Any petition under this section must be signed in compliance with 37 CFR 1.33(b) ."				
I certify, in accordance with 37 CFR 1.4(d)(4) that I am				
☒ An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application. ☐ An attorney or agent registered to practice before the Patent and Trademark Office ☐ A sole patentee ☐ A joint patentee; I certify that I am authorized to sign this submission on behalf of all the other patentees as evidenced by the power of attorney in the application ☐ A joint patentee; all of whom are signing this e-petition ☐ The assignee of record of the entire interest that qualifies as an authorized party under 37 CFR 1.33(b)				

Attorney			
A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature			
Signature	/Robin L. Barnes/		
Name	Robin L. Barnes	Registration Number	45936

Electronic Patent Application Fee Transmittal				
Application Number:		11315293		
Filing Date:		23-Dec-2005		
Title of Invention:		METHOD AND ARRANGEMENTS IN AN IP NETWORK		
First Named Inventor/Applicant Name:		Jim Sundqvist		
Filer:		Robin L. Barnes/Nicole Isenhardt		
Attorney Docket Number:		NET-7349		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
MAINTENANCE FEE DUE AT 7.5 YEARS	2552	1	1800	1800
PET. DELAY PYMT MAINTAIN PATENT IN FORCE	2558	1	1000	1000
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2800



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. 7885286 :
Issue Date: February 8, 2011 :
Application No. 11315293 :DECISION GRANTING PETITION
Filed: December 23, 2005 :UNDER 37 CFR 1.378(b)
Attorney Docket No. NET-7349 :

This is a decision on the electronic petition, filed July 23, 2019, under 37 CFR 1.378(b) to accept the unintentionally delayed payment of the 7.5 year maintenance fee for the above-identified patent.

The petition is **GRANTED**.

The maintenance fee is accepted, and the above-identified patent reinstated as of July 23, 2019. This decision also constitutes notice that the fee has been accepted. An electronic copy of the petition and this decision has been created as an entry in the Image File Wrapper. Nevertheless, petitioner should print and retain an independent copy.

Telephone inquiries related to this electronic decision should be directed to the Electronic Business Center at 1-866-217-9197.

Electronic Acknowledgement Receipt	
EFS ID:	36668221
Application Number:	11315293
Patent Number:	7885286
Confirmation Number:	1382
Petition Issued Date:	July 23,2019
Title of Invention:	METHOD AND ARRANGEMENTS IN AN IP NETWORK
First Named Inventor/Applicant Name:	Jim Sundqvist
Customer Number:	25962
Filer:	Robin L. Barnes/Nicole Isenhardt
Filer Authorized By:	Robin L. Barnes
Attorney Docket Number:	NET-7349
Receipt Date:	23-JUL-2019
Filing Date:	23-DEC-2005
Time Stamp:	16:59:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$2800
RAM confirmation Number	072419INTEFSW17001101
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Petition automatically granted by EFS	petition-request.pdf	32575	no	2
			21d88bb8995542f620f417df6291d28662cf696f		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32308	no	2
			9c585ccf41c84fd7f05d7de236fc0f6524bed a36		
Warnings:					
Information:					
Total Files Size (in bytes):			64883		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/315,293	12/23/2005	Jim Sundqvist	NET-7349

110123
Ross Barnes LLP
275 W. Campbell Rd., Ste. 210
Richardson, TX 75080

CONFIRMATION NO. 1382
POA ACCEPTANCE LETTER



Date Mailed: 07/29/2019

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/23/2019.

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.

/tmwilliams/



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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/315,293	12/23/2005	Jim Sundqvist	NET-7349

25962
SLATER MATSIL, LLP
17950 PRESTON RD, SUITE 1000
DALLAS, TX 75252-5793

CONFIRMATION NO. 1382
POWER OF ATTORNEY NOTICE



Date Mailed: 07/29/2019

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/23/2019.

- 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.

/tmwilliams/