to initiate completion of the bearer service set-up if the policy check was successful.

According to a second aspect the present invention a method in a policy decision function for performing policy control on a bearer service for delivery of a service from an application function to a mobile terminal is provided. The method according to the second aspect of the invention comprises the steps of receiving a registration message, including a terminal identity and policy identifying information; registering the terminal identity associated with the policy identifying information in a register; receiving a bearer service activation request from the terminal, via a core network node, which bearer service activation request includes the terminal identity and a set of requested QoS parameters for the bearer service; binding the bearer service activation request to the policy identifying information in the policy decision function by means of the terminal identity to determine applicable policy information for the bearer service; performing a policy check by means of checking if the requested QoS parameters fulfill said applicable policy information; and sending an accept message to the core network node to initiate completion of the bearer service set-up if the policy check was successful.

According to a third aspect of the present invention a policy decision function for performing policy control on a bearer service for delivery of a service from an application function to a mobile terminal is provided. The policy decision function includes a first interface for receiving a registration message, including a terminal identity and policy identifying information; a register for registering the terminal identity associated with the policy identifying information; a second interface for receiving a bearer service activation request from the terminal, via a core network node, which bearer service activation request includes the terminal identity and a set of requested QoS parameters for the bearer service; andprocessing means for binding the bearer service activation request to the policy identifying information in the policy decision function by means of the terminal identity to determine applicable policy information for the bearer service, performing a policy check

by means of checking if the requested QoS parameters fulfill said applicable policy information, and for sending an accept message to the core network node to initiate completion of the bearer service set-up if the policy check was successful.

An advantage of the present invention is that it obviates the need to transmit an authorization token to the terminal for the purpose of setting up a policy controlled bearer service. This means that there is no impact on the terminals from a standard on the terminal.

Another advantage of the present invention is that by means of the present invention, no new standardization is required for RTSP (Real-Time Streaming Protocol), SIP (Session Initiation Protocol), and SDP (Session Description Protocol) and other protocols used in set-up and handling of application sessions.

A further advantage of the present invention is that the policy mechanism and QoS control mechanism of the invention are possible to implement in the mobile terminals that are available on the market today. Thus there is no need to modify the mobile terminals in order to implement the present invention.

Another advantage according to an embodiment of the present invention is that it allows for a service provider to upgrade the QoS parameters that a terminal requests for a bearer service if the requested QoS parameters do not fulfill the service providers QoS demand. This is possible since an embodiment of the present invention allows for the possibility to check if the requested QoS parameters fulfill a set of predefined minimum QoS requirements provided by the application function. If the predefined minimum QoS requirements are not fulfilled by the requested QoS parameters it is possible to determine modified QoS parameters for use when setting up the bearer service.

Further advantages and features of embodiments of the present invention will become apparent when reading the following detailed description in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic block diagram illustrating the different elements that are involved in the policy control mechanism developed by 3GPP

Fig. 2 is a schematic block diagram illustrating the general network architecture of a mobile communication system in which the present invention may be used.

Fig. 3 is a schematic flow diagram illustrating an embodiment of a method according to the present invention.

Fig. 4 is a schematic flow diagram illustrating an alternative embodiment according to the present invention.

DETAILED DESCRIPTION

The present invention will now 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. In the drawings, like numbers refer to like elements.

The present invention is applicable to packet switched services in a mobile communication system. Such services include packet switched communication between a mobile client terminal of an end-user and an application server. The mobile communication system includes a radio

network such as for example a WCDMA, CDMA2000, Wireless LAN or GPRS network in which the mobile client terminal resides.

Fig. 2 is a schematic block diagram illustrating the general network architecture of a mobile communication system in which the present invention may be used. The mobile system 101 in fig. 1 comprises a mobile client terminal 102 which may communicate with a network node 106 of a service provider and thereby receive a service that is offered by the service provider. The communication between the client terminal 102 and the network node 106 is carried out via a radio network 103, a core network 104 and a service network 105. The radio network 103 may for instance be a UTRAN (UMTS Terrestrial Radio Access Network), the core network 104 may for instance be a UMTS Core Network and the service network may for instance be the Internet or a private IP network of a service provider. The network node 106 of the service provider may for instance be an application server.

Fig. 3 is a schematic flow diagram illustrating an embodiment of a method according to the present invention. The figure illustrates the interaction between a mobile terminal 301, a GGSN (Gateway GPRS Support Node) 302, a policy decision function (PDF) 303, an application function (AF) 304 and a session database 305 when setting up a policy controlled bearer service. Further network nodes may be involved in the process of setting up the bearer service but only the nodes that are of particular relevance to the present invention are illustrated in fig. 3 to simplify the description of the invention.

In fig. 3 it is assumed that a primary PDP context exists and that the terminal 301 asks the AF 304 for a streaming content, step 306. The AF is in this example a streaming server. The AF could also be for instance an MMS or Download server.

After receiving the request for a streaming content the AF 304 finds a terminal identity associated with the terminal 301. In this example the

terminal identity is an MSISDN (Mobile Identification Number) which is found by asking the session database 305 for a mapping between a terminal IP-address and MSISDN according to a method that is well known to the person skilled in the art, step 307. The AF then registers in the PDF 303 that it is interested in checking the QoS of the PDP context that is to be set up for delivery of the requested streaming content, step 308. The registration involves registering the MSISDN associated with policy identifying information in a register in the PDF. In this example the policy identifying information is an IP address of the AF so that the AF can be asked for applicable policy information. It is assumed that the address to the PDF is previously known to the AF. After the registration in the PDF, the AF sends an SDP-file to the terminal, step 309. The terminal then interprets the SDP-file and deduces QoS parameters to request for the bearer service to be set-up for delivery of the streaming content, step 310. The terminal then initiates a secondary PDP context by means of sending a activation request for a second PDP context, step 311. The activation request includes the QoS parameters that were deduced form the interpretation of the SDP-file. These QoS parameters will hereafter be denoted as requested QoS parameters. The steps 309, 310 and 311 are well known to the person skilled in the art and will therefore not be described in greater detail herein.

The GGSN 302 receives the PDP context activation request. The GGSN sends a request to the PDF to check the requested QoS parameters, step 312. The check request includes the MSISDN of the mobile terminal and the requested QoS parameters. It is assumed that the address of the PDF is known to the GGSN. When receiving the check request the PDF 303 finds the address of the AF 304 by mapping the MSISDN received in the check request to the register in which the AF's previous registration is stored, step 313. The PDF 303 then sends a check request to the AF 304 with the address that matches the MSISDN of the terminal in the register, step 314. The check request includes the MSISDN of the terminal and the requested QoS parameters. The AF 304 processes the QoS parameters and performs a policy check of the QoS parameters, step 315. The policy check may include checking that the QoS requirements does not succeed the limits of a subscription of the user of

the mobile terminal according to the principles described for the policy mechanism specified by 3GPP.

According to an embodiment of the present invention the policy check may also include a supplemental check that includes checking that the requested QoS parameters fulfil a set of predefined minimum QoS parameters which define the QoS that the service provide considers desired or needed for the bearer service. This supplemental check allows for the application function to initiate an upgrade of the QoS requirements if the requested QoS parameters do not achieve the QoS that the service provider considers desired or needed. The supplemental check and the mechanism for upgrading the requested QoS parameters will be described in further detail below.

After the AF 304 has checked the requested QoS parameters the AF sends an accept message or a modify message back to the PDF, step 316. If the policy check showed that the requested QoS parameters fulfilled the applicable policy, and selectively also the predefined minimum QoS parameters an accept message is sent. A modify message may be sent if the requested QoS parameters exceed the applicable policy and will in that case include an order to downgrade the requested QoS parameters. The order to downgrade the requested QoS parameters may be in the form of a set of downgraded QoS parameters to be used when setting up the bearer service. If the policy check includes checking that the requested QoS parameters match the predefined minimum QoS parameters a modify message may be sent if the requested QoS parameters are considered to result in a QoS that is poorer than what the service provider has defined as desired or needed. In that case the modify message may include an order to upgrade the requested QoS parameters. The order to upgrade the requested QoS parameters may be in the form of a set of upgraded QoS parameters to be used when setting up the bearer service.

After receiving the accept or modify message from the AF 304 the PDF 303 answers back to the GGSN. In this example the PDF sends a message

accepting the secondary PDP context to the GGSN, step 317. If the policy check resulted in a decision to modify the requested QoS parameters the message from the PDF 303 to the GGSN 302 may include modified QoS parameters to be used when setting up the secondary PDP context.

The set-up of the secondary PDP context is then completed by means of the PDP context set-up messages that are well known to a person skilled in the art. This includes that the GGSN answers back to the terminal via radio and core network nodes (not shown), step 318. When the PDP context is set-up the streaming session continues, step 319 and the streaming content may be delivered to the terminal over the secondary PDP context.

In fig. 3 it was illustrated that the policy check included that the PDF 303 asked the AF 304 to check the requested QoS parameters. It is however possible that this check is performed by the PDF. The AF may for instance send the applicable policy information and selectively also the set of predefined minimum QoS parameters to the PDF when it received the check request from the PDF. It is also possible that the applicable policy information was transferred to the PDF during the step 308 of registering the terminal identity in the PDF. The applicable policy information could then be stored in the register in the PDF along with the terminal identity.

In the above description of an embodiment of the invention it was mentioned that it was assumed that the AF and the GGSN was aware of the address of the PDF. This may for instance be the case if the network architecture was configured such that there is a preconfigured relationship between a single PDF and a number of GGSNs and a number of AFs. Each GGSN and each AF should in that case however be configured to only communicate with the single PDF for the purpose of achieving policy control.

A prerequisite of the binding mechanism that is provided by the present invention and which uses a terminal identity as binding information is that the mobile terminal requests activation of a single bearer service, such as a PDP context, at a time. The registration of the terminal identity in the PDF

should preferably be removed after the policy check is completed so that the terminal may request set-up of another bearer service and have a new request mapped correctly to applicable policy information.

The supplemental check described above to determine if the requested QoS requirements match the QoS that the service provider considers desired or needed for the bearer service is optional but may be very advantageous since it allows the service provider to control the QoS too a higher degree than provided by prior art solutions. The service provider may be interested in making sure that the terminal does not map a received SDP-file to QoS parameters that the service provider considers unsuitable for the bearer service since they result in poor QoS. Poor QoS may have a bad reflection on the service provider even if the poor QoS is a result of the implementation of the terminal. The supplemental check is here presented in combination with a token unaware terminal (i.e. a terminal that is not aware of an authorization token according to prior art), but the supplemental check may also be implemented in a system that makes use of an authorization token as binding mechanism instead of the terminal identity as described herein.

If it is of interest to perform the supplemental check the AF should be implemented with information that defines a set of minimum QoS parameters against which the requested QoS requirements may be checked. If the supplemental check results in a decision to upgrade the requested QoS parameters modified QoS parameters which correspond to an upgrade of the requested QoS parameters may be determined by the AF or the PDF. It is also necessary that the GGSN is implemented such that it is able to handle an upgrade of the requested QoS parameters. The upgrade scenario may require new signalling between the GGSN and other core network nodes and radio network nodes.

Fig. 4 is a schematic flow diagram that illustrates a scenario in which the requested QoS parameters are upgraded because the requested bandwidth was considered to low from the viewpoint of the service provider/AF. Fig. 4 illustrates, apart from the mobile terminal 301, the GGSN 302, the PDF 303

and the AF 304, also a radio network node 401, which e.g may be a Radio Network Controller (RNC) or a Base Station Controller (BSC), and a SGSN (Serving GPRS Support Node) 402. The session database 305 is not shown in fig. 4, but the AF 304 may have an interface to the session database for retrieving specific session information. The dashed box 403 surrounds the new signalling scheme, compared with what is supported by the current 3GPP standard and which is needed in order to handle an upgrade of the requested QoS parameters. The steps 411-424 illustrated in fig. 4 will now be described.

Step 411 The user has an interactive/browsing session established.

Step 412 The user clicks on an "rtsp-link".

Step 413 Streaming session establishment is performed.

Step 414 The AF (Application/Streaming server) registers the terminal identity in the PDF (this step corresponds to step 308 of fig. 3).

Step 415 The terminal requests activation of a secondary PDP context (this step corresponds to step 311 of fig. 3).

Step 416 The GGSN initiates a policy/QoS check with the PDF (this step corresponds to step 312 of fig. 3).

Step 417 The PDF checks that the needed resource reservation that is defined by the requested QoS parameters, is within the subscribed limits and issues a check request towards the AF (this step corresponds to step 314 of fig. 3).

Step 418 The AF sees that the bandwidth must be updated to ensure satisfactory end-user QoS during the service provisioning. Thus, it requests more bandwidth than the terminal initially requested (this step corresponds to step 316 of fig. 3).

Step 419 The PDF replies back to the GGSN. The GGSN discovers that the bandwidth parameter has been changed to a higher value than what requested by the terminal. Thus, the GGSN needs to request an update of the secondary PDP context.

Step 420 The requests a modification (bandwidth upgrade) of the terminal's requested secondary PDP Context by sending a PDP

Context update request message to the SGSN 402 which forwards the request to the radio network node 401.

Step 421 The radio network node 401 checks if it has enough resources to upgrade the bandwidth parameter. In this scenario it has enough resources and replies back to the SGSN (and the GGSN via the SGSN) with an acknowledgement. If the radio network node had not had enough resources, it is possible that the set-up of the service would be interrupted and that the requested service would be denied.

Step 422 The SGSN responds (possible in parallel with step 421) to the terminal's PDP context activation request with a different bandwidth parameter than the terminal initially requested.

Step 423 The terminal issues a "Play request".

Step 424 The application session starts.

The reason why a supplemental check as described above may be desired is that it is the terminal that translates or maps the application level QoS parameters to bearer service QoS parameters such as PDP context parameters. The implementation of the translation/mapping function in the terminal is vendor specific and may thus vary between different terminals. If the service provider is interested in delivering services with good quality irrespective of the terminal that requests the service the supplemental check may be desirable.

An example of application level QoS parameters are those defined for UMTS (Universal Mobile Telecommunication System). In UMTS QoS is defined with a set of attributes that specifies the UMTS bearer service. The UMTS QoS attributes are the following:

- Traffic class
- Maximum bit-rate
- Guaranteed bit-rate
- Delivery order
- Maximum SDU size
- SDU format information

- SDU error ratio
- Residual bit error ration
- Delivery of erroneous SDUs
- Transfer delay
- Traffic handling priority
- Allocation/Retention Priority
- Source statistics descriptor
- Signaling Indication

These attributes can be mapped to the pre-defined UMTS QoS classes: Conversational class, Streaming class, Interactive class and Background class. More detailed information about UMTS QoS can be found in the technical specifications 3GPP TS 23.107 V6.1.0 (2004-03) and 3GPP TS 23.207 V6.2.0 (2004-03).

The QoS classes can be negotiated and managed by using PDP context management. Application level QoS requirements are mapped to PDP context parameters in the mobile client terminal. In prior art solutions pre-configurations of PDP contexts are made in the client terminal such that when a packet switched application starts and connects to the network a matching pre-configured PDP context is activated. This PDP context has a selected QoS class that should match the desired QoS requirements of the application. If for instance the application is a WAP browser or MMS client the QoS class of the activated PDP context is usually the Interactive class.

Thus in the prior art solutions the selection of QoS parameters for the bearer service that is set up for delivery of the service in the example depends on the terminal vendor's configuration of the mobile client terminal. The service provider cannot influence the selection of the QoS parameters. As mentioned above this is in many instances problematic, especially from the viewpoint of the service provider, but also from a user perspective, when it results in set-up of a bearer service with a QoS that is not appropriate for the delivery of the service. The service provider is usually interested in being able to ensure that the offered service is delivered with a certain minimum quality. If the quality of service is bad this may have a negative impact on the service

provider's reputation even if the bad quality is caused by a network operator or terminal vendor. The user of the service will become annoyed if the QoS is bad and will probably blame the service provider for the bad quality. It is also possible that a user with one terminal gets unacceptably bad QoS when receiving a particular service content while another user, with a terminal from another vendor, gets acceptable QoS when receiving the same service content.

However, as shown above, the embodiment of the present invention that includes a supplemental check, in which the service provider can control the requested QoS parameters and also modify them if is considered necessary, makes it possible to overcome many of the disadvantages that may arise when the terminal translates/maps application lever QoS requirements into bearer service QoS parameters.

In the drawings and specification, there have been disclosed typical preferred embodiments of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being set forth in the following claims.

CLAIMS

1. A method for setting up a policy controlled bearer service for delivery of a service from an application function (304) to a mobile terminal (301), which method comprises

registering (308) a terminal identity of the terminal (301) associated with policy identifying information in a register of a policy decision function (303);

receiving (312) a bearer service activation request from the terminal, via a core network node (302), which bearer service activation request includes the terminal identity and a set of requested QoS parameters for the bearer service;

binding (313) the bearer service activation request to the policy identifying information by means of the terminal identity to determine applicable policy information for the bearer service;

performing (314, 315, 316) a policy check by means of checking if the requested QoS parameters fulfill said applicable policy information; and

sending (317, 318) an accept message to the core network node to initiate completion of the bearer service set-up if the policy check was successful.

2. The method according to claim 1, wherein said terminal identity is a Mobile Identification Number, MSISDN, an International Mobile Subscriber Identity, IMSI, or an International Mobile Equipment Identity, IMEI, associated with the terminal (301).

3. The method according to claim 1 or 2, wherein said policy identifying information includes an address of the application function (304) and wherein the step (313) of binding the bearer service activation request to the policy identifying information includes requesting (314) the applicable policy information from the application function (304) identified by the application address in the policy identifying information.

4. The method according to claim 1 or 2, wherein said policy identifying information includes the applicable policy information for the bearer service to be set up.

5. The method according to any of claims 1-4, wherein said step of performing a policy check includes checking (315) if the requested QoS parameters fulfill a set of predefined minimum QoS requirements provided by the application function (304).

6. The method according to claim 5, wherein the method includes a further step of determining a set of modified QoS parameters that match the set of predefined minimum QoS requirements if the requested QoS parameters do not fulfill the set of predefined minimum QoS requirements, and a further step of sending (316, 317) the set of modified QoS parameters to the core network node (302) for use when setting up the bearer service.

7. The method according to any of claims 1-6, wherein the core network node (302) is a Gateway GPRS Support Node, GGSN.

8. The method according to any of claims 1-7, wherein the method includes a further step of removing the registration of the terminal identity and the policy identifying information from the register of the policy decision function (303) after the step (314, 315, 316) of performing the policy check.

9. The method according to any of claims 1-8, wherein said bearer service is a Packet Data Protocol, PDP, context.

10. A method in a policy decision function (303) for performing policy control on a bearer service for delivery of a service from an application function (304) to a mobile terminal (301), which method comprises the steps of

receiving (308) a registration message, including a terminal identity and policy identifying information;

registering the terminal identity associated with the policy identifying information in a register;

receiving (312) a bearer service activation request from the terminal (301), via a core network node (302), which bearer service activation request

includes the terminal identity and a set of requested QoS parameters for the bearer service;

binding (313) the bearer service activation request to the policy identifying information in the register by means of the terminal identity to determine applicable policy information for the bearer service;

performing (314) a policy check by means of checking if the requested QoS parameters fulfill said applicable policy information; and

sending (317) an accept message to the core network node (302) to initiate completion of the bearer service set-up if the policy check was successful.

11. The method according to claim 10, wherein said terminal identity is a Mobile Identification Number, MSISDN, an International Mobile Subscriber Identity, IMSI, or an International Mobile Equipment Identity, IMEI, associated with the terminal (301).

12. The method according to claim 10 or 11, wherein said policy identifying information includes an address of the application function (304) and wherein the step (313) of binding the bearer service activation request to the policy identifying information includes requesting (314) the applicable policy information from the application function (304) identified by the application address in the policy identifying information.

13. The method according to claim 10 or 11, wherein said policy identifying information includes the applicable policy information for the bearer service to be set up.

14. The method according to any of claims 10-13, wherein said step of performing a policy check includes checking if the requested QoS parameters fulfill a set of predefined minimum QoS requirements provided by the application function (304).

15. The method according to claim 14, wherein the method includes a further step of determining a set of modified QoS parameters that match the set of predefined minimum QoS requirements if the requested QoS

parameters do not fulfill the set of predefined minimum QoS requirements, and a further step of sending (317) the set of modified QoS parameters to the core network node (302) for use when setting up the bearer service.

16. The method according to any of claims 10-15, wherein the core network node (302) is a Gateway GPRS Support Node, GGSN.

17. The method according to any of claims 10-16, wherein the method includes a further step of removing the registration of the terminal identity and the policy identifying information from the register after the step of performing the policy check.

18. The method according to any of claims 10-17, wherein said bearer service is a Packet Data Protocol, PDP, context.

19. A policy decision function (303) for performing policy control on a bearer service for delivery of a service from an application function (304) to a mobile terminal (301), which policy decision function includes

a first interface for receiving (308) a registration message, including a terminal identity and policy identifying information;

a register for registering the terminal identity associated with the policy identifying information;

a second interface for receiving (312) a bearer service activation request from the terminal, via a core network node (302), which bearer service activation request includes the terminal identity and a set of requested QoS parameters for the bearer service; and

processing means for

binding (313) the bearer service activation request to the policy identifying information in the policy decision function by means of the terminal identity to determine applicable policy information for the bearer service;

performing (314) a policy check by means of checking if the requested QoS parameters fulfill said applicable policy information; and

sending (317) an accept message to the core network node (302) to initiate completion of the bearer service set-up if the policy check was successful.

20. The policy decision function (303) according to claim 19, wherein said terminal identity is a Mobile Identification Number, MSISDN, an International Mobile Subscriber Identity, IMSI, or an International Mobile Equipment Identity, IMEI, associated with the terminal (301).

21. The policy decision function (303) according to claim 19 or 20, wherein said policy identifying information includes an address of the application function (304) and wherein the processing means are arranged to request the applicable policy information from the application function (304) identified by the application address in the policy identifying information.

22. The policy decision function (303) according to claim 19 or 20, wherein said policy identifying information includes the applicable policy information for the bearer service to be set up.

23. The policy decision function (303) according to any of claims 19-22, the processing means are further arranged to check if the requested QoS parameters fulfill a set of predefined minimum QoS requirements provided by the application function (304).

24. The policy decision function (303) according to claim 23, wherein the processing means are further arranged to determine a set of modified QoS parameters that match the set of predefined minimum QoS requirements if the requested QoS parameters do not fulfill the set of predefined minimum QoS requirements, and to send (317) the set of modified QoS parameters to the core network node for use when setting up the bearer service.

25. The policy decision function (303) according to any of claims 19-24, wherein said processing means are arranged to remove the registration of the

terminal identity and the policy identifying information from the register after the processing means has completed the policy check.

1/4

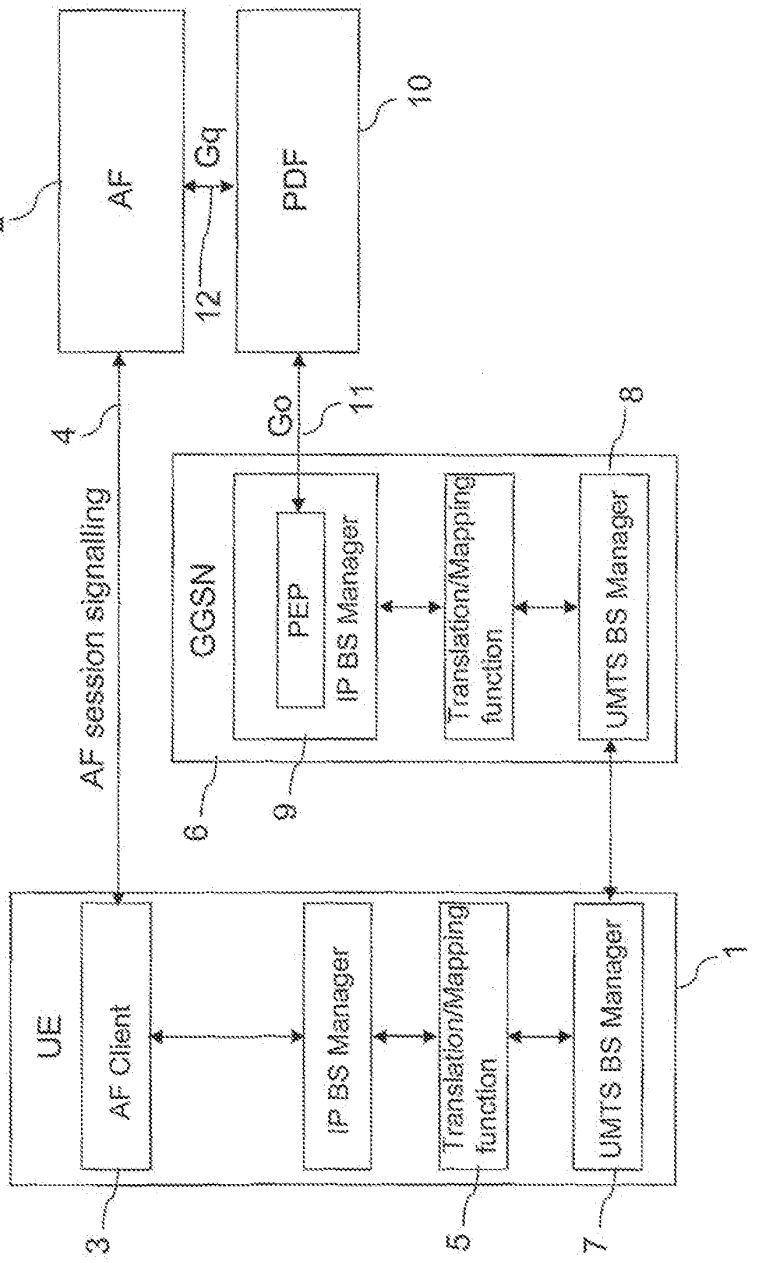

2
AF
Gq
12
PDF
10
4
Go
11
8
AF session signalling
GGSN
PEP
IP BS Manager
Translation/Mapping function
UMTS BS Manager
6
9
UE
AF Client
IP BS Manager
Translation/Mapping function
UMTS BS Manager
1
3
5
7

Fig. 1

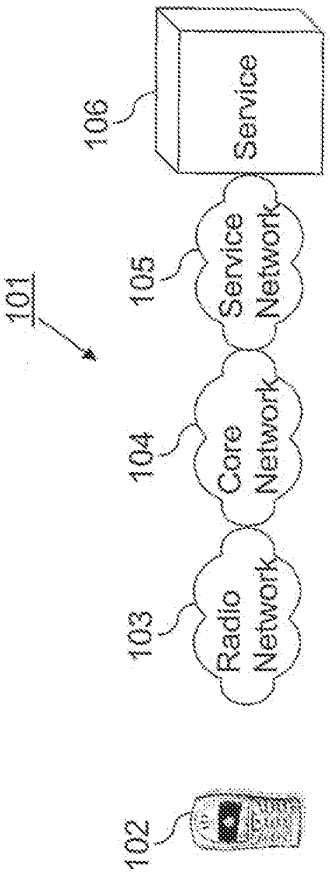

101
102
103
Radio Network
104
Core Network
105
Service Network
106
Service

Fig. 2

3/4

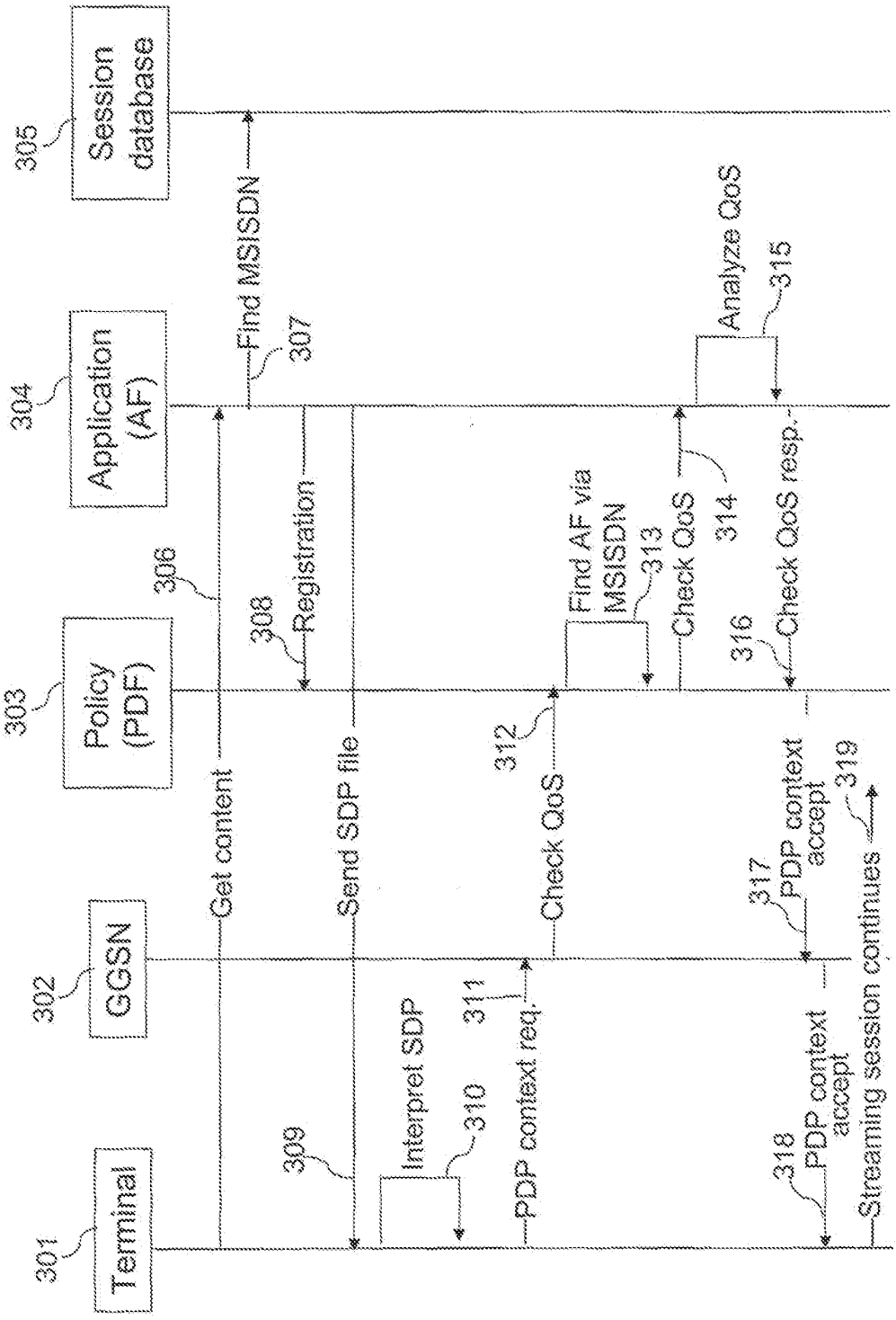

Terminal
301
GGSN
302
Policy (PDF)
303
Application (AF)
304
Session database
305
Get content
306
Find MSISDN
307
Registration
308
Send SDP file
309
Interpret SDP
310
PDP context req.
311
Check QoS
312
Find AF via MSISDN
313
Check QoS
314
Analyze QoS
315
Check QoS resp.
316
PDP context accept
317
PDP context accept
318
Streaming session continues
319

Fig. 3

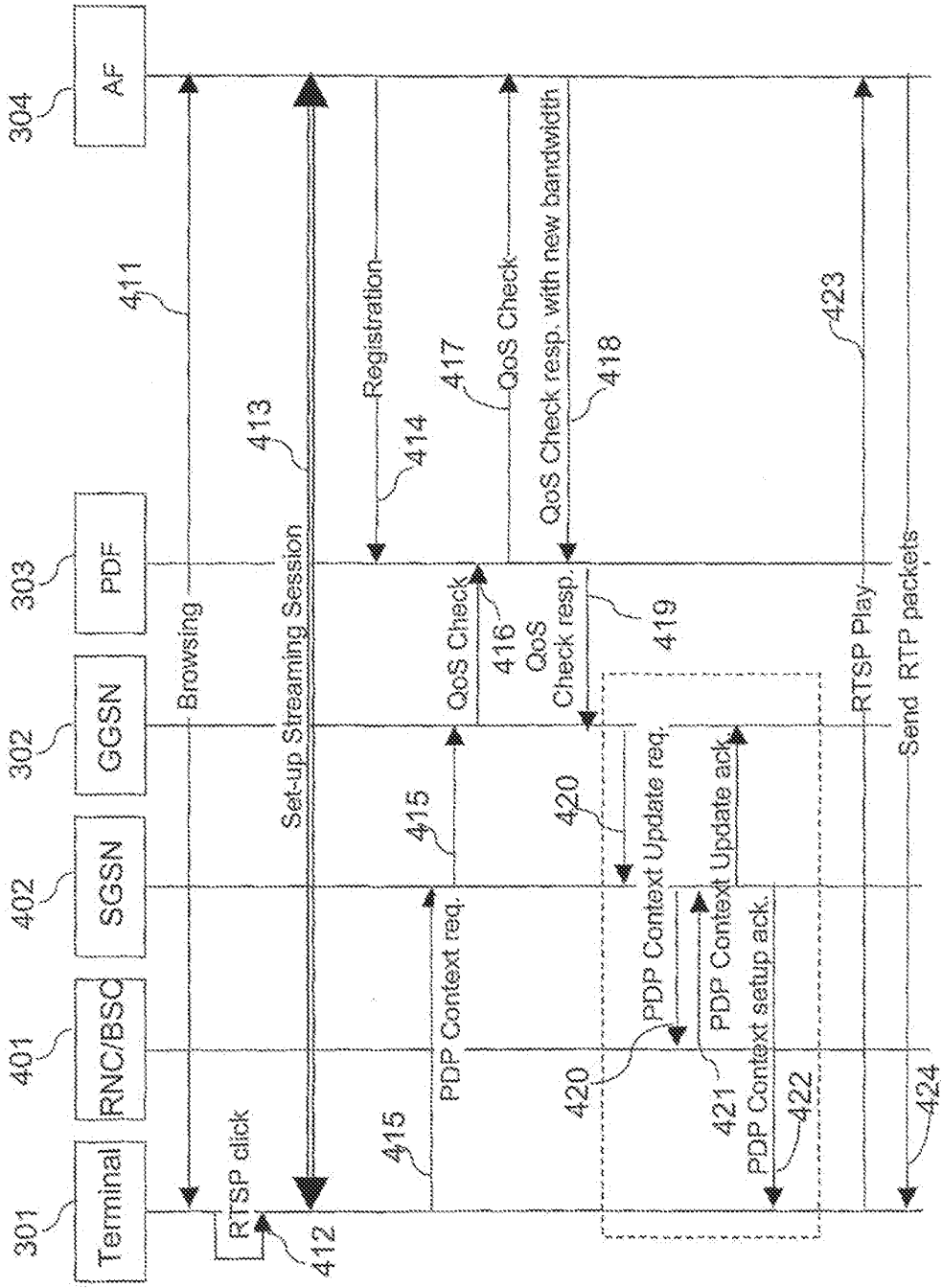

301
Terminal
401
RNC/BSC
402
SGSN
302
GGSN
303
PDF
304
AF
411
Browsing
413
Set-up Streaming Session
Registration
414
417
QoS Check
418
QoS Check resp. with new bandwidth
423
RTSP Play
Send RTP packets
424
RTSP click
412
415
PDP Context req.
QoS Check
416
QoS Check resp.
419
420
PDP Context Update req.
421
PDP Context Update ack.
PDP Context setup ack.
422

Fig. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 2004/001087

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/38, H04L 12/56
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)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ETSI TS 123 207 V5.9.0 (2004-03) Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); End-to-end Quality of Service (QoS) concept and architecture (3GPP TS 23.207 version 5.9.0 Release 5). See chapter 6 --	1-25
A	WO 03049348 A2 (NOKIA INC), 12 June 2003 (12.06.2003), claims 1,8,9, abstract --	1-25

☐ 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	Date of mailing of the international search report
18 February 2005	24 -02- 2005
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 Lisbeth Andersson /LR Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (January 2004)

WO	03049348	A2	12/06/2003	AU	2002353271	A	00/00/0000
				US	6661780	B	09/12/2003
				US	20030108015	A	12/06/2003

Electronic Acknowledgement Receipt

EFS ID:	7931227
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy inplementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	21912
Filer:	Michael J. Schallop/Veronica Pula
Filer Authorized By:	Michael J. Schallop
Attorney Docket Number:	RALEP018
Receipt Date:	01-JUL-2010
Filing Date:	02-MAR-2009
Time Stamp:	14:03:48
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	Transmittal Letter	RALEP018_IDS_Before_1st_OA.pdf	56528 360846d02c00e598c3909f3171296226f661c34e	no	2
Warnings:					
Information:					

2	Information Disclosure Statement (IDS) Filed (SB/08)	RALEP018_IDS_SB08_3.pdf	87018 9b54739e5d6bedc9dcf3a2f06a9b27e3a85661e7	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Foreign Reference	RALE_Foreign_Ref_3A.pdf	7292666 bda2da57ab175aa54d24e9cd7699784789063e0a	no	55
Warnings:					
Information:					
4	Foreign Reference	RALE_Foreign_Ref_3B.pdf	4238695 2b1ac857c7db7ca12f5a92190a59fb4eac5e537a	no	29
Warnings:					
Information:					
5	NPL Documents	RALE_NPL_Ref_3C.pdf	117093 adaccc6f7b2b7c7891095a31e01c2a5c2182ad86	no	8
Warnings:					
Information:					
6	NPL Documents	RALE_NPL_Ref_3D.pdf	1817585 1b0cb7a0b41b1340ba9e48fa0ea77e27f1632f33	no	10
Warnings:					
Information:					
7	NPL Documents	RALE_NPL_Ref_3E.pdf	184255 2e2daf80298dda3e93323c4a7f91f1ec3e478c42	no	9
Warnings:					
Information:					
8	NPL Documents	RALE_NPL_Ref_3F.pdf	5141787 6ecd30cfa00263c87082d7274ae16e8caa198bf1	no	35
Warnings:					
Information:					
9	NPL Documents	RALE_NPL_Ref_3G.pdf	1451509 e95282786ba86e4a05ee8c793a9ec634aa5a654c	no	6
Warnings:					
Information:					
10	NPL Documents	RALE_NPL_Ref_3H.pdf	128010 8d35d15d27cc8636c1526980a75aa6a4a97a745d	no	9

Warnings:					
Information:					
11	NPL Documents	RALE_NPL_Ref_3I.pdf	112089 24c595d8153db4b6ba795d5be64c6f98b0573749	no	5
Warnings:					
Information:					
12	NPL Documents	RALE_NPL_Ref_3J.pdf	338617 74671591bbc19ab5364956f70d29b176cce30b1f	no	11
Warnings:					
Information:					
13	NPL Documents	RALE_NPL_Ref_3K.pdf	2587996 104930755650d3cb8fbbb63837dc7338fbc2bd3c	no	16
Warnings:					
Information:					
14	NPL Documents	RALE_NPL_Ref_3L.pdf	1050612 c5435588dd68fcddc7835e4dce1e6489894a398b	no	124
Warnings:					
Information:					
		Total Files Size (in bytes):	24604460		

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	Gregory G. Raleigh	Examiner:	Not Assigned
Application No.:	12/380,773	Art Unit:	2445
Filed:	March 2, 2009	Docket No.:	RALEP018
Title:	VERIFIABLE SERVICE POLICY IMPLEMENTATION FOR INTERMEDIATE NETWORKING DEVICES		

INFORMATION DISCLOSURE STATEMENT
UNDER 37 CFR §§1.56 AND 1.97(b) BEFORE MAILING OF A FIRST OFFICE ACTION

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

Dear Sir:

The references listed in the attached PTO SB/08, may be material to examination of the above-identified patent application. Applicants disclose these references in compliance with their duty of disclosure pursuant to 37 CFR §§1.56 and 1.97. The Examiner is requested to make these references of official record in this application. Copies of the cited references are provided to the extent required by 37 CFR §1.98 and any applicable waivers.

This Information Disclosure Statement is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that these references indeed constitute prior art.

This Information Disclosure Statement is being filed (1) with the above-referenced application or (2) within three months of the filing date of the above-referenced application or (3) before the mailing date of a first Office Action on the merits or (4) before the mailing date of a first Office Action after filing of a Request for Continued Examination. Accordingly, it is believed that no fees are due in connection with the filing of this Information Disclosure Statement. However, if it is determined that any fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-0685 (Order No. RALEP018).

Respectfully submitted,
VAN PELT, YI & JAMES LLP

/Michael J. Schallop/

Michael J. Schallop
Registration No. 44,319
V (408) 207-4762
F (408) 973-2595

10050 N. Foothill Blvd, Ste 200
Cupertino, CA 95014

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
12/380,773	03/02/2009	Gregory G. Raleigh	RALEP018

CONFIRMATION NO. 5719

21912
VAN PELT, YI & JAMES LLP
10050 N. FOOTHILL BLVD #200
CUPERTINO, CA 95014

PUBLICATION NOTICE

OC000000042806078

Title: Verifiable service policy inplementation for intermediate networking devices

Publication No.US-2010-0191846-A1
Publication Date:07/29/2010

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 1-866-217-9197.

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

Substitute for form 1449/PTO				Complete if Known	
Information Disclosure Statement By Applicant *(Use as many sheets as necessary)*				Application No.:	12/380,773
				Filing Date	March 2, 2009
				First Named Inventor	Gregory G. Raleigh
				Art Unit	2445
				Examiner Name	Not Assigned
Sheet	1	of	2	Atty Docket No.	RALEP018

U.S. Patent Documents

Examiner Initials	Cite No.	Document Number Number-Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A.	US 2003/0088671	05-08-2003	KLINKER et al.	
	B.	US 2007/0248100	10-25-2007	ZUBERI et al.	
	C.	US 2008/0130534	06-05-2008	Tazuko Tomioka	
	D.	US 7,747,240	06-29-2010	BRISCOE et al.	
	E.	US 2006/0236095	10-19-2006	SMITH et al.	
	F.	US 2009/0054030	02-26-2009	Golds	
	G.	US 6,952,428	10-04-2005	NECKA et al.	
	H.	US 2010/0043068	02-18-2010	VARADHAN et al.	
	I.	US 2010/0071053	03-18-2010	ANSARI et al.	
	J.	US 2003/0005112	01-03-2003	Krautkremer	
	K.	US 2006/0045245	03-02-2006	AARON et al.	
	L.	US 2007/0076616	04-05-2007	NGO et al.	
	M.	US 2006/0190314	08-24-2006	Hernandez	
	N.	US 2009/0271514	10-29-2009	THOMAS et al.	
	O.	US 6,684,244	01-27-2004	GOLDMAN et al.	
	P.	US 2005/0055291	03-10-2005	BEVENTE et al.	
	Q.	US 2006/0019632	01-26-2006	CUNNINGHAM et al.	
	R.	US 2005/0238046	10-27-2005	HASSAN et al.	
	S.	US 5,577,100	11-19-1996	McGREGOR et al.	
	T.	US 6,198,915	03-06-2001	McGREGOR et al.	
	U.	US 6,650,887	11-18-2003	McGREGOR et al.	
	V.	US 7,245,901	07-17-2007	McGREGOR et al.	
	W.	US 7,373,136	05-13-2008	WATLER et al.	
	X.	US 6,725,031	04-20-2004	WATLER et al.	
	Y.	US 2002/0022472	02-21-2002	WATLER et al.	
	Z.	US 6,532,579	03-11-2003	SATO et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Foreign Patent Document Country Code–Number–Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	AA.	WO 1999/065185	12-16-1999	British Telecommunications	
	BB.	WO 2007/018363	08-02-2006	Upresto, Inc.	

NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T^2
	CC.		
	DD.		

Examiner	Date Considered

Substitute for form 1449/PTO				*Complete if Known*	
Information Disclosure Statement By Applicant *(Use as many sheets as necessary)*				Application No.:	12/380,773
				Filing Date	March 2, 2009
				First Named Inventor	Gregory G. Raleigh
				Art Unit	2445
				Examiner Name	Not Assigned
Sheet	2	of	2	Atty Docket No.	RALEP018

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

T[2] = Applicant is to place a check mark here if English language Translation is attached

PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : H04L 12/00 | A2

(11) International Publication Number: **WO 99/65185**

(43) International Publication Date: 16 December 1999 (16.12.99)

(21) International Application Number: PCT/GB99/01773

(22) International Filing Date: 4 June 1999 (04.06.99)

(30) Priority Data:

9812161.9	5 June 1998 (05.06.98)	GB
98309609.0	24 November 1998 (24.11.98)	EP
9825723.1	24 November 1998 (24.11.98)	GB
9902052.1	29 January 1999 (29.01.99)	GB
9902648.6	5 February 1999 (05.02.99)	GB

(71) Applicant *(for all designated States except US)*: BRITISH TELECOMMUNICATIONS PUBLIC LIMITED COMPANY [GB/GB]; 81 Newgate Street, London EC1A 7AJ (GB).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: BRISCOE, Robert, John [GB/GB]; Home Farm, Parham, Woodbridge, Suffolk IP13 9NW (GB). RIZZO, Michael [MT/GB]; 12 Dewar Lane, Kesgrave, Ipswich, Suffolk IP5 2GJ (GB).

(74) Agent: EVERSHED, Michael; BT Group Legal Services, Intellectual Property Dept., 8th floor, Holborn Centre, 120 Holborn, London EC1N 2TE (GB).

(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, 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, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, 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), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published

Without international search report and to be republished upon receipt of that report.

(54) Title: COMMUNICATIONS NETWORK

(57) Abstract

In a communications network, loading of network resources is detected locally at a customer terminal, and a tariff for network usage is varied automatically depending on the usage.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the from pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

Communications Network

BACKGROUND TO THE INVENTION

The present invention relates to a communications network, and in particular to charging mechanisms in such a network. It includes aspects of the inventions disclosed and claimed in the present applicant's co-pending British patent application no. 9812161.9 filed 5 June 1998 (applicant's ref: A25547) and the contents of that earlier application are incorporated herein by reference.

In conventional communications networks, such as national PSTNs (public switched telephone networks), a significant proportion of the network resources are devoted to metering and billing network usage. Studies have estimated these resources as consuming as much as 6% of the revenue of a telecommunications company. The Internet, by contrast, does not in general incorporate metering and billing mechanisms for individual customers. The absence of the network infrastructure required to support metering and billing reduces the operational costs of the Internet compared to conventional telephony networks, and has facilitated the rapid expansion of the Internet. However, the absence of appropriate billing mechanisms has significant disadvantages in terms of the characteristics of the traffic carried by the Internet: it encourages profligate use of network resources, and diminishes the incentive for investment in network infrastructure to support new applications requiring, e.g., guaranteed quality of service (QoS).

SUMMARY OF THE INVENTION

According to a first aspect of the present invention, there is provided a method of operating a communications network, including automatically varying, depending on network loading as detected at a customer terminal, a tariff for network usage by the customer terminal.

In this document references to varying a tariff encompass changing a price, e.g. as a function of a congestion parameter. The structure of the tariff may be unchanged.

The present invention provides an approach to charging for network usage which involves little or no network overheads, and which moreover is able to reflect local variations in network loading. This is achieved by detecting a measure of

network loading at the customer terminal. This measure will reflect those resources being used by the customer terminal at a particular time. For example, in a federated data network comprising a number of sub-domains, such as the Internet, a customer terminal in one subdomain may attempt to access a server in another subdomain at a time when there is overloading of a router somewhere in the path from the customer terminal to the server. Then, even if average loading of the network as a whole is low, the loading as perceived by the customer terminal is high, and a tariff for use of the network by the customer terminal is increased to reflect the scarcity of the relevant network resources. Similarly other terminals attempting to access data via the same router will also perceive the network loading as being high, and will also have their tariffs increased accordingly. With an appropriately steep rise in tariff, at least some customer terminals will then choose to abandon or defer their attempts to use the network resource in question, thereby relieving the loading of the router.

This aspect of the invention may be used in systems in which the end user is merely informed of the price and accounting and billing is carried out by the network provider, also in systems where the end user measures their usage and supplies this information to the network provider, and also in systems where the end user both measures their usage and calculates the payment due to the network provider.

The method may include detecting at the customer terminal a network performance parameter which depends on network loading, and varying the tariff depending on the network performance parameter. When the network is a packet network, then the network performance parameter may be the number of packets lost in transmission between a data source and the customer terminal. This approach has the advantage that it is suitable for implementation using existing congestion control mechanisms in packet networks. For example, in the Internet, routers respond to congestion by dropping packets, and a customer terminal using TCP (Transport Control Protocol) detects packet loss and controls a congestion window at the terminal accordingly. The present invention may use the detected packet loss to trigger an increase in the tariff applicable to the terminal. This may be accompanied by the signalling of congestion by the receiving terminal to the data source.

In an alternative and preferred approach, when congestion is detected within the network an explicit congestion signal may be generated and transmitted to the customer terminal, and the receipt of the explicit congestion signal at the customer

terminal may then trigger the increase in the tariff. This approach has the advantage that an appropriate congestion signal may be generated in advance of significant degradation in network performance occurring, making it easier to maintain a required quality of service. Preferably the explicit congestion signal is carried with a data packet on the communications network. Preferably a router in the network writes an explicit congestion signal in a packet when congestion is detected at the router.

As a further alternative, the congestion notification signal may be a source quench signal generated at the router and transmitted back to the data source.

Preferably there is a non-linear relationship between the increase in tariff and the detected network loading. Preferably the method includes making a first relatively smaller increase in the tariff when congestion is first detected, and making at least one further, relatively larger increase, if the congestion persists. This behaviour may be pre-programmed into the tariff algorithm. In this way oscillatory behaviour of the network can be avoided, while ensuring that a sufficient increase is made to have a desired impact on the demand for network resources.

Preferably the method includes programming a decision agent at the customer terminal with user-determined price criteria, and comparing a price calculated using the tariff with the said price criteria. For example, the decision agent might be programmed to proceed with data communications as long as a per-packet charge is zero or is less than a predetermined threshold. Then if congestion causes the charge to rise above that threshold, the data communication is interrupted and the decision agent modifies the operation of the customer terminal. For example the decision agent may slow down communications once the cost threshold is exceeded. The user may then choose to continue with the communication, or may elect to abandon the attempt to access data from a particular source. The decision agent may be programmed with rules which relate to an overall price for multiple simultaneous transmissions and which accord different weights to different respective applications.

Preferably the method includes distributing a tariff algorithm via the communications network to a plurality of terminals and calculating at each terminal using the tariff a charge for network usage by the terminal. In this case preferably the method includes steps, carried out by a network operator, of intermittently

sampling traffic between a customer terminal and the network, and as part of the sampling recording network loading affecting the customer terminal;

for the sampled traffic comparing a charge calculated by the customer terminal and an expected charge and detecting thereby any discrepancy.

The step of recording network loading may involve, for example, recording packet drops, or explicit congestion notification (ECN) bits or source quench messages.

The invention also encompasses a network operating by a method in accordance with the first aspect of the invention, and customer terminals, network routers and other network nodes for use in such a network.

DESCRIPTION OF DRAWINGS

Systems embodying the present invention will now be described in further detail, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a schematic showing a network embodying the invention;

Figures 2a and 2b are graphs showing tariff functions;

Figure 3 shows the format of a differential service byte;

Figure 4 is a schematic showing the component objects of a charging architecture for use with the network of Figure 1;

Figure 5 shows data passed between the accounting objects of Figure 4;

Figure 6 is a schematic showing protocol stacks on a customer terminal and in the network domain;

Figure 7 is a graph showing the variation of tariff with time;

Figures 8a to 8e are class diagrams for software implementing accounting and measurement objects;

Figure 9 is a diagram showing a graphic user interface (GUI) for use with the objects of figures 8a to 8e;

Figure 10 is a class diagram for software implementing tariff objects; and

Figure 11 is a diagram showing an alternative embodiment.

DESCRIPTION OF EXAMPLES

As shown in Figure 1, a communications network 1 includes a number of network sub-domains 2A-C. The network sub-domains may be under the control of different operators who may not trust each other. The network subdomains are interconnected by gateway routers 3, 4. In the present example the communications network is the Internet and supports both unicast and multicast Internet Protocol (IP) and associated protocols. A customer terminal 5 is connected via a public switched telephony network (PSTN) 6 and an access router 7 to a subdomain 2A. A single blocking test is applied to traffic at this point of access. The gateway routers 3,4, and access router 7 may be commercially available devices such as CISCO series 7500 routers and CISCO series AS5800 universal access server respectively. Other customer terminals are connected to the network, including a Java-enabled mobile terminal 8 and a data server 9. The customer terminal 5 may be connected via a LAN to an accounting server. The accounting server may include an accounting object as described below that receives measurement data from the customer terminal.

In addition to the local tariff variation mechanism that is described below, the network also uses network-based control of a number of tariff bands. A network management platform 10 is connected to each subdomain. Each network management platform may comprise, for example, a computing system comprising a SPARC workstation running UNIX (Solaris) together with network management applications. The network management platform 10 hosts management entities and tariff entities. The network management platform communicates with agents 100 in managed devices connected to the respective subdomain, for example using SNMP (simple network management protocol). The management platforms monitors the overall loading of network resources in the respective subdomains, and, as will be further described below, adjust the tariffs for network use accordingly. The Net management platform (NMP) instructs the agent to monitor the device and report aggregated results at regular intervals back to the NMP, so the NMP can monitor the combination of all reports.

Tariff data is communicated to peer tariff entities in other subdomains and also to the customer terminals. The tariff data is multicast using, for example Distance Vector Multicast Routing Protocol (DVMRP) or Protocol Independent Multicast (PIM) dense mode. The tariff data channels are announced and monitored

using protocols based on SDP (Session Description Protocol), SAP (Session Announcement Protocol) Charging is carried out on a "pay and display" model. Each customer terminal monitors its own network usage, for example by counting the number of packets it sends or receives across the network interface and the quantity of data (in bytes) in those packets. It calculates, using a tariff received via the network, the payment due to the network operator, and makes a corresponding payment into an account at the network operator. The network operator polices the use made by customers of the terminal by intermittently sampling traffic to or from a particular customer and comparing the use made and the use paid for.

The tariffs supplied to the customer terminals are divided into bands of different volatilities. The tariffs are varied under the control of the network operators to reflect the overall loading of the network. That is to say, if network loading becomes high, then the tariffs may be increased to reflect the scarcity of network resources.

A service provider may offer different products defined by different service level agreements, and/or by different price volatilities. For example product A might offer best-effort service at a fixed price while another product B might offer best-effort service at a variable price. A service provider may adjust product prices on the basis of the following parameters: the price the service provider pays to its wholesale provider: competitors' prices; current resource utilisation; relevant demand for different products. In response to changes in these parameters, tariff adjustments may be effected in one of three ways. Firstly, a tariff may adjust prices on the basis of local observations of network loading, without necessitating explicit communication from the provider. This approach, which is described in further detail below, needs to be built into the tariff at the outset, and is limited to those price variations which are dependent exclusively on local observations. Secondly, the provider may tune a tariff by adjusting some of its parameters. This kind of adjustment is required when the decision is dependent on parameters which cannot be observed directly by the customer, e.g., variation in the wholesale price of network resources. Thirdly, the provider may completely replace a tariff. This is required when the existing tariff cannot accommodate the changes that are required.

The first of the tariff changes described above is necessarily carried out automatically. The second type of change may be performed manually, or by an

agent that issues adjustments automatically in response to observations made by the service provider system. The third type of change is likely to be performed manually, as replacement of a new tariff will in general require an element of design requiring human input. However, it is possible that an agent might be employed to automatically switch tariffs for a product on the basis of a set of specified rules.

This section describes a prototype that we implemented to demonstrate the tariff subsystem outlined above. Features of the design include:

* using mobile code to represent tariffs and associated user interface components;
* use of a repeated multicast announcement protocol to communicate tariffs and tariff adjustments efficiently;
* using dynamic class loading and reflection in order to receive and tune tariffs.

The prototype consists of a library of general-purpose Java classes and two specific applications, namely:

* a provider system which allows the provider to introduce, replace, and tune tariffs for a number of products;
* a customer system that enables customer to keep track of the charges being applied for the products they are using.

The provider system services multiple instances of the customer system running on different hosts in a multicast-enabled network. A multicast announcement protocol is used to communicate tariff changes from the provider system to customer systems.

In order to maximise flexibility with respect to the definition of tariffs, we chose to represent tariffs using Java classes. This technique is also used to supply user interface components to customers to support visualisation of the behaviour of a tariff.

The `Tariff` interface acts as the base class for all tariffs. This defines a single operation get `GUI()` which returns as a Java SWING component that can be incorporated into the customer's GUI (graphical user interface). This GUI component enables the customer to visualise the behaviour of the tariff using techniques appropriate to the tariff.

Subclasses of the `Tariff` interface establish a set of tariff types, each of which is associated with a different set of measurement and input parameters. These parameters are identified by listing them in the signature of the `getCharge ()` method. For example, the interface `RSVPTariff` defines `getCharge ()` as

receiving n RSVP TSPEC, allowing for the definition of tariffs that compute price on the basis of the characteristics of an RSVP reservation. On the other hand, the interface PacketCountTariff defines getCharge () as receiving measurements of packets in, packets out, and current congestion (typically measured as a function of packet drop), allowing for the definition of tariffs that are dependent on packet counts and sensitive to congestion. Other tariffs may be added as new forms of usage-measurement emerge.

Tariffs are defined by providing implementations of the various tariff interfaces described above. For example, the tariff PacketCountLinear implements PacketCountTariff to compute charges in proportion to packet counts. Another tariff CongestionSensitiveLinear works on a similar basis, but adds a penalty charge if the customer does not stay within a specified traffic limit in the presence of congestion.

In addition to the tariff interface implementation, a tariff may make use of other 'helper' classes to assist in its operation, as well as one or more user interface component classes for customer visualisation purposes. A provider-side user interface may also be required in order to enable the provider to make tariff adjustments.

A complete tariff description consists of a set of Java classes, some of which are destined for the customer system and others which are intended for use by the provider system. The customer-side classes are bundled into a Java archive (JAR) file to facilitate processing by the provider system.

In order to deploy a new tariff, the provider system first loads the tariff classes which it requires into its execution environment. It then loads the customer-side bundle, serialises it, signs it with a private key, and uses an announcement protocol to distribute it to customer systems. The use of a signature makes it possible for customers to verify that received tariffs are authentic.

Upon receiving the bundle, each customer system verifies the signature (using the public key matching the provider's private key), and at the activation time specified in the announcement protocol headers which may be significantly later, e.g. hours or days, unpacks the bundle, and loads the classes into its execution environment using a purpose-built dynamic class loader. An instance of the received tariff class is created and installed in place of the previous tariff. If the tariff has a

user interface component (obtained by calling the tariff object's `getGUI()` method), then it replaces the user interface of the previous tariff. The change in user interface serves to notify the user that the tariff has changed.

Tariff adjustment involves the remote invocation of an operation which is specific to the tariff currently in force. This means that a customer system cannot know the signature of this operation in advance of receiving the tariff i.e. the operation will not be listed in any of the tariff interfaces known to the customer system.

In order to get around this problem, use is made of the "reflection" feature supported by Java. In order to disseminate a tariff adjustment, the provider creates an instance of an `Invocation` object, which stores the name of the operation to be called, together with the parameters that are to be supplied to it. This object is then serialised, signed, and announced using the announcement protocol. When an adjustment is receive and verified by a customer system, the `Invocation` object is de-serialised and applied to the current tariff by using reflection to invoke the described operation.

In order to simplify the announcement protocol, adjustments are required to be idempotent and complete. Idempotency guarantees that a tariff will not be adversely affected if an adjustment is applied more than once. Completeness implies that an adjustment determines the entire parameter set of a tariff object, so that an adjustment completely removed the effects of any previously applied adjustments.

The customer system may apply a tariff by repeatedly invoking the `getCharge()`operation supported by that tariff every second, and adding the returned value to the cumulative charge. The parameters supplied to `getCharge()`depend on the kind of tariff currently in force. For example, if the tariff is an implementation of `PacketCountTariff`, then measurements of inbound packets, outbound packets and congestion over the past second are required. However, if the tariff is an implementation of `RsvpTariff`, then only a `TSPEC` describing the current reservation is required. This implies that a customer system can only subscribe to a product if it can supply the parameters require by the tariff associated with hat product.

Each invocation of the `getCharge ()` method also results in an update to the tariff-specific user interface. For example, in the `CongestionSensitiveLinear` tariff, the usage parameters supplied to `getCharge ()` are used to update the graphical displays of traffic and congestion.

The announcement protocol is used to communicate serialised tariffs and adjustments from a provider system to multiple customer systems. The number of customer systems is assumed to be large, and a repeated multicast solution is adopted.

Each product supported by a provider is assigned a multicast channel for announcement purposes. Customer systems listen to the channels corresponding to the products that they are using. In the current implementation, it is assumed that each customer system has knowledge of well-known multicast addresses for the products it is interested in.

For each product channel, the provider repeatedly announces the current tariff and the most recent adjustment made to it (if any). Each announcement carries a version number, which is incremented each time the announcement is changed. Customer systems only process announcements when a version number change is detected. If a new customer joins a channel, it waits until it receives a tariff before processing any adjustment announcements. Furthermore, an adjustment is only applied if its announcement version is greater than that of the current tariff, thereby ensuring that a missed tariff announcement does not result in the application of a subsequent adjustment to an old tariff.

While centralised monitoring and control of tariffs by the network management platform is effective to respond to global changes in the loading of the network, it is difficult to handle localised congestion in this way. It is difficult to cause a price rise signal to be multicast in such a way that the signal is only received by those attempting to communicate packets through the point of congestion. This would require a separate multicast transmission for each element in the Internet , e.g. a multicast for every different queue on every interface of every router. Alternatively some aggregation of price rises triggered by local resource loading might be used. This however would mean that price rise signals were sent to users who were not making use of the congested resource. This in turn would make it necessary for the

price rise signal to be damped, reducing the ability of the price rise to reduce the demand on the congested resource.

To overcome these difficulties, the tariff algorithms installed on the customer terminals are arranged to respond automatically to congestion in a network resource being used by the terminal. Each algorithm includes a function which varies the price for network usage in dependence upon the detected congestion level. This function may be integrated in the main tariff algorithm, or, as in the example described here may be a separate algorithm used to calculate a premium to be added to a price calculated in accordance with the main tariff algorithm.

The main tariff algorithm calculates a price P as a function of a number of quality parameters, Q_1, Q_2, Q_3 where, for example, Q_1 is a specified latency for packets communicated across the interface between the customer terminal and the network, Q_2 is the reserved bandwidth for the transmission, Q_3 is a specified level of reliability corresponding to a maximum permissible level of packet loss.

The price P is then given by:

$$P = f(Q_1, Q_2, Q_3, \ldots\ldots)$$

An example of the pricing function in terms of one of the quality parameters Q is shown schematically in Figure 2a.

The congestion tariff algorithm calculates a premium ΔP which is a function of one or more congestion parameters C:

$$\Delta P = f(C_1, C_2 \ldots)$$

The congestion parameters provide a measure of the loading of the resources which a customer terminal is making use of at any given time. In the present example the ratio of packets lost to packets received is used as the congestion parameter. This parameter is readily calculated, for example in the case of packets using TCP (transport control protocol), or RTP (real time protocol) over UDP (user datagram protocol), since such packets include a sequence number. Figure 2b shows one example of the function for generating the premium. In this case, the premium increases as an approximately exponential function of the congestion, so that at low congestion levels a small premium is charged, while if congestion increases still further, then at higher levels of congestion the premium increases sharply.

In an alternative implementation, an explicit congestion signal is added by any congested router within the network to packets transmitted to the customer

terminal. Whether congestion is signalled explicitly or implicitly by packet drop, the price algorithm might not directly charge for congestion indication. Instead, it may charge if the customer terminal does not halve the congestion window in response to a congestion indication. Halving the congestion window halves the rate of transmission which is the standard response to congestion indication used in TCP and other compatible congestion control protocols. The change in transmission rate can be measured by the network provider as well as at the customer terminal, although this places a heavy load on router processing resources. If the provider is merely sampling certain customers to audit their own measurements, this results in an acceptable load.

Although only a single main tariff and premium are described here, in practice different subdomains, and different service providers associated with each subdomain, may each have a different pricing structure, with different main and premium tariffs. However, there is across all the subdomains a common relationship between network loading levels and congestion signalling.

The operation of this second implementation will now be described in the context of a network operating using a differentiated service as described in the Internet Engineering Task Force draft "Differentiated Services Operational Model and Definitions" and in the paper by David D Clark (MIT), "A Model for Cost Allocation and Pricing in the Internet", presented at MIT Workshop on Internet Economics, Mar 1995, URL:http://www.press.umich.edu/jep/works/ClarkModel.html. In a network implementing differentiated services, nodes are arranged to discriminate between packets to provide different levels of service. This capability might be used, for example, to accord delay-sensitive data, such as data generated by an IP telephony client, a higher priority compared to other data, such as email data. At the network edge, for example at a client terminal running the IP telephony client, bits in a TOS (type of service) octet contained within each packet header are set to indicate the appropriate service level. Those bits are used by routers within the network to determine how the relevant packets should be handled.

The TOS octet when used in this way is termed the DS (differential service) byte. The format of the differential service byte is shown in Figure 3. Bit zero, labelled "IN" indicates whether the packet is inside or outside a defined profile. Bits 1 to 5 labelled "PHB" define a "per-hop-behaviour" that is they indicate how, for

example, a router should handle the packet, e.g. by according it lower or higher priority. Bits 6 to 7, in this particular form of the DS byte, are used for explicit congestion notification (ECN). One of these bits is set to indicate whether the routers in the path of the packet are capable of setting the ECN field, and the other bit is used as a flag which is set (by ECN capable routers) when congestion, or loading which would potentially lead to congestion, occurs. Random Early Detection (RED) algorithms are currently implemented in routers. These algorithms measure average queue length within the packet buffers of a router. An exponential moving average is calculated. When that average queue length exceeds a predetermined threshold, then the router signals that congestion is occurring. Conventionally this signalling has been done simply by dropping a packet. However, in the context of an ECN scheme, the router, instead of dropping a packet, sets an ECN bit in a packet header to indicate that congestion is occurring. This is done probabilistically: that is, some only of the packets passing through the router are marked. The probability of a packet being marked increases with the average queue size. In the rare case that the queue increases to a length where the router buffers are full, then packets are dropped, rather than an ECN bit being set. In this case ECN bits are set for all the remaining packets.

In operation, if the client terminal 5 is accessing a data source on the server 9, congestion may occur, for example, at router 4 which links network sub-domains 2B and 2C. RED-like algorithms in the router 4 detect that the queue lengths in the router buffers, as calculated using the exponential moving average, exceed a predetermined threshold. Accordingly some of the packets from the server 9 en route to the client terminal have the ECN bit of the DS byte set by the router 9 to mark the fact that congestion is occurring. At the client terminal, the DS byte in the headers of incoming packets is read. A moving average of the number of packets containing an ECN bit which is marked is calculated. This average then provides the congestion parameter C_1 which is used to calculate the premium:

$$\Delta P = f(C_1).$$

The total price to the user P_{TOT} is then calculated by adding together the prices determined by main tariff algorithm and by the premium algorithm:

$$P_{TOT} = P + \Delta P.$$

This total price is passed to a cost decision agent running on the client terminal. This cost decision agent is programmed with user defined rules. These might state, for example, that the cost decision agent should authorise the system to proceed with a connection as long as the total cost averaged over a certain time period falls below a predetermined threshold, e.g. of £0.01 per minute, and that the cost decision agent should suspend a connection and alert the user if the cost rises above that threshold. Alternatively, as previously noted, the cost decision agent may handle several applications simultaneously, and may be programmed to slow down one of the applications as the premium for using a data source accessed by that application increases.

For some customers in some circumstances, the variability of the tariff for network usage may pose problems. For example, a customer might wish to schedule a multicast audio-video conference with, say, twenty participants and with the customer intending to pay the network usage costs for all of the participants. The conference will be scheduled a day or more in advance, but since the tariff is variable over time, at the point when the conference is scheduled, the customer will not know the cost which will be incurred. The preferred implementation of the present invention overcomes this problem for the customer, and also provides an additional revenue source for the network operator. This is achieved by applying a further tariff which defines a premium for price stability for a given customer terminal, the value of the premium increasing as the required duration of the period of stability increases. In the example referred to above, the customer scheduling a conference one day in advance refers to the current tariff to determine the present cost of the network resources required, including any congestion premium currently applicable, and then refers to the further tariff to determine the premium for maintaining the cost at its present value for a period of one day. Then if the user decides to make use of the fixed tariff a message is sent from the user to the network operator. The message identifies the data flows in question, for example by specifying the IP addresses and the service levels for the audio and video data flows between the participants, together with the current time at which the user is contracting for a fixed period, and the required duration of the fixed period and also an identifying code for the message. Alternatively, the message with these details may be tracked with an appropriate cryptographic function (e.g. MD5), and the hash value only communicated initially to

the provider, and subsequently used to verify account data. Subsequently, for the duration of the specified period, in this case one day, the user applies the fixed tariff. In systems where the users themselves are responsible for generating accounting data and calculating the applicable charge for network usage, then the user calculates the charge using the fixed tariff and returns the accounting data to the network operator together with the identifying code for the fixed tariff contract.

This aspect of the invention is not only applicable to systems where tariff variation is carried out locally in response to the detection of congestion, but may also be used in systems where, for example, the only variation is imposed by the network operator.

The tariff for the stability premium may be distributed by multicasting from tariff entities in network operator platforms to the customer terminals in the same manner as described previously for the other tariffs discussed above. As with those other tariffs, different tariffs and optionally different periods of stability might apply to different service levels. In a scenario such as that discussed in the preceding paragraph, then different service levels might be used for different elements of the audio and video data streams required for the multicast conference.

Figure 2c shows a possible for the stability premium tariff. This tariff may be embodied in a Java function multicast to the users. Curve C is communicated to the customer terminal as another subsidiary algorithm that contributes to the main tariff algorithm. The customer may choose a period of price stability and calculate the premium above the spot price that his will require using curve C. Curve B is an example of the stable price chosen in a particular case. Once the period of stability expires a new one can be bought at the premium over the spot price at that time. To buy a period of price stability, the customer must announce the period required and the range of addresses for which it applies to her provider. It may be required for one address (e.g. for the duration of an Internet phone call to a single person) or for a range of addresses (e.g. for a video conference). Certain risk-averse customers might request stable pricing for all addresses all the time.

For ease of description, the preceding sections have treated in isolation the local variations in tariff in response to congestion. In practice, this mechanism will in general be combined with other responses to congestion, and with other sources of variation in the tariff. Also, a decision to proceed with a transmission despite

congestion will in general require the consent of parties at both ends of the transmission. Considering the entire system of the data source, network and routers and the data receiver, the implementation of an increase in tariff (also termed here a "fine") in response to locally detected congestion occurs as a last resort. Other responses are implemented first, in the following numerical order:

1.the network re-routes around congestion

2.the network borrows capacity from lower levels of service (lower in the context of the relevant dimension(s) of QoS) including the best effort service

3.the network introduces extra capacity (possibly automatically)

4.the end-system establishes that the congestion is on the shared network and not just on the access links or end systems

5.the end-system sets QoS requirements to a "higher" level (if cheaper than the fine for ignoring congestion at the current level)

6.the end-system decides it is essential to ignore the congestion, given the fine for doing

so might be quite high

7.both (all) end-systems agree to ignore the congestion.

Typically, it is at step 4 that an ECN signal is generated. Steps 1 to 3 precede the generation of this signal and steps 5 to 7 follow the generation of the ECN signal.

The last step prior to proceeding with a connection and paying the premium for doing so is establishing agreement by both parties. Accordingly, when the customer terminal detects congestion, either through receiving explicit congestion notification, or through detection of a relevant parameter such as packet loss, the customer terminal signals this fact back to the or each other end system. In the present example therefore, the client terminal 5 signals to the data server 9 that congestion is occurring. The data server is programmed with rules, which as at the customer may be implemented as an agent, which determine the response to such a signal. For example, the server may refuse service in these conditions. As described previously with respect to Figure 1, in the present example tariffs are multicast through the network from network operators to the customer terminals, and charging is carried out using a "pay and display" process. Figures 4a and 4b shows the objects used to implement the charging architecture in this case. Figure 4a

shows the higher level objects and 4b shows the component objects used in a software implementation of the architecture of Figure 4b. In Figure 4a, objects on the client terminal are shown in the half of the Figure labelled "customer" and objects on the access router 7 and the corresponding network sub-domain are shown in the half of the Figure labelled "edge network". The objects on the customer terminal include a session control object S, a customer business rules object B_c, a customer pricing object Pr_c, a QoS manager Q, a customer accounting object Act_c and a customer measurement object M_c. The business rules object B_c receives information on those aspects of the session which involve liability for payment and receives current pricing data from the pricing object Pr_c. The customer business object makes decisions, under the customer's policy control on which chargeable services are utilised, and how much of the chargeable services are utilised. These decisions are fed to the QoS manager Q, which decides which mechanisms are used to achieve the requirements. The QoS manager then controls the customer measurement object M_c to determine which aspects of traffic and service to measure and which aspects to ignore. The measurement object then records the selected aspects of the traffic, for example counting the number of packets received by the customer terminal and the QoS levels for those packets. These data together with the current tariffs, including any premium for congestion, are then used by the customer terminal to determine the charge payable to the network operator. The measurement object M_c is also programmed with instructions which determine the frequency with which it passes data to the customer accounting object Act_c. The customer accounting object Act_c passes payments to an accounting object Act_p in the network provider's domain.

The accounting objects on the customer terminal may be implemented using a small encrypted flat-file database. On the network provider's side, the equivalent objects may be implemented using a larger database that is scaleable to handle e.g., tens of thousands of customer accounts. An object request broker (ORB) is used for communication between the customer-side objects and the network-side objects, implemented using commercially available tools such as ORBIX (TradeMark) from Iona Technologies plc.

On the network provider's side, that is to say within the subdomain to which the customer terminal is connected, the customer's traffic is measured by a version of M_c denoted M_p, but only on a sampling basis determined by the policing function,

Po. That is to say, the network operator samples the customer's traffic only intermittently. Po controls where in the network measurements are made in order to capture all of any particular customer's traffic. A bulk measurement function, M_b, is responsible for reporting aggregate traffic levels, as reflected in the moving average of the router queue lengths, to the pricing object, Pr_p. Bulk measurements would typically be collected from across the provider's domain to a centralised pricing function (which would be replicated for reliability). Pr_p sets prices taking into account the business rules from the network provider's business object, B_p, as well as the current traffic levels reported by Mb and pricing from neighbouring providers (see below). The policing function, Po, compares sample measurements from M_b with accounting messages received at Act_p as a result of the customers own measurements . If it establishes that the accounts are insufficient it might restrict service at the access control gateway, Acs, or initiate some other punishment. Encapsulated within the accounting object another policing object checks the accounts match the payments within the contracted time for payment. Finally, the identity mapping function, I, provides a mapping between a customer's identity (account, digital signature, etc.) and their current network address (typically allocated by the ISP, whether unicast or multicast).

Figure 5 shows the data which are passed between the accounting objects. In this example the account data comprises: account identity; bill record identity; service type identifier; source address; destination address; tariff identity; time; period (i.e. the period covered by the bill record); units; cost; and currency. In addition, the payment data comprises the amount of money and the currency of payment.

Figure 6 shows the measurement region within protocol stacks on the customer terminal and in the network domain. Ideally there would be two measurement points within this region, one trusted by the customer and one trusted by the network, for example at the two points referenced (a) in the Figure. For ease of implementation, a single measurement point (b) trusted by both parties may be used. This might be implemented, for example within a secure module such as a cryptographic card on the client terminal. As an alternative, measurements may be made at different points with some possibility of discrepancies between measurements. On the network the practical measurement point is at the first

access device(s) that, for each customer, inspects network layer headers (c)(IP in this case). ISPs should not measure any deeper into their network (d) because their access network and systems will introduce delays and losses.

For an individual customer (e.g. on dial-up access), a practical point at which to measure would also be alongside the network layer but in their end-system's stack (e). Ideally these measurement points would be lower in each stack to be closer to the interface between the two parties and less likely to be affected by contention in the stack. However, measuring at the link layer (f-f) would be inappropriate because only some chargeable parameters set at the network layer will ever be reflected in link layer frames; network level multicast, end-end latency requirements etc. may never be visible at the link layer. Also, link layer headers would need to be ignored when measuring packet sizes for bandwidth calculations to avoid apparent discrepancies where different link technologies are chained together.

In the reception direction (up the stack) this choice of measurement points implies that the lower layers must be dimensioned (buffer sizes, interrupt and thread scheduling priorities) to cope with the most stringent QoS requirements of higher layers. As frames are taken off the physical media, the machine must be able to pass data up the stack without any chance that usage-charged data gets discarded (e.g. due to buffer overflow caused by interrupt contention) before it gets to the network layer. It is at the network layer where the ISP's service is to be measured and where it is most convenient for QoS requirements to control correct differential treatment of the various flows as they are passed further up the stack (on end-systems) or forwarded (on routers).

The measurement objects described above may be implemented using, with appropriate modifications, publicly available network metering software such as Nevil Brownlee's NeTraMet system. This is a software meter which conforms to the IETF Internet accounting architecture described in RFC 2063 and RFC 2064. The meter builds up, using "packet sniffing", packet and byte counts for traffic flows, which are defined by their end-point addresses. Although generally, Addresses can be ethernet addresses, protocol addresses (IP, DECnet, EtherTalk, IPX or CLNS) or 'transport' addresses (IP port numbers, etc), or any combination of these, in the present implementation IP addresses only are used. The traffic flows to be observed are specified by a set of rules, which are downloaded to NeTraMet by a 'manager'

program. Traffic flow data is collected via SNMP (Simple Network Management Protocol) from a 'collector' program.

Figure 7 shows how the main tariff determined by the network operator varies in time. In the Figure, curve A is the spot price calculated to reflect the loading of the network at any instant. Curve B is one of a number of different tariff bands. Different tariff bands have different volatilities, and the customer pays a premium for bands offering greater stability. Tariffs are communicated to the customer terminals using a hierarchy of channels carried by the network. An initial contract between a customer and a service provider a single channel address that might typically hold new announcements distributed some months apart (e.g. for contract variations or for new services specifying which second level channel to listen to for tariffs or for downloading new code to handle new tariff structures). The second level channels might deliver updates hours apart which simply announce the addresses of third level channels for the most volatile information. These third level channels may carry updates at intervals of less than a second. Prices for many services may be carried on one channel. For greatest efficiency, this one channel may be split into several channels at times of highest volatility, and re-aggregated into a single channel in more stable periods.

Tables 1 to 7 below list Java source code used to implement two different tariffs. The code of table 1 establishes the operations used for communication between a customer system and a tariff algorithm downloaded by the customer system. Table 2 shows a linear tariff algorithm, in which the tariff depends on the total of the packets sent and packets received by the customer together with a congestion parameter. Table 3 shows the code for generating the customer display in this case. Table 4 shows the code used to display the tariff at the network operator's server. Table 5 shows an exponential tariff algorithm. Table 6 generates the customer display and Table 7 the operator display for the exponential tariff algorithm. By downloading Java code to generate the user interface, that interface can be tailored to the requirements of the particular tariff, and can be adapted as the tariff changes.

Although the examples so far described have been in the context of federated packet data networks, such as the Internet, many aspects of the invention can also be used with advantage in other types of network, such as in a circuit-

switched PSTN (public switched telephony network). Figure 11 shows an example of the invention applied in this context. In this network, customer terminals 81, which are in this example so-called intelligent phones, that is telephones incorporating a microprocessor and a data interface, are connected via local exchanges 82 and trunk exchanges 3 to the telephony networks. The trunk exchanges 83 are connected via a common channel SS7 (signalling system number 7) signalling network to a service control point 85 that is responsible for the execution of advanced call control functions. The service control point 85 is also connected to an operational support server 86 that is responsible for billing operations, and that, in this example, controls the setting of tariffs for the network. The OSS server and customer terminals include tariff entities (TE). The fixed PSTN network is also interconnected via a gateway 87 to a cellular GSM network 88. Base Stations BS in the cellular network communicate signals to intelligent mobile phones 89. In operation, network tariffs are distributed to customer terminals via the PSTN network and via the GSM network. Conveniently, the tariff may again take the form of Java functions which are executed on processors in the customer terminals. The Java functions may be streamed as Internet packets. In one implementation, these Internet packets may be distributed via the PSTN networks and GSM networks themselves. For example, the packets may be encapsulated and transported to the trunk exchanges using the MTP (message transport part) transport layer and may be communicated onwards to the customer terminals using out-of-band signalling. Alternatively, a separate data connection may be established between the OSS server and the customer terminals via the public internet. As in the examples above, the network operator monitors the loading of resources within the network and may transmit signals to the tariff entities in the customer terminals to change the tariff to reflect the scarceness or otherwise of relevant resources. Customer terminals may themselves monitor network loading and automatically generate variations in the tariffs. Usage of network resources may be measured locally by the customer terminals instead of conventional billing carried out within the network. The network operator may police the measurement of usage data by carrying out sampling, as described previously.

Table 1

```
// Generated by Together
package com.bt.jungle.lsma.charging.pricing;

import com.sun.java.swing.JComponent;

/**This establishes the operations used for
communication between the customer system
and the downloaded algorithm.
@author Mike Rizzo*/
public interface Tariff {
Jcomponenet getGUI( );
Float getPrice (int pkin, int pkout, int cng);
```

Table 2

```
package algorithms.linear;

import com.sun.java.swing.JComponent;
import com.sun.java.swing.JTextField;

import com.bt.jungle.isma.charging.pricing.Tariff ;

public class LinearAlgorithm implements Tariff {
        private float rate;
        private LinearAlgorithmDisplay display;
        public LinearAlgorithm ( ) {
                display = new LinearAlgorithmDisplay ( );
                setRate (new Float(1));
        }
        public float getPrice (int pkin, int pkout, int cng) {
                return (pkin + pkout + cng) * rate;
        }
        public JComponent getGUI( ) { return display; }
        public void setRate (Float f) {
                rate = f.floatValue( ) ;
                display.setRate (rate) ;
        }
}
```

Table 3

```
// Generated by Together

package algorithms.linear;

import com.sun.java.swing.JPanel;
import com.sun.java.swing.JTextField;
import com.sun.java.swing.Box;
import com.sun.java.swing.JLabel;

public class LinearAlgorithmDisplay extends Jpanel {
        private JTextField tfRate = new JTextField (4);
        public LinearAlgorithmDisplay ( ) {

                Box vbox = Box.createVerticalBox ( ) ;

                Box hbox = Box.createHorizontalBox ( ) ;
                hbox.add (Box.createHorizontalGlue ( )) ;
                hbox.add (new Jlabel ("Rate:"));
                hbox.add (Box.createHorizontalGlue( ));
                hbox.add (tfRate);
                tfRate.setEditable (false);
                hbox.add (Box.createHorizontalGlue( ))
                vbox.add (hbox);

                add (vbox());
        }
        public void setRate (float f) {
                tfRate.setText (String.valueOf (f));
        }
        }
```

Table 4

```
// Generated by Together
package algorithms.linear;

import com.sun.java.swing.*;
import java.awt.event.*;

import com.bt.jungle.isma.charging.pricing.provider.*;
import com.bt.jungle.util.*;

public class LinearAlgorithmGUI extends Jpanel {
    private JTextField tfRate - new JTextField ( );
    private TuningMessageListener tuningMessageListener;
    private final static String DEFAULT_RATE = "1.0";
    public LinearAlgorithmGUI (TuningMessageListener tml) {
        tuningMessageListener = tml;
        tfRate.setText (DEFAULT_RATE);

    Box vbox = Box.createVerticalBox( );

    Box hbox = Box.createHorizontalBox ( );
    hbox.add (new Jlabel ("Rate:"));
    hbox.add (Box.createHorizontalGlue( ));
    hbox.add (tfRate);
    hbox.add (Box.createHorizontalGlue( ));
    hbox.add (hbox);

    JButton bTransmit = new JButton ("Transmit");
    bTransmit.addActionListener (
        new ActionListener ( ) {
            public void actionPerformed (ActionEvent e) {
                transmit ( ) ;
            }
        }
    );
    hbox = Box.createHorizontalBox( );
    hbox.add. (Box.createHorizontalGlue( ));
    hbox.add (bTransmit);
    hbox.add (Box.createHorizontalGlue( ));
    vbox.add (hbox);

    add (vbox);
}
void transmit ( ) {
    try {
        Float f = new Float (tfRate.getText( ));
        Object  args [ ] = new Object [1];
        Args [0] = f;
        TuningMessageListener.notify(
```

```
                    new Invocation ("SetRate", args)
                );
            }
            catch (Exception e) {
                e.printStackTrace ( );
            }
        }
    }
```

Table 5

```
package algorithms.exp;

import com.sun.java.swing.JComponent;
import com.sun.java.swing.JTextField;

import com.sun.java.lsma.charging.pricing.Tariff;

public class ExpAlgorithm implements tariff {
        private float min;
        private float base;
        private float divisor;
        private ExpAlgorithmDisplay display( );
        public ExpAlgorithm( ) {
                display = new ExpAlgorithmDisplay ( );
                setMin (new Float (1));
                setBase (new Float (2));
                setDivisor (new Float (10));
        }
        public float getPrice (int pkin, int pkout, int cng) {
                return min + (float)math.pow (base,(pkin + pkout + cng)/divisor);
        }
        public JComponent getGUI( ) {return display; }
        public void setMin (Float f) {
                min = f.floatValue( );
                display.setMin(min);
        }
        public void setBase (Float f) {
                base = f.floatValue( );
                display.setBase(base);
        }
        public void set Divisor (Float f) {
                base = f.floatValue( );
                display.setBase (divisor);
        }
}
```

Table 6

```
// Generated by Together

package algorithms.exp;

import java.awt.GridLayout;
import com.sun.java.swing JPanel;
import com.sun.java.swing.JTextField;
import com.sun.java.swing.Box;
import com.sun.java.swing.JLabel;

public class ExpAlgorithmDisplay extends Jpanel {
        private JLabel tfDisplay = new JLabel ( );
        private float min, base, div;

        public ExpAlgorithmDisplay ( ) {

                add (tfDisplay);
        //              tfDisplay.setEditable (false);
                updateDisplay ( );
        }
        private void updateDisplay ( ) {
                tfDisplay.setText ("price = " + min + " + " + base +
"^((pkin+pkout+cng)/" + div +")");
        }
        public void setMin (float f) {
                min = f;
                updateDisplay ( );
        }
        public void setBase (float f) {
                base = f;
                updateDisplay ( );

        public void setDivisor (float f) {
                div = f;
                updateDisplay ( );
        }
}
```

Table 7

```
// Generated by Together

package algorithms.exp;

import java.awt.GridLayout;
import com.sun.java.swing.*;
import java.awt.event.*;

import com.bt.jungle.isma.charging.pricing.provider.*;
import com.bt.jungle.util.*;

public class ExpAlgorithmGUI extends Jpanel {
        private JTextField tfMin = new JTextField ( );
        private JTextField tfBase = new JtextFfield ( );
        private JTextField tfDivisor = new JTextField ( );

        private TuningMessageListener tuningMessageListener;
        private final static String DEFAULT_MIN = "1.0";
        private final static String DEFAULT_BASE = "2.0";
        private final static String DEFAULT_DIV = "10.0";

        public ExpAlgorithmGUI (TuningMessageListener tml) {
                tuningMessageListener = tml;
                tfMin.setText (DEFAULT_MIN);
                tfBase.setText (DEFAULT_BASE);
                tfDivisor.setText (DEFAULT_DIV);

                Box vbox = Box.createVerticalBox ( );

                vbox.add (new JLabel ("price = min + pow (base,
(pkin + pkout + cng)/divisor)"));

                vbox.add (Box.createVerticalGlue ( ));

                Jpanel panel = new JPanel (new GridLayout (3,2));
                panel.add (new JLabel ("Minimum"));
                panel.add (tfMin);
                tfMin.addActionListener (
                        new ActionListener ( ) {
                                public void actionPerformed (ActionEvent e) {
                                        transmit ("setMin", tfMin);
                                }
                        }
                );
                panel.add (new JLabel ("Base"));
                panel.add (tfBase)
                tfBase.addActionListener (
                        new ActionListener ( ) {
```

```
                        public void actionPerformed (ActionEvent e) {
                        transmit ("setBase", tfBase);
                    }
                }
            };
            panel.add (new JLabel ("Divisor"));
            panel.add (tfDivisor);
            tfDivisor.addActionListener (
                new ActionListner ( ) {
                    public void actionPerformed (ActionEvent e) {
                        transmit ("setDivisor", tfDivisor);
                    }
                }
            );
            vbox.add (panel);

            add (vbox)
        }
        void transmit (String m, JTextField tf) {
            try {
                Float f = new Float (tf.getText ( ));
                Object args [ ] = new Object [1];
                args [0] = f;
                tuningMessageListener.notify(
                    new Invocation (m, args)
                );
            }
            catch (Exception e) {
            e.printStackTrace ( );
            }
        }
    }
```

CLAIMS

1. A method of operating a communications network, including automatically varying, depending on network loading as detected at a customer terminal, a tariff for network usage by the customer terminal.

2. A method according to claim 1, including detecting at the customer terminal a network performance parameter which depends on network loading, and varying the tariff depending on the network performance parameter.

3 A method according to claim 2, in which the network is a packet network and the network performance parameter is the number of packets lost in transmission between a data source and the customer terminal.

4. A method according to claim 1, including detecting a congestion signal at the customer terminal and varying the tariff in response to the congestion signal.

5. A method according to claim 4, including reading a congestion signal at the customer terminal from a data packet received at the customer terminal.

6. A method according to claim 4 or 5, including generating a congestion signal at a router in the network in response to the detection of congestion at the router.

7. A method according to any one of the preceding claims, including making a first relatively smaller increase in the tariff when congestion is first detected, and making at least one further, relatively larger increase, if the congestion persists.

8. A method according to any one of the preceding claims, including programming a decision agent at the customer terminal with user-determined price criteria, and comparing a price calculated using the tariff with the said price criteria.

9. A method according to any one of the preceding claims, including distributing a tariff algorithm via the communications network to a plurality of terminals and

calculating at each terminal, using the tariff, a charge for network usage by the terminal.

10. A method according to claim 9, further comprising steps, carried out by the network operator, of:

intermittently sampling traffic between a customer terminal and the network, and as part of the sampling recording network loading affecting the customer terminal; and

for the sampled traffic comparing a charge calculated by the customer terminal and an expected charge and detecting thereby any discrepancy.

11. A method according to any one of the preceding claims, in which when the customer terminal detects congestion in data transmitted to the customer terminal from a data source via the network, the customer terminal returns a congestion notification signal to the data source.

12. A method according to any one of the preceding claims, including at a customer terminal, selecting a period of time for which the tariff is to be fixed and paying a premium depending on the duration of the said period.

13. A method of operating a communications network including applying to customer terminals a tariff for network usage, varying the tariff with time; at a customer terminal, selecting a period of time for which the tariff is to be fixed; and paying a premium depending on the duration of the said period.

14. A communications network including :

means for detecting network loading locally at a customer terminal; and

means responsive to the said means for detecting arranged automatically to vary a tariff for network usage by the customer terminal.

15. A customer terminal for use in a communications network, the customer terminal including:

means for detecting loading of a network to which, in use, the customer terminal is connected;

means responsive to the said means for detecting and arranged automatically to vary a tariff for network usage by the customer terminal.

14. A customer terminal for use in a communications network, the customer terminal including one or more processors arranged to carry out the following steps in sequence:

detecting loading of resources in a network to which the customer terminal is connected; and

automatically varying in dependence on the detected loading a tariff for network usage by the customer terminal.

15. A method according to any one of claims 1 to 13, in which the tariff is varied only if the terminal fails to reduce its output in response to detected congestion.

Fig.1.

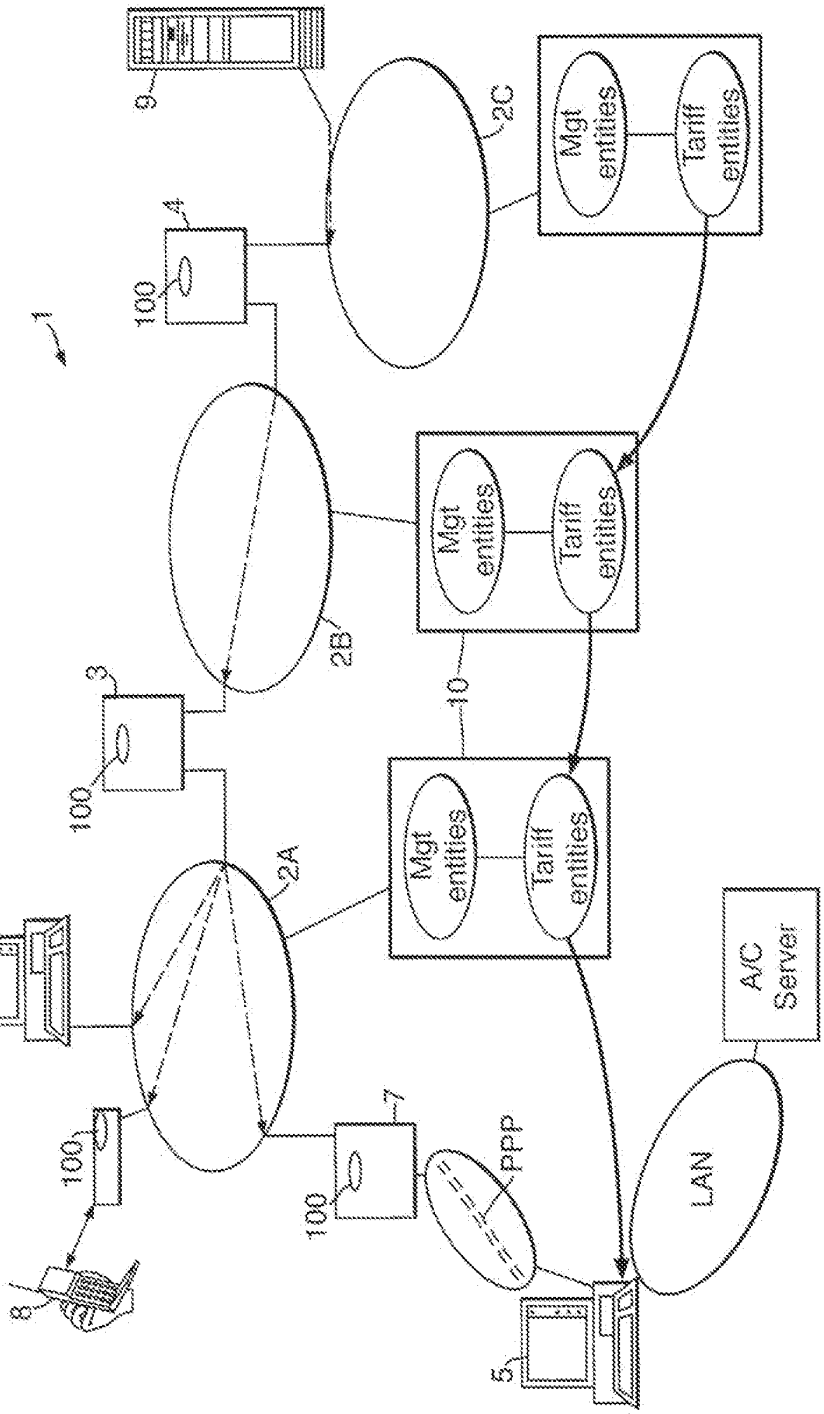

1
2A
2B
2C
3
4
5
7
8
9
10
100
Mgt entities
Tariff entities
A/C Server
LAN
PPP

Fig.2a.

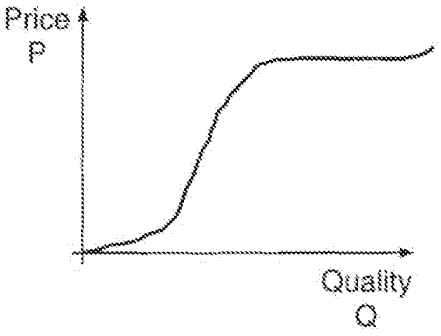


Fig.2b.

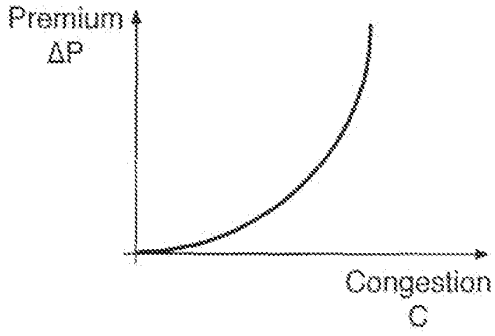


Fig.3.

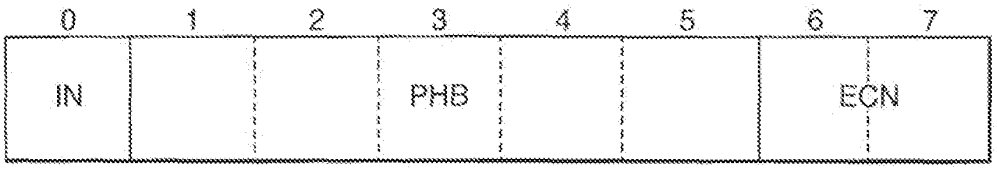


Fig.2c.

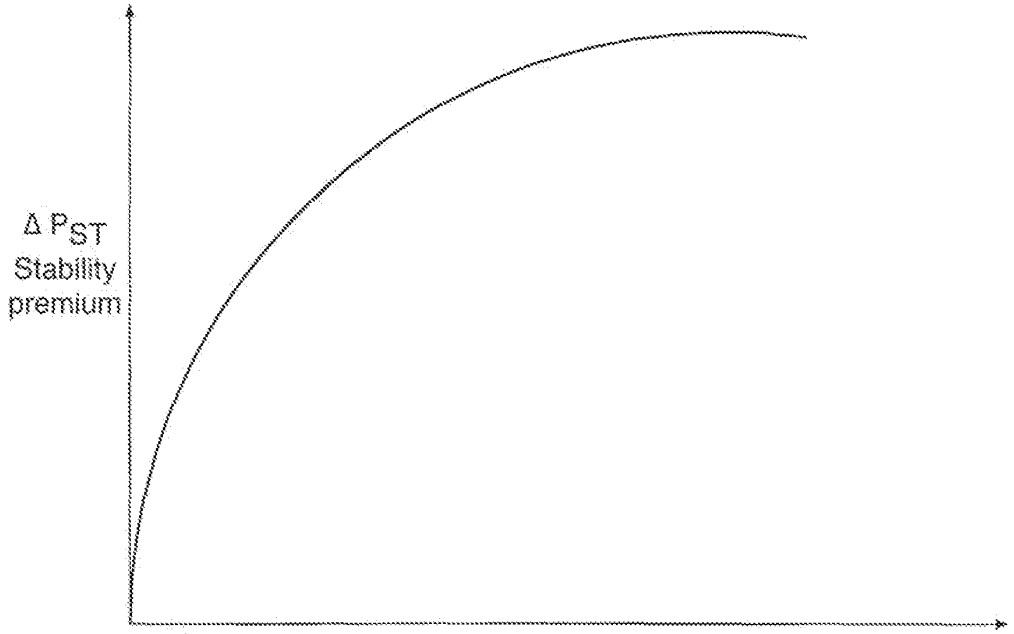


Fig.4a.

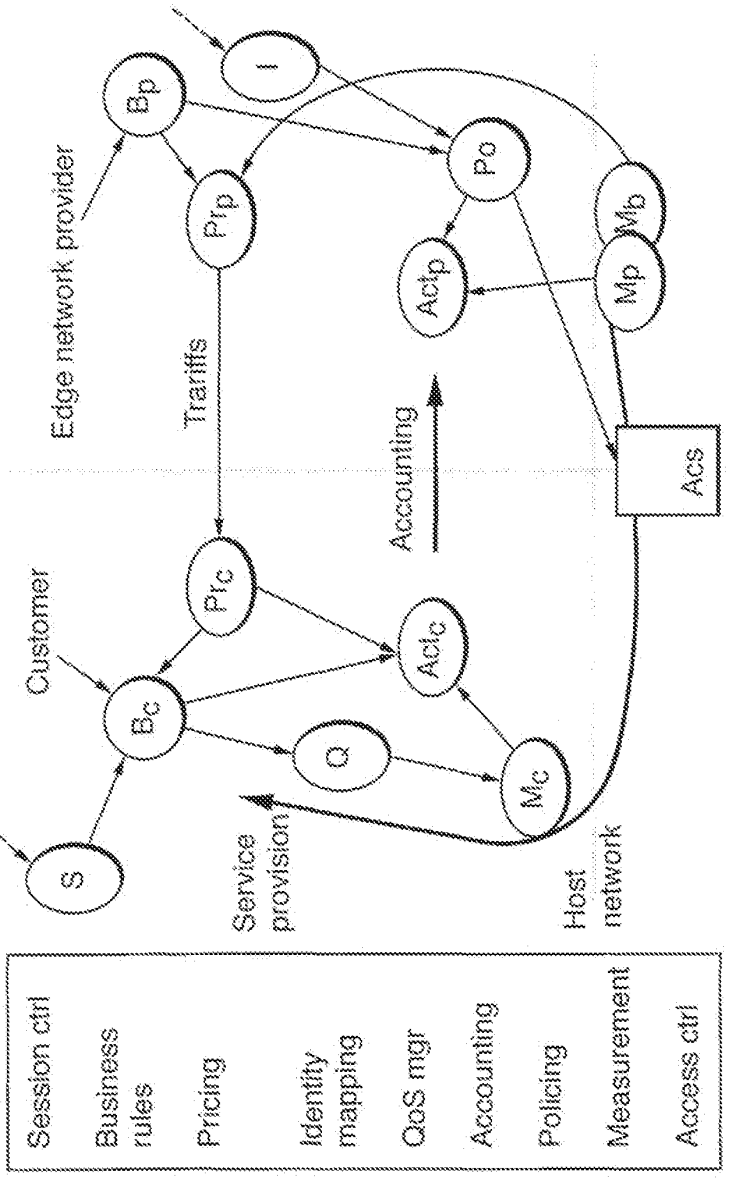

Edge network provider
Customer
Tariffs
Accounting
Service provision
Host network
Session ctrl
Business rules
Pricing
Identity mapping
QoS mgr
Accounting
Policing
Measurement
Access ctrl

Fig.4b.

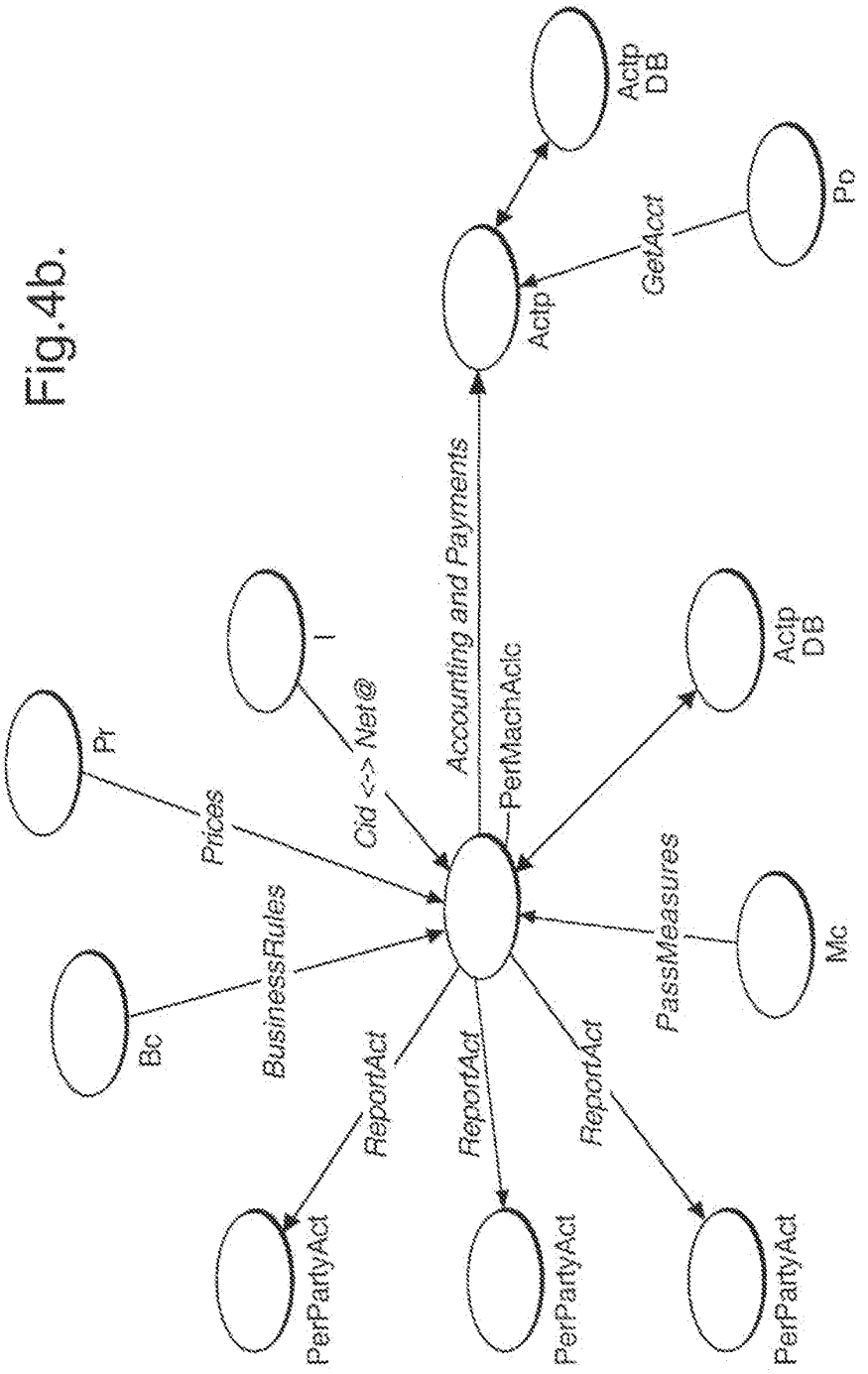

Actp DB
Po
GetAcct
Actp
Accounting and Payments
I
Pr
Prices
Qid <-> Net@
PerMachAcic
Actp DB
Bc
BusinessRules
PassMeasures
Mc
ReportAct
ReportAct
ReportAct
PerPartyAct
PerPartyAct
PerPartyAct

Fig.5a.

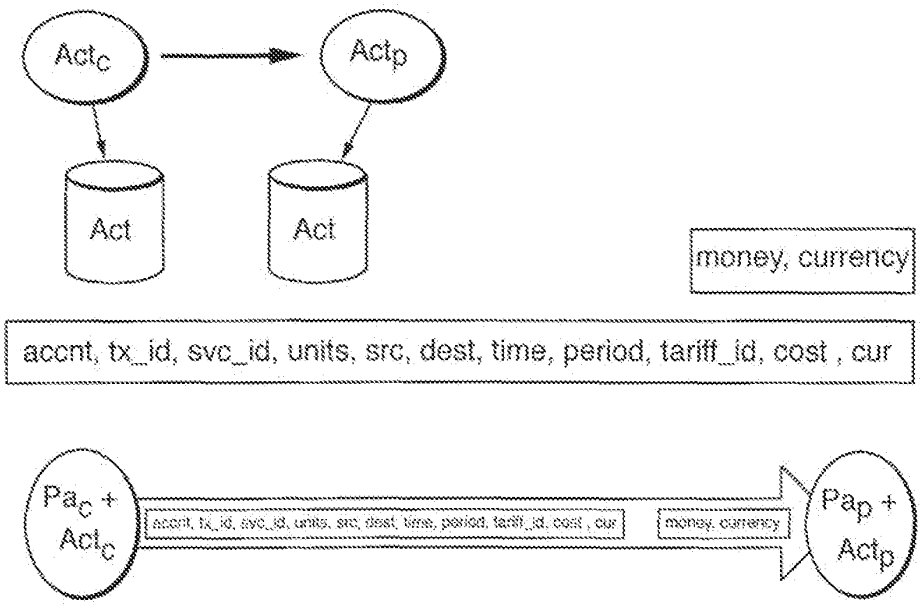

Act$_c$
Act$_p$
Act
Act
money, currency
accnt, tx_id, svc_id, units, src, dest, time, period, tariff_id, cost , cur
Pa$_c$ + Act$_c$
accnt, tx_id, svc_id, units, src, dest, time, period, tariff_id, cost , cur
money, currency
Pa$_p$ + Act$_p$

Fig.5b.

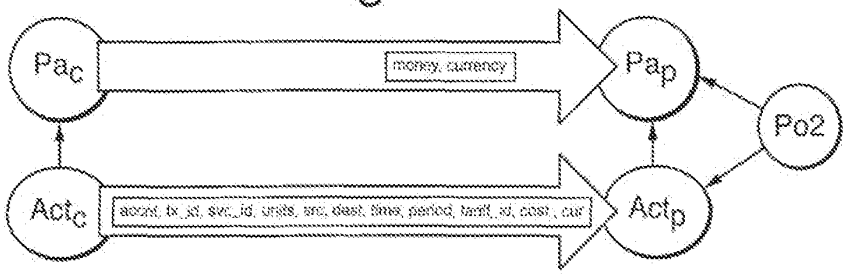

Pa$_c$
money, currency
Pa$_p$
Po2
Act$_c$
accnt, tx_id, svc_id, units, src, dest, time, period, tariff_id, cost , cur
Act$_p$

Fig.6.

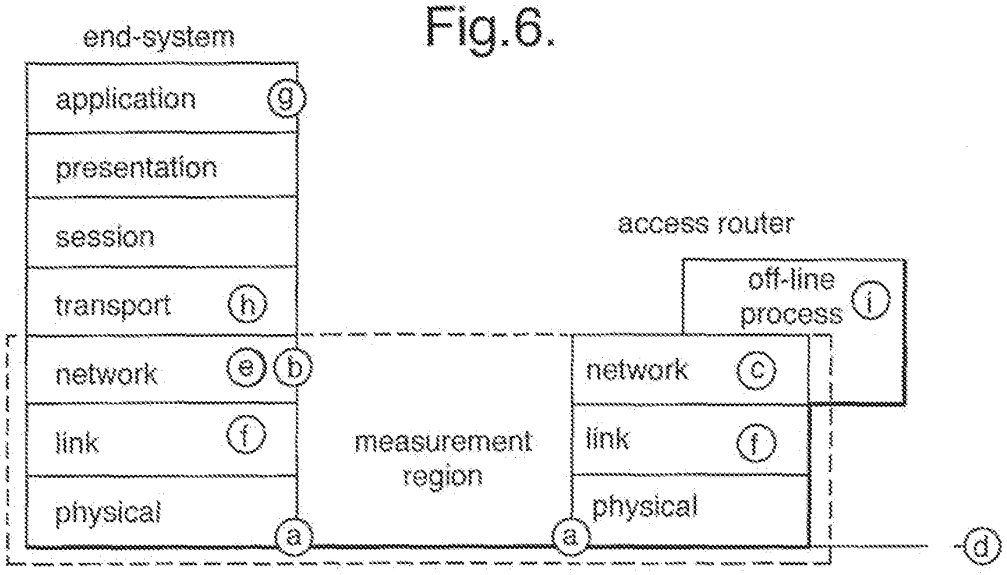

end-system
application
g
presentation
session
transport
h
network
e
b
link
f
physical
a
measurement region
access router
off-line process
i
network
c
link
f
physical
a
d

Fig.7.

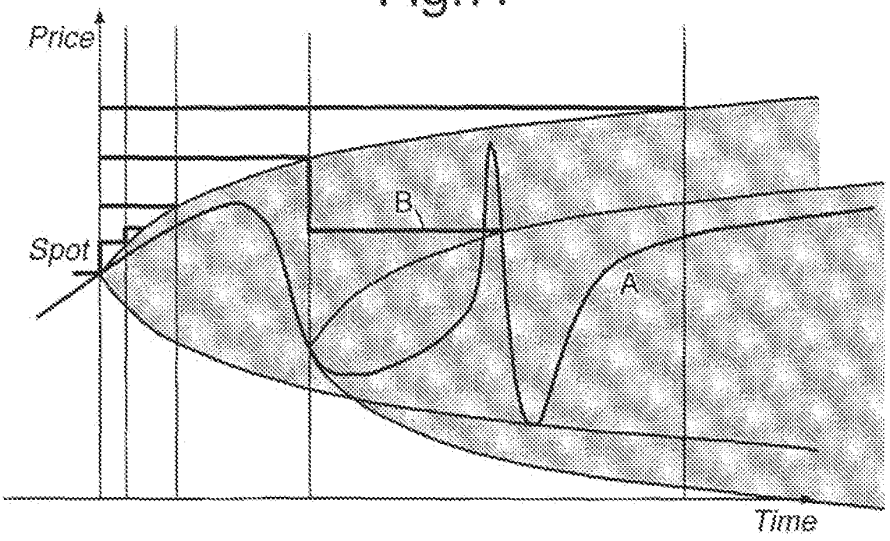

Price
Spot
B
A
Time

Fig.8a.

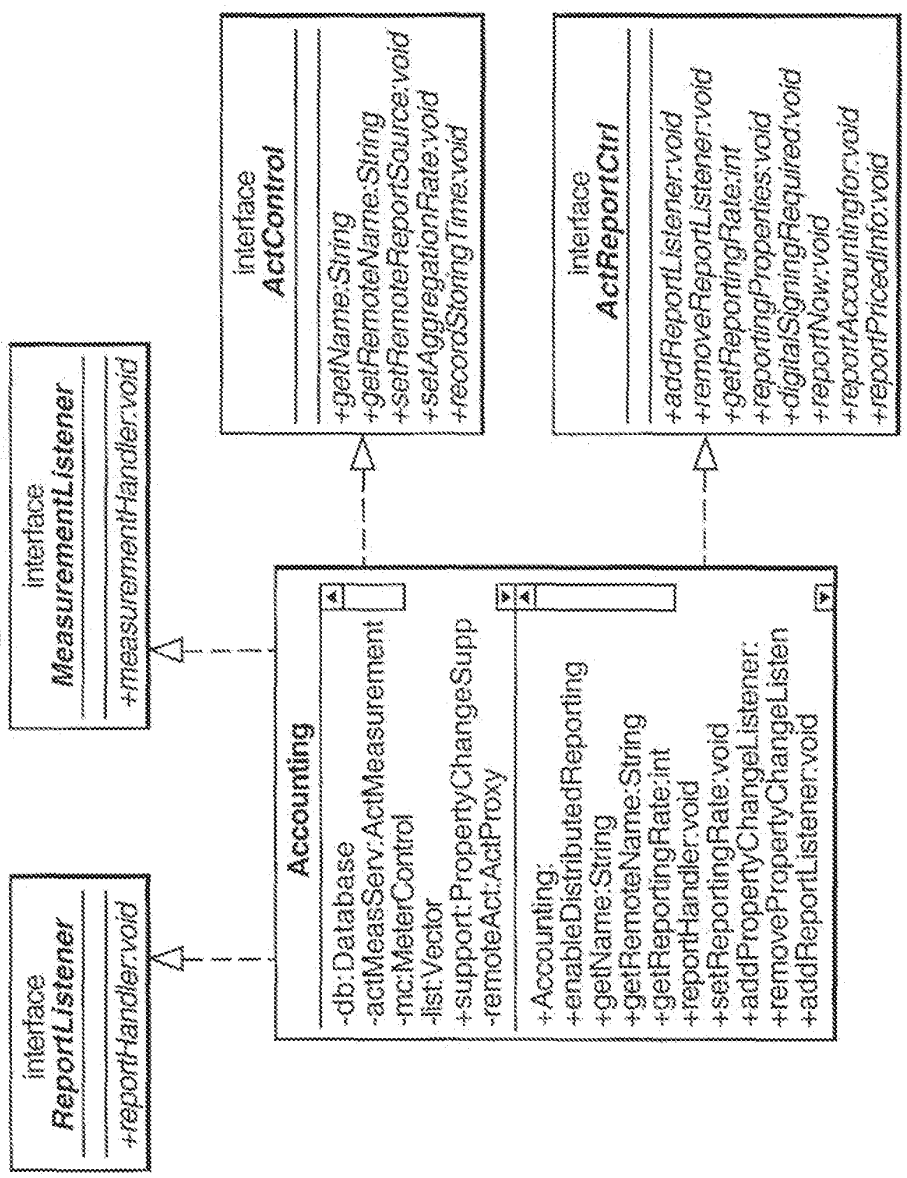

interface
ReportListener
+reportHandler:void
interface
MeasurementListener
+measurementHandler:void
Accounting
-db:Database
-actMeasServ:ActMeasurement
-mc:MeterControl
-list:Vector
+support:PropertyChangeSupp
-remoteAct:ActProxy
+Accounting:
+enableDistributedReporting
+getName:String
+getRemoteName:String
+getReportingRate:int
+reportHandler:void
+setReportingRate:void
+addPropertyChangeListener:
+removePropertyChangeListen
+addReportListener:void
interface
ActControl
+getName:String
+getRemoteName:String
+setRemoteReportSource:void
+setAggregationRate:void
+recordStoringTime:void
interface
ActReportCtrl
+addReportListener:void
+removeReportListener:void
+getReportingRate:int
+reportingProperties:void
+digitalSigningRequired:void
+reportNow:void
+reportAccountingFor:void
+reportPricedInto:void

Fig.8b.

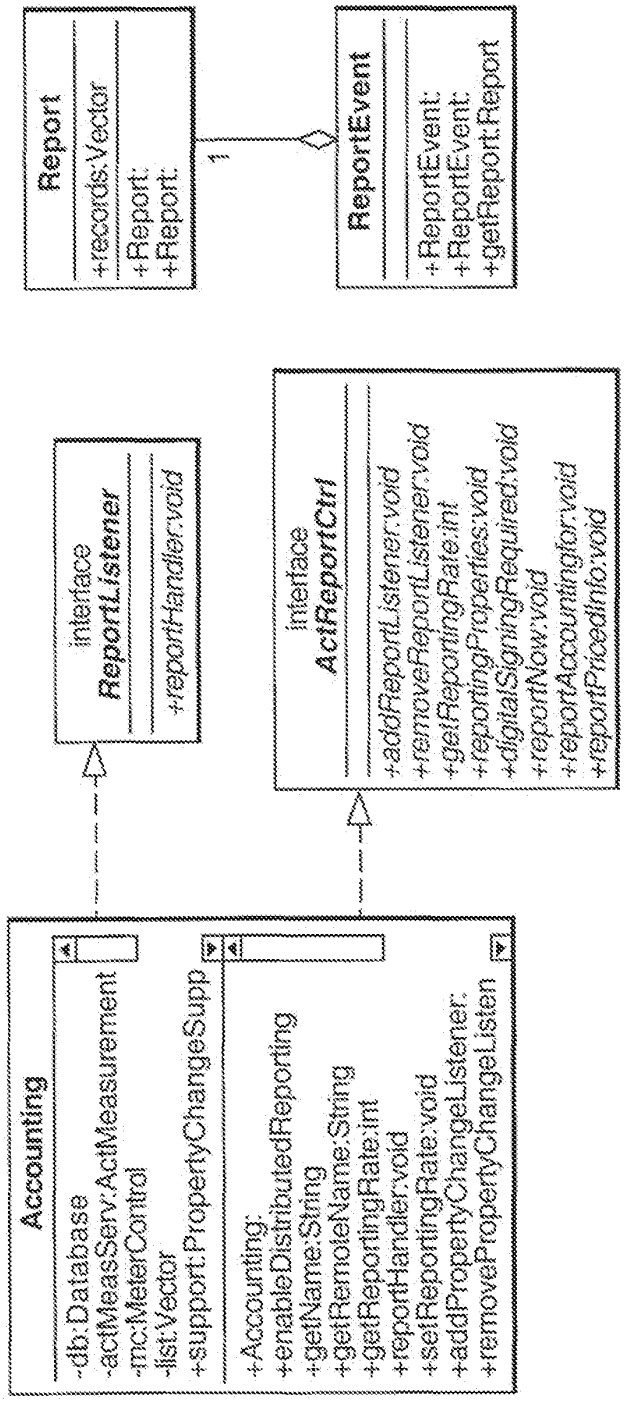

Report
+records:Vector
+Report:
+Report:
1
ReportEvent
+ReportEvent:
+ReportEvent:
+getReport:Report
interface
ReportListener
+reportHandler:void
interface
ActReportCtrl
+addReportListener:void
+removeReportListener:void
+getReportingRate:int
+reportingProperties:void
+digitalSigningRequired:void
+reportNow:void
+reportAccountingFor:void
+reportProceedInfo:void
Accounting
-db:Database
-actMeasServ:ActMeasurement
-mcMeterControl
-listVector
+support:PropertyChangeSupp
+Accounting:
+enableDistributedReporting
+getName:String
+getRemoteName:String
+getReportingRate:int
+reportHandler:void
+setReportingRate:void
+addPropertyChangeListener:
+removePropertyChangeListen

Fig.8c.

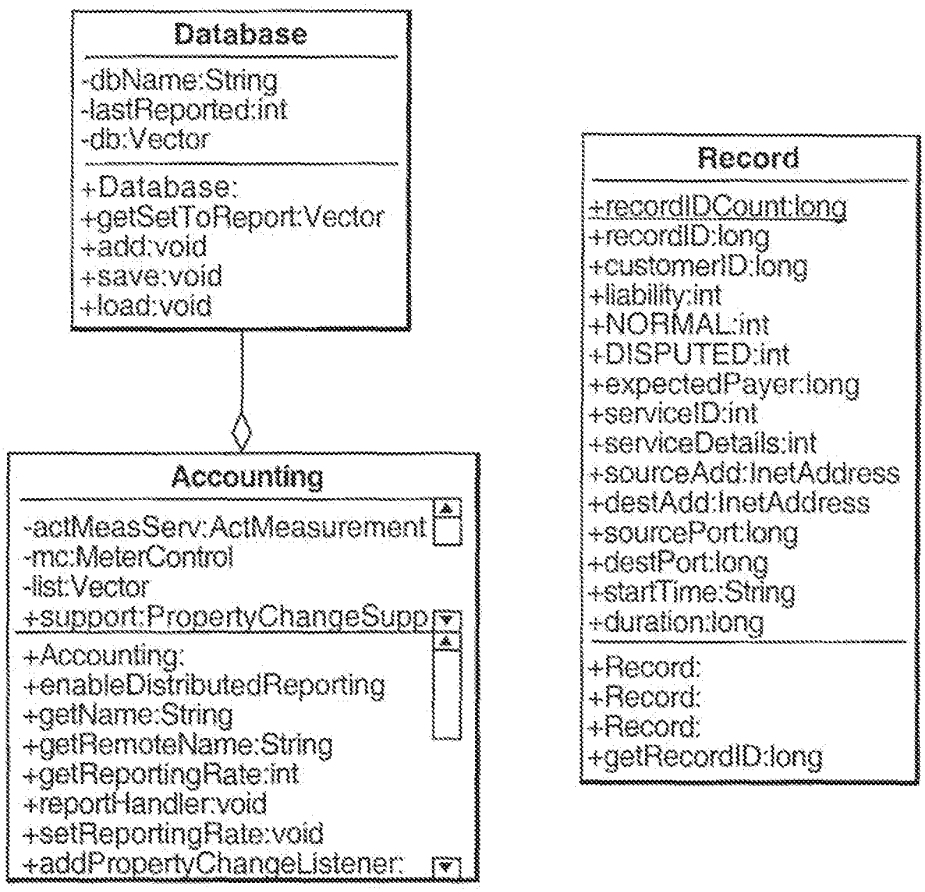

Database
-dbName:String
-lastReported:int
-db:Vector
+Database:
+getSetToReport:Vector
+add:void
+save:void
+load:void
Accounting
-actMeasServ:ActMeasurement
-mc:MeterControl
-list:Vector
+support:PropertyChangeSupp
+Accounting:
+enableDistributedReporting
+getName:String
+getRemoteName:String
+getReportingRate:int
+reportHandler:void
+setReportingRate:void
+addPropertyChangeListener:
Record
+recordIDCount:long
+recordID:long
+customerID:long
+liability:int
+NORMAL:int
+DISPUTED:int
+expectedPayer:long
+serviceID:int
+serviceDetails:int
+sourceAdd:InetAddress
+destAdd:InetAddress
+sourcePort:long
+destPort:long
+startTime:String
+duration:long
+Record:
+Record:
+Record:
+getRecordID:long

Fig.8d.

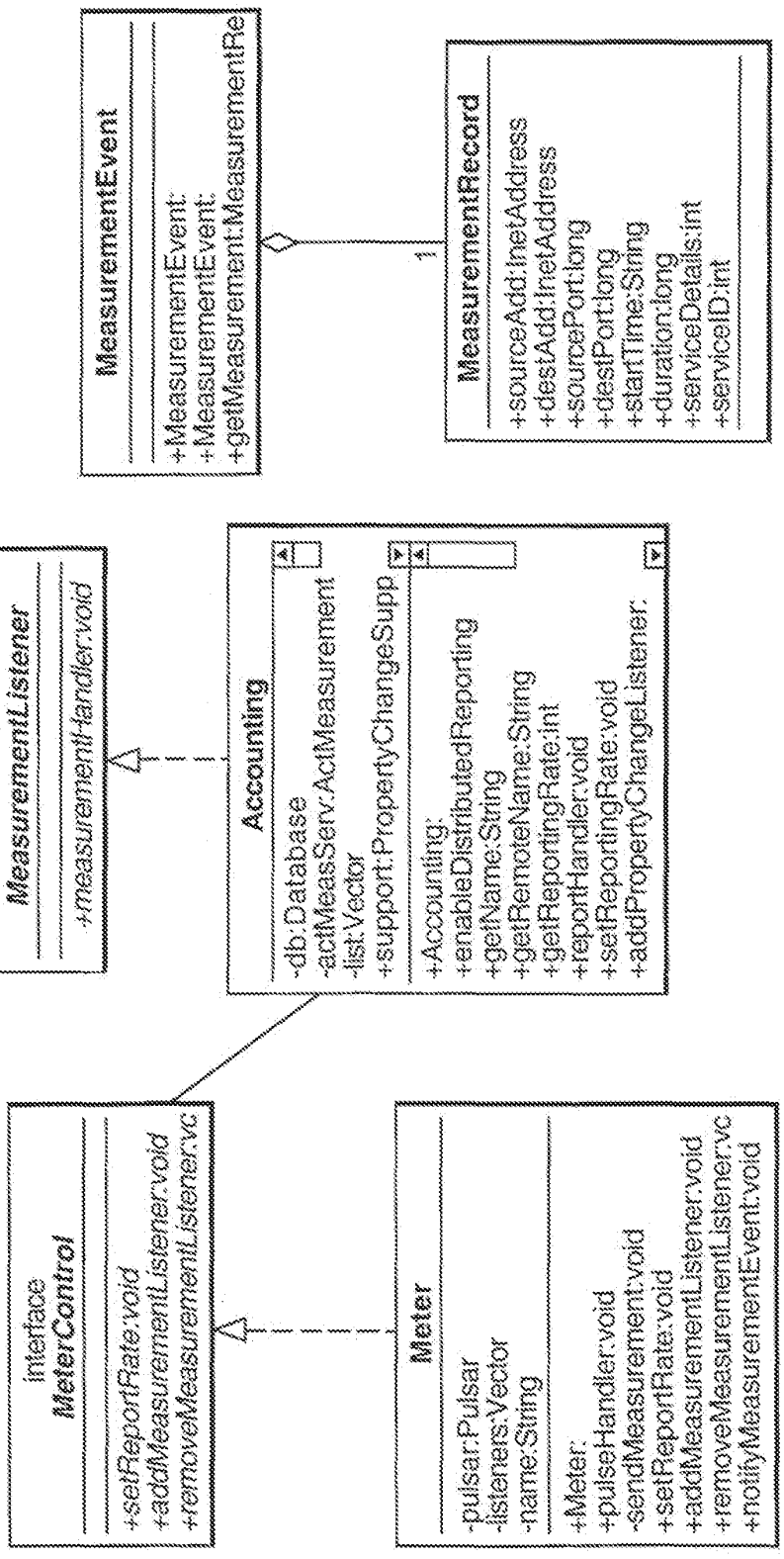

interface
MeasurementListener
+measurementHandler:void
Accounting
-db:Database
-actMeasServ:ActMeasurement
-list:Vector
+support:PropertyChangeSupp
+Accounting:
+enableDistributedReporting
+getName:String
+getRemoteName:String
+getReportingRate:int
+reportHandler:void
+setReportingRate:void
+addPropertyChangeListener:
MeasurementEvent
+MeasurementEvent:
+MeasurementEvent:
+getMeasurement:MeasurementRe
1
MeasurementRecord
+sourceAdd:InetAddress
+destAdd:InetAddress
+sourcePort:long
+destPort:long
+startTime:String
+duration:long
+serviceDetails:int
+serviceID:int
interface
MeterControl
+setReportRate:void
+addMeasurementListener:void
+removeMeasurementListener:vc
Meter
-pulsar:Pulsar
-listeners:Vector
-name:String
+Meter:
+pulseHandler:void
-sendMeasurement:void
+setReportRate:void
+addMeasurementListener:void
+removeMeasurementListener:vc
+notifyMeasurementEvent:void

Fig.8e.

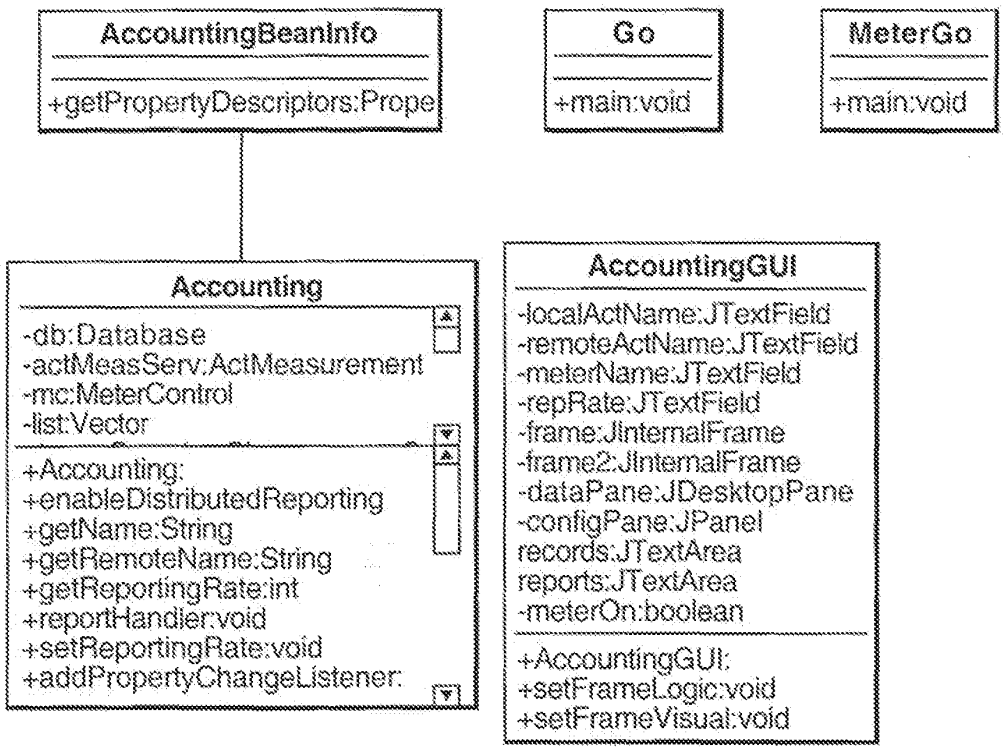

AccountingBeanInfo
+getPropertyDescriptors:Prope
Go
+main:void
MeterGo
+main:void
Accounting
-db:Database
-actMeasServ:ActMeasurement
-mc:MeterControl
-list:Vector
+Accounting:
+enableDistributedReporting
+getName:String
+getRemoteName:String
+getReportingRate:int
+reportHandler:void
+setReportingRate:void
+addPropertyChangeListener:
AccountingGUI
-localActName:JTextField
-remoteActName:JTextField
-meterName:JTextField
-repRate:JTextField
-frame:JInternalFrame
-frame2:JInternalFrame
-dataPane:JDesktopPane
-configPane:JPanel
records:JTextArea
reports:JTextArea
-meterOn:boolean
+AccountingGUI:
+setFrameLogic:void
+setFrameVisual:void

Fig.9.

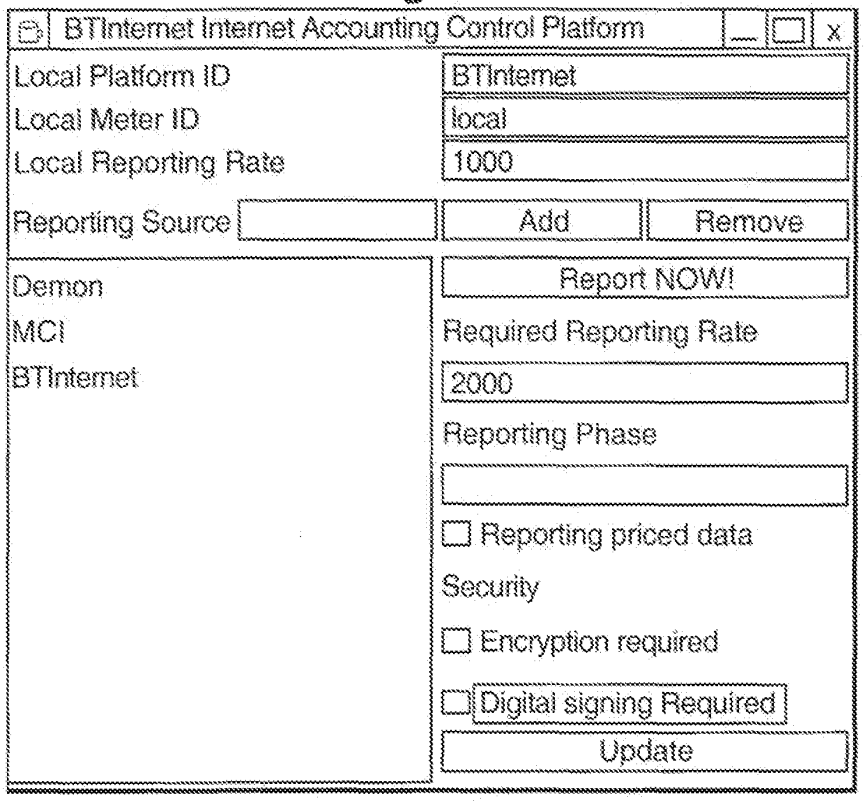

BTInternet Internet Accounting Control Platform
Local Platform ID
BTInternet
Local Meter ID
local
Local Reporting Rate
1000
Reporting Source
Add
Remove
Demon
MCI
BTInternet
Report NOW!
Required Reporting Rate
2000
Reporting Phase
Reporting priced data
Security
Encryption required
Digital signing Required
Update

Fig.10.

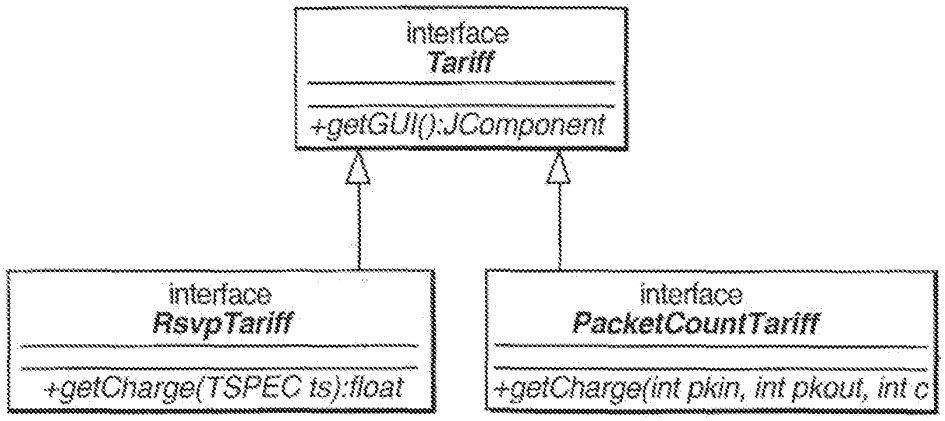
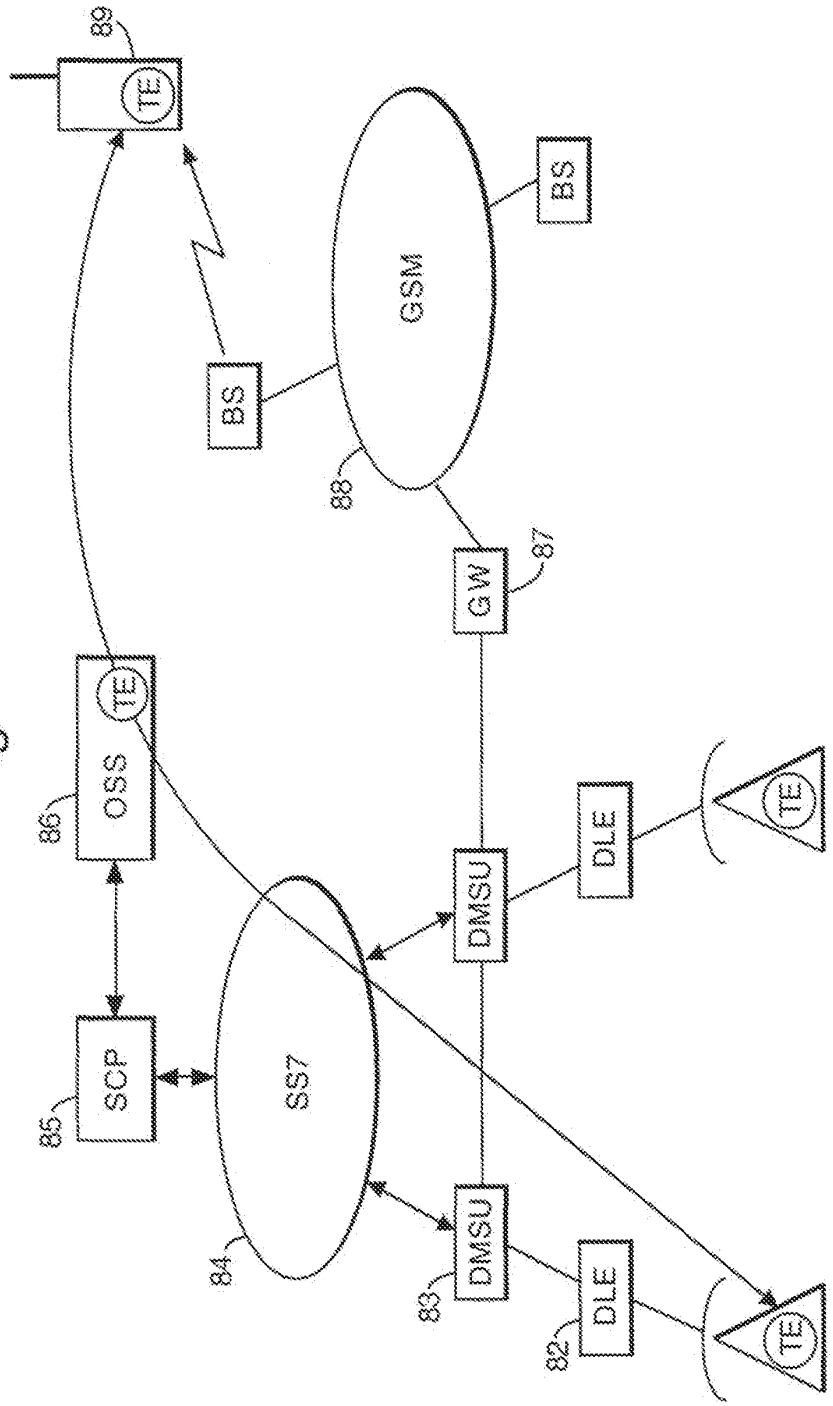

interface
Tariff
+getGUI():JComponent
interface
RsvpTariff
+getCharge(TSPEC ts):float
interface
PacketCountTariff
+getCharge(int pkin, int pkout, int c

Fig.11.


89
TE
BS
GSM
BS
88
GW
87
86
OSS
TE
DMSU
DLE
TE
SCP
85
SS7
84
DMSU
83
DLE
82
TE

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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
15 February 2007 (15.02.2007)

PCT

(10) International Publication Number
WO 2007/018363 A1

(51) International Patent Classification:
H04Q 7/34 (2006.01)

(21) International Application Number:
PCT/KR2006/003036

(22) International Filing Date: 2 August 2006 (02.08.2006)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:
10-2005-0071848 5 August 2005 (05.08.2005) KR

(71) Applicant *(for all designated States except US)*: **UP-RESTO, INC.** [KR/KR]; 7, 8th floor Youngshin B/D, 925-4 Bangbae-Dong Seocho-Gu, Seoul 137-060 (KR).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **SON, Byoung-Young** [KR/KR]; 102-904 Gwanak Hyundai Apt., 1000, Bongcheon-Dong Gwanak-Gu, Seoul 151-755 (KR).

(74) Agent: **LEE, Ji-Yeon**; 3F, Maru Bldg., 942-20 Daichi3-dong, Gangnam-gu, Seoul 135-845 (KR).

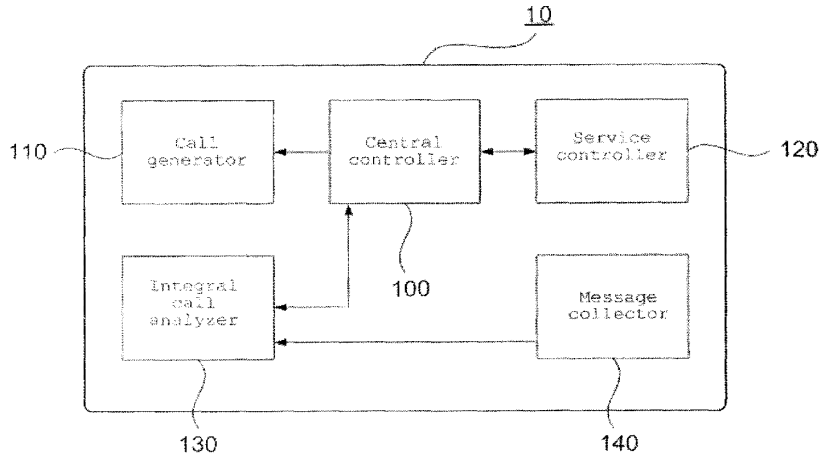
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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: SYSTEM FOR TESTIFYING MOBILE COMMUNICATION NETWORK AND METHOD THEREOF



(57) Abstract: Provided is a mobile network verification network system and a method thereof. The mobile network verification system includes: a central controller which controls an overall operation and receives information required for a call simulation; a call generator which automatically generates a call by using a terminal according to an instruction requested from the central controller; an integral call analyzer which collects messages transmitted/received between systems included in a mobile network by using the call generated by the call generator, analyzes the collected messages, and transmits the analyzed information to the central controller; and a service controller which provides a service scenario test environment, and checks or modifies a subscriber service profile in association with external systems related to a specific service. Accordingly, the mobile network and each system can be automatically verified.

WO 2007/018363 A1

【DESCRIPTION】

【Invention Title】

SYSTEM FOR TESTIFYING MOBILE COMMUNICATION NETWORK AND METHOD THEREOF

【Technical Field】

The present invention relates to a mobile network verification system and a method thereof, and more particularly, to a mobile network verification system, in which messages transmitted/received between various systems included in a mobile network are collected and analyzed so as to verify the mobile network and operations of the respective systems, and a method thereof.

【Background Art】

In general, signaling used in a network is defined as a rule for transferring a series of signals so as to transfer information on a call between systems included in a network and information used for network management and maintenance. As an example of the signaling, No.7 signaling is common channel signaling (CCS) standardized by the International Telecommunication Union's Telecommunication Standardization Sector (ITU-T). In the No.7 signaling, call connection between subscribers and various communication services are provided, or various control signals are transferred so as to manage a network.

A protocol employing the No.7 signaling includes: a message transfer part (hereinafter, referred to as MTP) of a network service part which controls signal transfer, corrects errors, and secures a signaling network; a signaling connection control part (hereinafter, referred to SCCP); an ISDN user part (hereinafter, referred to as ISUP) which is designed separately depending on an application field such as telephone exchange and data exchange; a transaction capability application part (hereinafter, referred to as TCAP); and an application part (hereinafter, referred to AP).

A No. 7 signaling network, which transfers a signal for controlling a network and performs various communication services, includes a signaling point (SP) for sending, receiving, or transferring a signaling message generated by a user, and a signaling link (SL) that is a logical signal transmission channel for connecting associated signaling points. The signaling point includes a signaling end point (SEP) that sends or receives a message, and a signaling transfer point (STP) that is formed in pair and transfers the message from one signaling link to another signaling link. The signaling end point includes an origination point (OP) that generates a signaling message and a destination point (DP) that is a destination of the signaling message. A group of signaling links is defined as a signaling LinkSet. A path

for transferring a message to the signaling point is defined as a signaling route (SR). A group of signaling routes, which is a routing path for a signaling destination, is defined as a signaling route set. That is, the No. 7 signaling network includes specification data regarding on the signaling point, the signaling link, the signaling LinkSet, and the signaling route, and transfers a signaling message generated by the originating point through a specific signaling link of a signal LinkSet to be transferred to a destination point, thereby requesting call connection and service.

Meanwhile, a plurality of systems, such as MSC, BSC, HLR, SCP, SMSC, etc, are included in a mobile network. When a new software or hardware package applies to the respective systems, or when a network problem occurs, a network operator verifies the package or tests the network in order to ensure network reliability and stability.

When the network is tested, or a specific package is verified, a conventional method has been used for debugging an internal logic of each system's software, or analyzing a transaction with respect to an adjacent system according to data displayed on an operating terminal by using a system tracing function through a man machine command of the operating terminal.

Moreover, in order to analyze a connection relationship between systems included in the overall network, actual calling may be made so that the connection relationship can be decided according to the result thereof.

Generally, in the conventional verification method, verification is manually achieved by operators. Therefore, when packages have to be frequently replaced in a system, verification of the packages becomes a problem in terms of long time consumption and high labor costs. In addition, when a problem occurs while a connection relationship is verified between systems included in the overall network, it is very difficult to decide which system erratically operates in the network. In this case, verification consumes human resources and time significantly.

Meanwhile, as mobile value added services (for example, pre-paid subscriber, call forwarding, etc) gradually become various, network operators face a lot of troubles in order to verify the services whenever the services are developed, because there is no appropriate method capable of properly verifying the systems and the overall mobile network according to a scenario for each service.

Therefore, the applicant proposes a method capable of recognizing an organic connection relationship between

systems included in a mobile network, and checking whether the systems and the overall network normally operate.

【Disclosure】

【Technical Problem】

The present invention provides a mobile network verification system capable of collecting and analyzing a message transmitted/received between systems included in a mobile network, and verifying an overall operation of the mobile network.

The present invention also provides a mobile network verification system capable of verifying an operation of a section included in a mobile network by forming a transaction flow for a call transmitted/received between the section included in the mobile network.

The present invention also provides a mobile network verification system capable of verifying a process of handling a call in a mobile network by forming a transaction flow for all transactions related to the call in all sections of the mobile network.

The present invention also provides a mobile network verification method capable of verifying an overall operation of a mobile network by collecting and analyzing a message transmitted/received between systems included in the mobile network.

【Technical Solution】

According to an aspect of the present invention, there is provided a mobile network verification system which verifies operations of respective systems included in the mobile network, the verification system comprising: a central controller which controls an overall operation and receives information required for a call simulation; a call generator which automatically generates a call by using a terminal according to an instruction requested from the central controller; an integral call analyzer which collects messages transmitted/received between systems included in a mobile network by using the call generated by the call generator, analyzes the collected messages, and transmits the analyzed information to the central controller; a service controller which provides a service scenario test environment, and checks or modifies a subscriber service profile in association with external systems related to a specific service; and a message collector which collects a No.7 protocol signal transmitted/received between the systems included in the mobile network, converts the collected signal into an TCP/IP signal, multiplexes the converted signal, and transmits the multiplexed signal to the integral call analyzer; wherein the verification system verifies operations of respective systems included in the mobile network.

In the aforementioned aspect of the present invention, the integral call analyzer may detect information on an origination point code, a destination point code, and a transaction ID from the collected messages, and stores the information in a database. Further, the integral call analyzer may use the database so as to analyze transactions for respective nodes, thereby forming a call transaction flow for a specific node. Further, the integral call analyzer may form a call transaction flow in a network for the specific call by detecting a related call transaction of all nodes for a specific call.

According to another aspect of the present invention, there is provided a method in which a message transmitted/received between nodes included in a mobile network is collected so as to verify the mobile network, the method comprising steps of: (a) checking whether the collected message is a call related message; (b) detecting LinkSet information from the message if the message is the call related message; (c) recognizing a type of a message protocol, and detecting a specific parameter decided depending on the type of the message protocol by using the message; (d) checking whether the message is a message desired to be collected, by using the LinkSet information and the specific parameter; and (e) storing the message in a call

information database classified according to the message protocol if the message is a message desired to be collected, wherein, in the method, transactions are analyzed for a specific call.

In the aforementioned aspect of the present invention, the step (c) may comprise: (c-1) recognizing a type of a message protocol; (c-2) detecting a mobile phone number and a transaction ID number from the message if the message protocol is MAP; (c-3) detecting a mobile phone number and a line ID number from the message if the message protocol is ISUP; and (c-4) detecting a mobile phone number and a local reference number from the message if the message protocol is BSAP, wherein, in the method, transactions are analyzed for a specific call.

【Advantageous Effects】

According to the present invention, when a software or hardware package of systems included in a mobile network is modified, or when a network problem occurs, operations of respective systems can be verified. In addition, according to the present invention, a call can be generated for an overall mobile network on the basis of end-to-end principle so as to control a service. Then, the result thereof is collected, and thus data obtained from integral call analysis can be provided to an operator.

Therefore, according to the present invention, reliability on a network and each system can be maximized, and efficiency of human and economic resources required for verification can also be maximized.

In particular, a system of the present invention applies to an intelligent network service, thereby providing further accurate and effective analysis data.

【Description of Drawings】

FIG. 1 is a block diagram schematically illustrating a structure of a mobile network verification system according to an embodiment of the present invention.

FIG. 2 illustrates an example of a mobile network employing a mobile network verification system according to an embodiment of the present invention.

FIG. 3 is a block diagram illustrating a portion of a mobile network in order to form a call transaction flow by a mobile network verification system according to an embodiment of the present invention.

FIG. 4 is a flowchart illustrating an example of a call transaction flow in a specific section of the mobile network of FIG. 3.

FIG. 5 is a flowchart illustrating an example of transactions generated in each section of the mobile network

in association with a specific call in the mobile network of FIG. 3.

FIG. 6 is a flowchart sequentially illustrating an operation of an integral call analyzer of a mobile network verification system according to an embodiment of the present invention.

FIG. 7 is a flowchart sequentially illustrating the MAP process of FIG. 6.

FIG. 8 is a flowchart sequentially illustrating the ISUP process of FIG. 6.

FIG. 9 is a flowchart sequentially illustrating the BSAP process of FIG. 6.

FIG. 10 illustrates an example of a call transaction flow formed by an integral call analyzer of a mobile network verification system according to an embodiment of the present invention.

【Best Mode】

Hereinafter, exemplary embodiments of the present invention will be descried in detail with reference to the accompanying drawings.

FIG. 1 is a block diagram schematically illustrating a structure of a mobile network verification system 10 according to an embodiment of the present invention. Referring to FIG. 1, the verification system 10 includes a

central controller 100, a call generator 110, a service controller 120, an integral call analyzer 130, and a message collector 140. Now, the aforementioned elements will be described.

First, the central controller 100 controls an overall operation of the verification system 10, receives information required for a call simulation, and instructs the call generator 110 to generate a call according to the received information. That is, when an origination phone number and a destination phone number desired to be found by a user are input to the central controller 100, the verification system 10 traces a call transaction related to a call for the origination and destination phone numbers input by the user from all nodes included in a mobile network. Then, the verification system 10 provides an analysis result thereof.

Further, the central controller 100 provides a user interface of the verification system 10, synchronizes each module of the verification system 10, and performs general control.

The call generator 110 automatically generates the call for the origination and destination phone numbers requested from the central controller 100 by using a terminal according to an instruction requested from the central controller 100.

The service controller 120 provides a service scenario test environment. Further, the service controller 120 checks or modifies a subscriber service profile in association with external systems related to a specific service. The external systems associated with the service controller 120 are a service network entity within a network. Examples of the external systems include SCP, HLR, and so on.

The message collector 140 collects messages of a No.7 protocol signal transmitted/received between systems included in the mobile network, and multiplexes the collected message by attaching a collected time and a node information tag. Thereafter, the message collector 140 converts the multiplexed message into a TCP/IP signal, and transmits the TCP/IP signal to the integral call analyzer 130. The message collector 140 may be included in the verification system 10. Alternatively, as an independent unit with respect to the verification system 10, the message collector 140 may be disposed outside the verification system 10, and transmit information to the verification system 10. Meanwhile, in a section for transmitting/receiving signals by using a TCP/IP protocol among system sections constituting the mobile network, the integral call analyzer 130 can collect a message without via the message collector 140.

The integral call analyzer 130 decodes messages transmitted from the message collector 140 or the like, and stores the decoded messages in a call information database. Further, the integral call analyzer 130 analyses the decoded messages for each node section and each call, and transmits information on the analysis result to the central controller 100. The call information database stores and manages a call ID and call transaction information on the call ID. The call transaction information includes an original point code, a destination point code, an origination phone number, a destination phone number, a message type, a transaction ID (TID), a call starting time, a call ending time, and the number of messages received and transmitted during entire calls.

FIG. 2 illustrates an overall structure of a mobile network installed with the verification system 10 having the aforementioned structure. Referring to FIG. 2, the verification system 10 according to an embodiment of the present invention may apply to a mobile network such as an intelligent network.

As shown in Fig, 2, the mobile network such as the intelligent network includes system nodes such as BTS, BSC, MSC, STP, HLR, SSP, SCP, PDSN, SGSN, IWF, etc. The

verification system 10 collects messages transmitted/received between each node through the data collector 140.

The call generator 110 of the verification system 10 automatically generates a call to be simulated using a terminal under the control of the central controller 100. The integral call analyzer 130 collects the messages transmitted/received between each node of the mobile network by using the call. Then, as shown in FIGS. 4 and 5, the integral call analyzer 130 performs analysis on each section and each call of the system.

FIG. 3 is a block diagram illustrating a portion of a mobile network. FIG. 4 illustrates a call transaction flow for a system section of the SSP 310 and the SCP 320 of FIG. 3. Referring to FIG. 4, the integral call analyzer 130 of the verification system 10 analyzes transactions received/transmitted between the SSP 310 and the SCP 320 with respect to a specific call, and forms a call transaction flow to be transmitted to the central controller 100.

FIG. 5 illustrates a call transaction flow in which related transactions transmitted/received between nodes representing the system over the mobile network of FIG. 3. Referring to FIG. 5, the integral call analyzer 130 of the verification system 10 analyzes all transactions related to a

specific call, and forms a call transaction flow to be transmitted to the central controller 100 .

Now, the operation of the integral call analyzer 130 of the verification system 10 according to an embodiment of the present invention will be described in detail with reference to FIGS. 6 to 9.

FIG. 6 is a flowchart sequentially illustrating an operation of the integral call analyzer 130 according to an embodiment of the present invention. Referring to FIG. 6, a collected message is firstly analyzed (step 600), and thereafter, it is checked whether the collected message is a call related signaling message (step 610). If the collected message is the call related signaling message, LinkSet information and mobile ID number (hereinafter, referred to as MIN) are collected, and a specific key value contained in a message is detected (step 620). The LinkSet information is section information of transaction, and is defined as information on a transmission node and a reception node of transaction.

Next, a key value for a specific parameter included in the message is analyzed, and thus a protocol type is recognized (step 630). If a protocol of the message is a mobile application part (MAP), the procedure illustrated in FIG. 7 is performed (step 640). If a protocol of the message

is a ISUP, the procedure illustrated in FIG. 8 is performed (step 642). If the protocol of the message is BASP, the procedure illustrated in FIG. 9 is performed(step 644). The procedures will be described later. After the aforementioned steps 640, 642, and 644 are performed, returning back to step 600, the process of analyzing collected messages is repeated.

FIG. 7 is a flowchart illustrating the procedure performed when a protocol is MAP. Referring to FIG. 7, it is checked whether a LinkSet, a MIN, and a transaction ID (hereinafter, referred to as TID) are accurate information (step 700). If they are accurate, the presence of a call ID is checked (step 710). If the call ID does not exist, the call ID is generated (step 712). A message is stored in a memory allocated to the call ID (step 720), and thereafter, it is checked whether the message is a call ending message or a transaction ending message (step 722). If the message is not the call ending message nor the transaction ending message, the process returns back to a flow indicated by 4 in FIG. 6.

When an operation type of the message is checked, and the check result shows that the message is the call ending message or the transaction ending message, transaction information on an associated call ID is determined to be an ending state (step 724). Thereafter, it is checked whether

the message is the call ending message (step 726). The end of call is determined according to an ISUP RLC (Release Complete) message or a SCCP RLC message. In the MAP protocol, a call starting message is confirmed if an 'Origination Request' message or an 'Analyzed Information' message exists. The end of transaction is determined according to a message type tag of a transaction portion and a component type tag of a component portion of a TCAP parameter contained in a MAP message. If the result of step 726 shows that the message is not the call ending message, the process returns back to the flow indicated by 4 in FIG. 6

If the message is the call ending message, it is checked whether all transactions contained in the call ID are ended (step 728). If all of the transactions contained in the call ID are not ended, the process indicated by 4 in FIG. 6 is performed.

If all of the transactions contained in the call ID are ended, an ending time is determined for a call (step 730), and the call is ended after the ending time is over (step 740). Next, information stored in the memory allocated to the call ID is stored in a database, thereby completing the procedure (step 742).

FIG. 8 is a flowchart performed when a message protocol is ISUP. All steps of FIG. 8 are the same as those of FIG. 7

except for a process (step 800) for checking whether a LinkSet, a MIN, and a circuit ID code (hereinafter, referred to as CIC) are accurate.

In addition, FIG. 9 is a flowchart performed when a message protocol is base station application part (BSAP). All steps of FIG. 9 are the same as those of FIG. 7 except for a process (step 900) for checking whether a LinkSet, a MIN, and a local reference number (hereinafter, referred to as LRN) are accurate.

The mobile network verification system of the present invention forms a call transaction flow by using transaction information on an call ID stored in a database according to the aforementioned processes.

While the present invention has been particularly shown and described with reference to exemplary embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the appended claims.

【Industrial Applicability】

A mobile network verification system of the present invention analyzes systems included in a mobile network such as an intelligent network, and provides an analysis result

thereof to an operator. The present invention can be widely used in a mobile network field.

【CLAIMS】

【Claim 1】

A mobile network verification system which verifies operations of respective systems included in the mobile network, the verification system comprising:

a central controller which controls an overall operation and receives information required for a call simulation;

a call generator which automatically generates a call by using a terminal according to an instruction requested from the central controller; and

an integral call analyzer which collects messages transmitted/received between systems included in a mobile network by using the call generated by the call generator, analyzes the collected messages, and transmits the analyzed information to the central controller.

【Claim 2】

The verification system according to claim 1, further comprising a service controller, wherein the service controller provides a service scenario test environment, and checks or modifies a subscriber service profile in association with external systems related to a specific service.

【Claim 3】

The verification system according to claim 1, further comprising a message collector, wherein the message collector collects a No.7 protocol signal transmitted/received between the systems included in the mobile network, converts the collected signal into an TCP/IP signal, multiplexes the converted signal, and transmits the multiplexed signal to the integral call analyzer.

【Claim 4】

The verification system according to any one of claims 1 to 3, wherein the integral call analyzer detects information on an origination point code, a destination point code, and a transaction ID from the collected messages, and stores the information in a database.

【Claim 5】

The verification system according to any one of claims 1 to 3, wherein:

the integral call analyzer detects information on an origination point code, a destination point code, and a transaction ID from the collected messages, and stores the information in a database; and

the integral call analyzer uses the database so as to analyze transactions for respective nodes, thereby forming a call transaction flow for a specific node.

【Claim 6】

The verification system according to any one of claims 1 to 3, wherein: the integral call analyzer detects information on an origination point code, a destination point code, and a transaction ID from the collected messages, and stores the information in a database; and

the integral call analyzer uses the database so as to detect a related call transaction of all nodes for a specific call, thereby forming a call transaction flow in a network for the specific call by using the detected transaction information.

【Claim 7】

The verification system according to any one of claims 1 to 3, wherein:

the central controller instructs the call generator to create a call by using an origination phone number and a destination phone number which are externally received;

the call generator generates a call by using a terminal under the instruction of the central controller; and

the integral call analyzer traces all transactions of the mobile network for the generated call from the collected messages, and analyzes the traced transaction.

【Claim 8】

A method in which a message transmitted/received between nodes included in a mobile network is collected so as to verify the mobile network, the method comprising steps of:

(a) checking whether the collected message is a call related message;

(b) detecting LinkSet information from the message if the message is the call related message;

(c) recognizing a type of a message protocol, and detecting a specific parameter decided depending on the type of the message protocol by using the message;

(d) checking whether the message is a message desired to be collected, by using the LinkSet information and the specific parameter; and

(e) storing the message in a call information database classified according to the message protocol if the message is a message desired to be collected,

wherein, in the method, transactions for a specific call are analyzed.

【Claim 9】

The method according to claim 8, wherein the step (c) comprises:

(c-1) recognizing a type of a message protocol;

(c-2) detecting a mobile phone number and a transaction ID number from the message if the message protocol is MAP;

(c-3) detecting a mobile phone number and a line ID number from the message if the message protocol is ISUP; and

(c-4) detecting a mobile phone number and a local reference number from the message if the message protocol is BSAP,

wherein, in the method, transactions for a specific call are analyzed.

【Claim 10】

The method according to any one of claims 8 and 9, further comprising the step of (f) checking whether all transactions stored in the call information database are ended, setting a predetermined ending time, and ending the call after the ending time is over if all of the transactions are ended, when the message is a call ending message.

FIG. 1

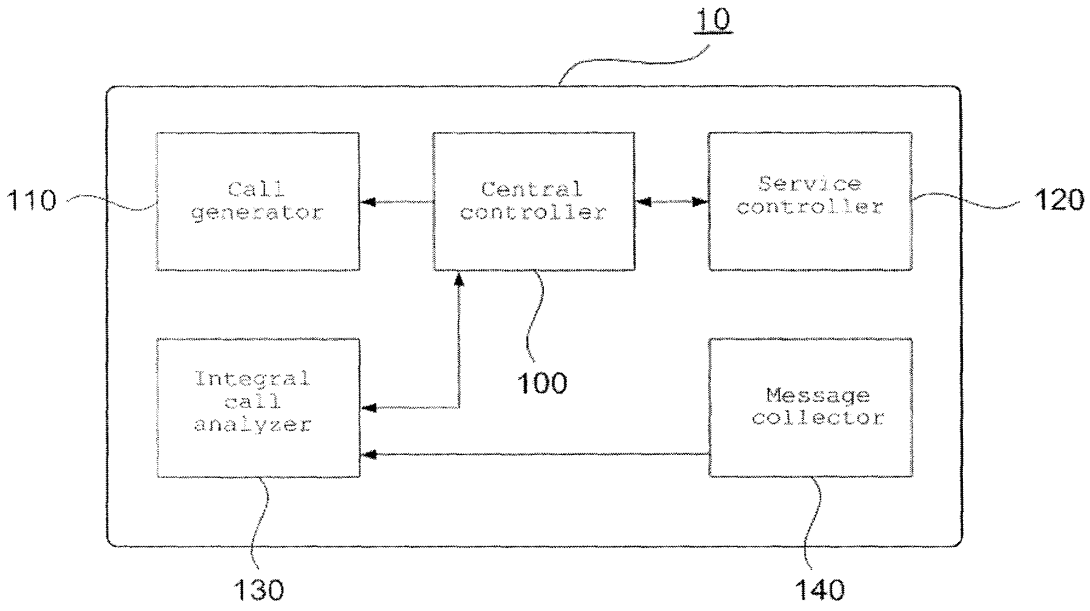

10
110
Call generator
Central controller
Service controller
120
Integral call analyzer
100
Message collector
130
140

FIG.2

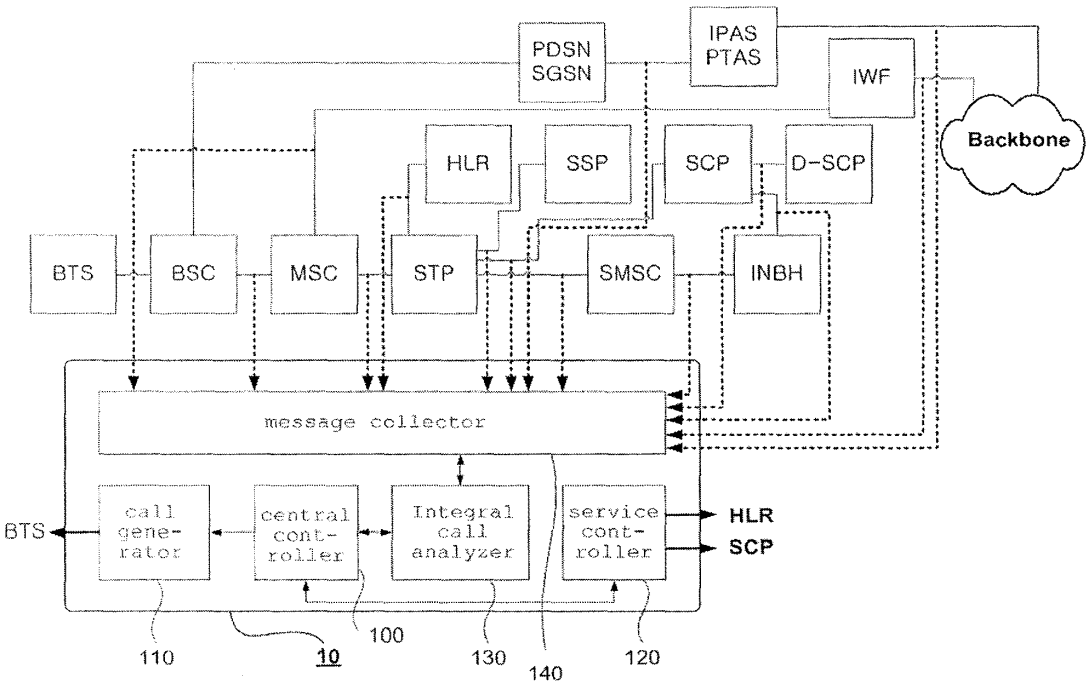

PDSN
SGSN
IPAS
PTAS
IWF
Backbone
HLR
SSP
SCP
D-SCP
BTS
BSC
MSC
STP
SMSC
INBH
message collector
BTS
call gene-rator
central cont-roller
Integral call analyzer
service cont-roller
HLR
SCP
110
10
100
130
140
120

FIG. 3

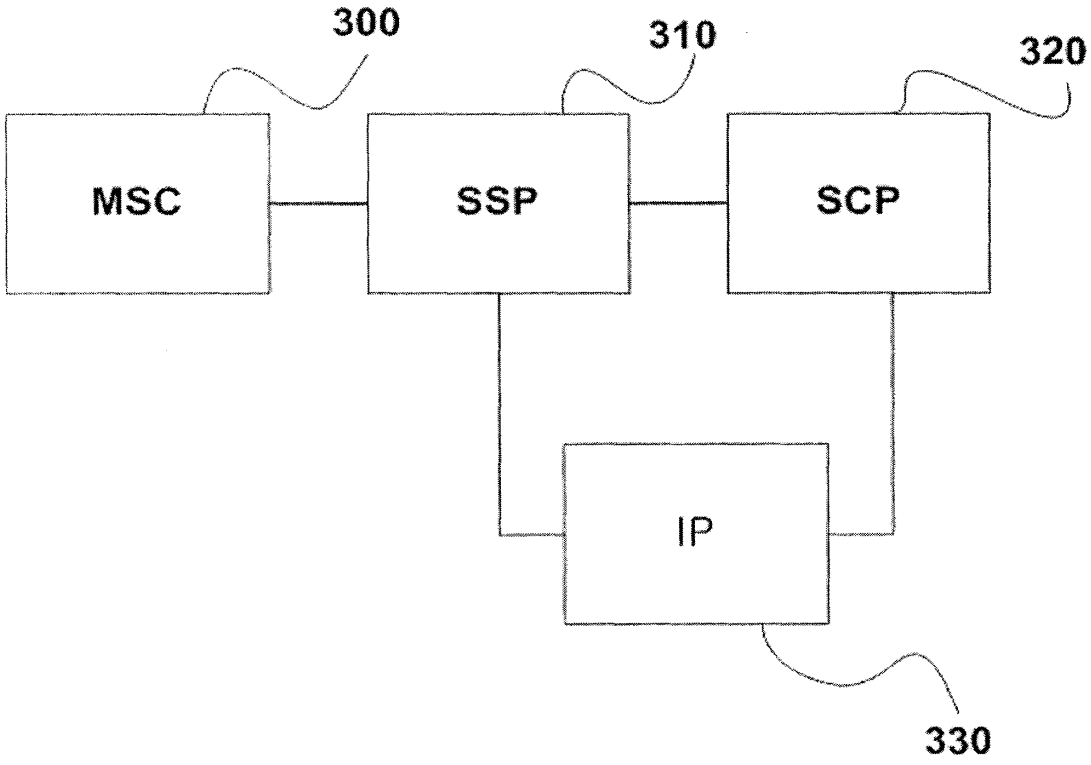


FIG. 4

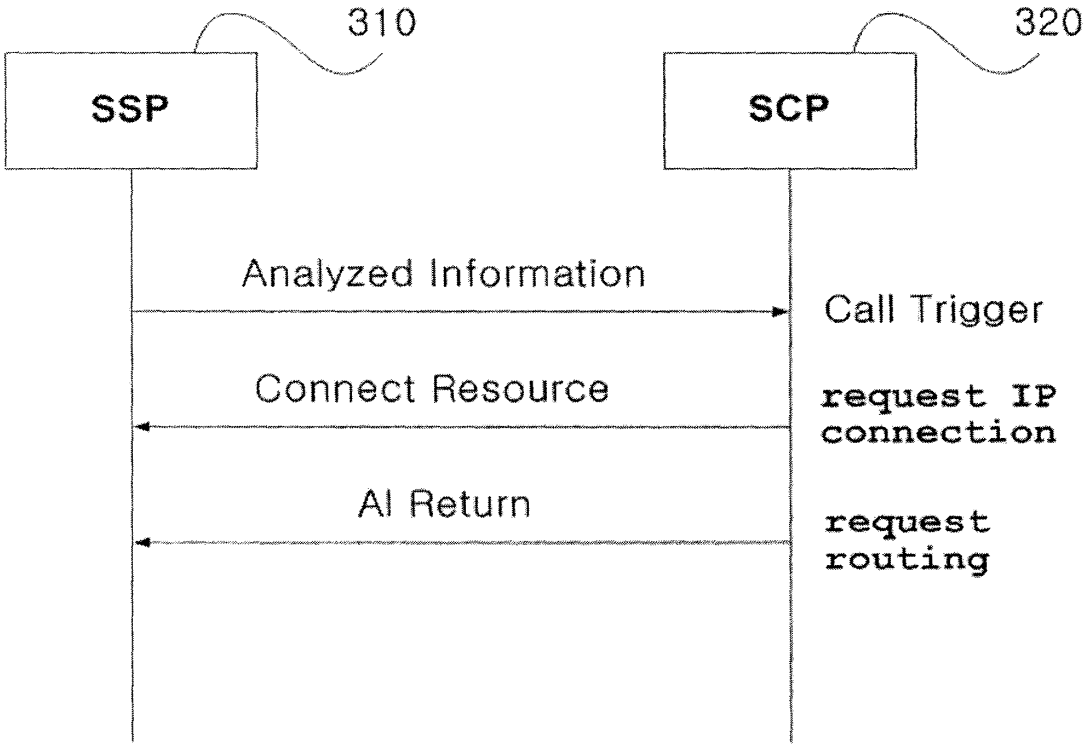

310
320
SSP
SCP
Analyzed Information
Call Trigger
Connect Resource
request IP connection
AI Return
request routing

FIG. 5

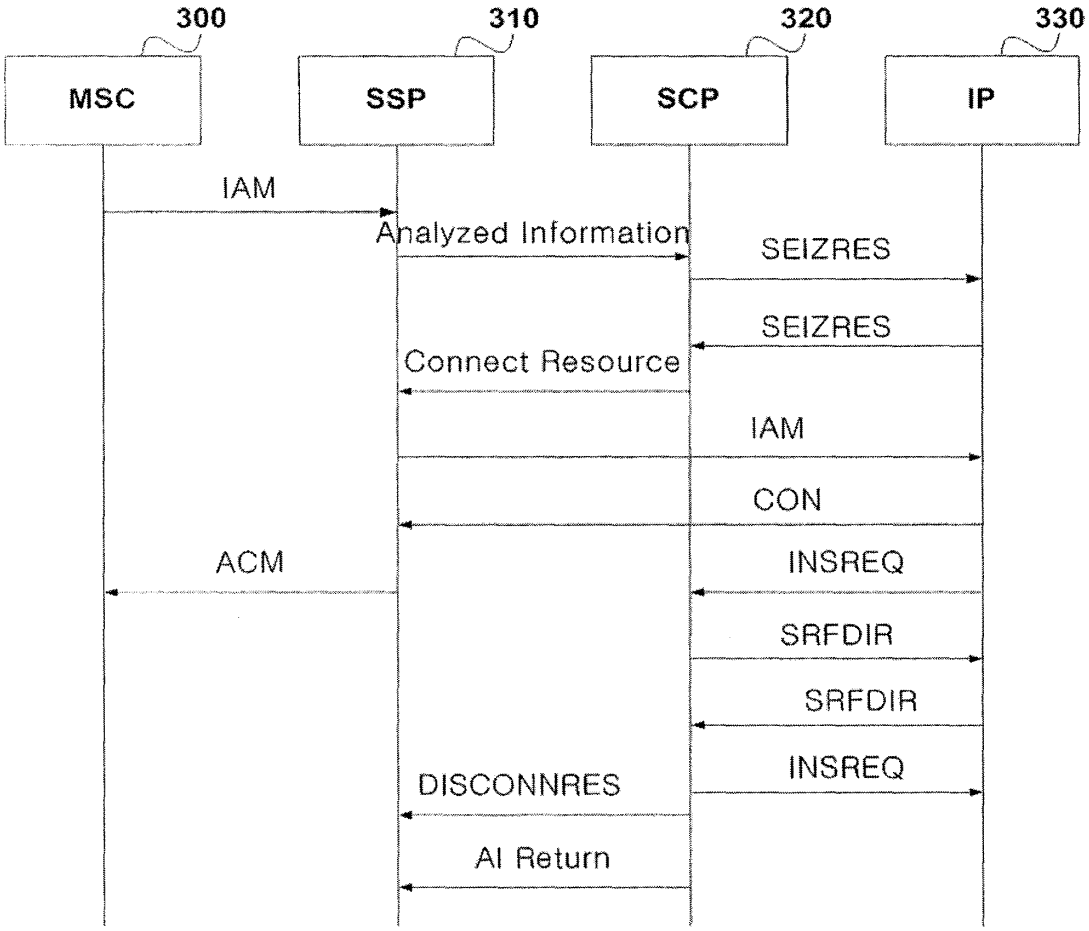

300
310
320
330
MSC
SSP
SCP
IP
IAM
Analyzed Information
SEIZRES
SEIZRES
Connect Resource
IAM
CON
ACM
INSREQ
SRFDIR
SRFDIR
INSREQ
DISCONNRES
AI Return

FIG. 6

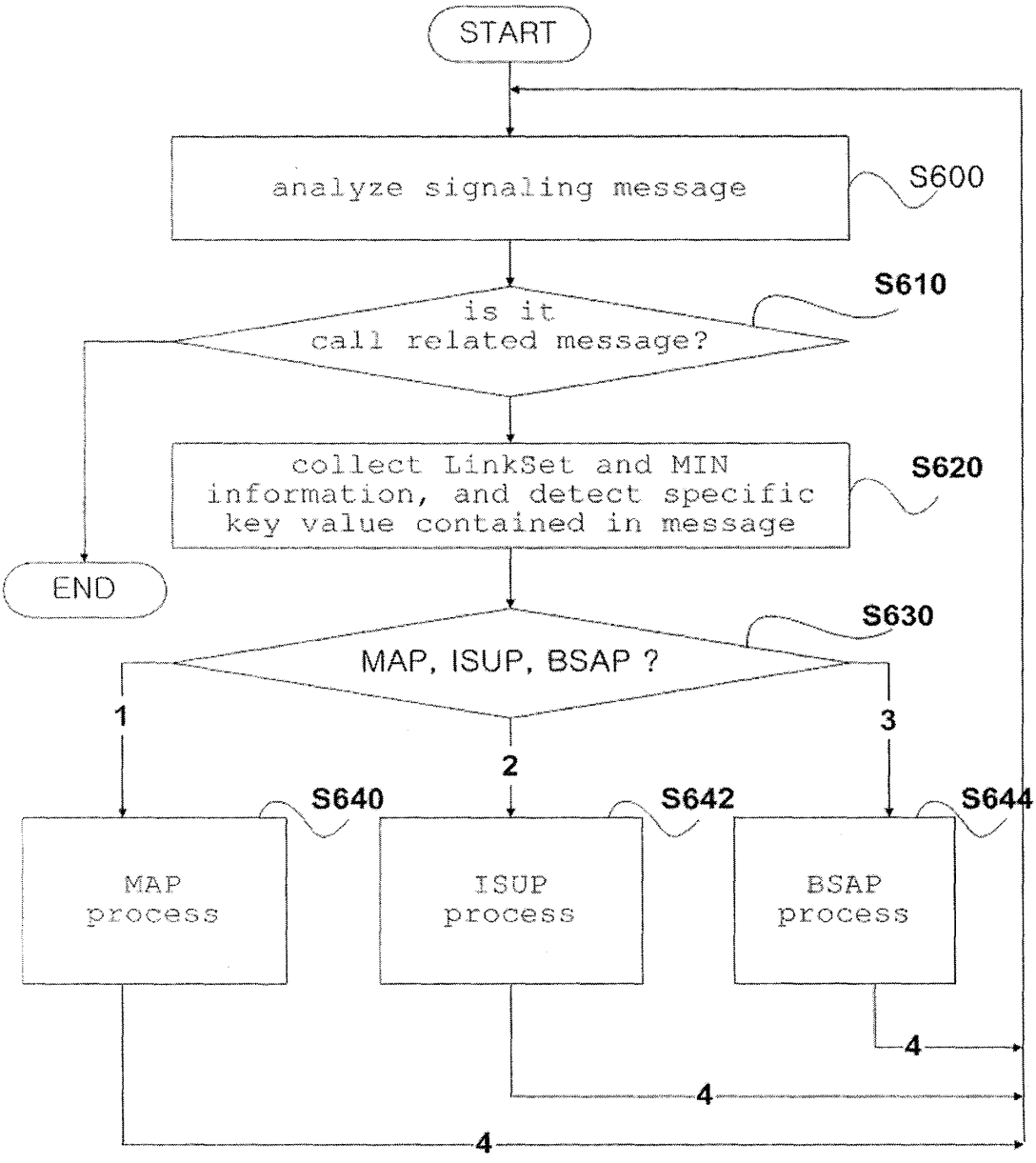

START
analyze signaling message
S600
S610
is it call related message?
collect LinkSet and MIN information, and detect specific key value contained in message
S620
END
S630
MAP, ISUP, BSAP ?
1
2
3
S640
S642
S644
MAP process
ISUP process
BSAP process
4
4
4

FIG. 7

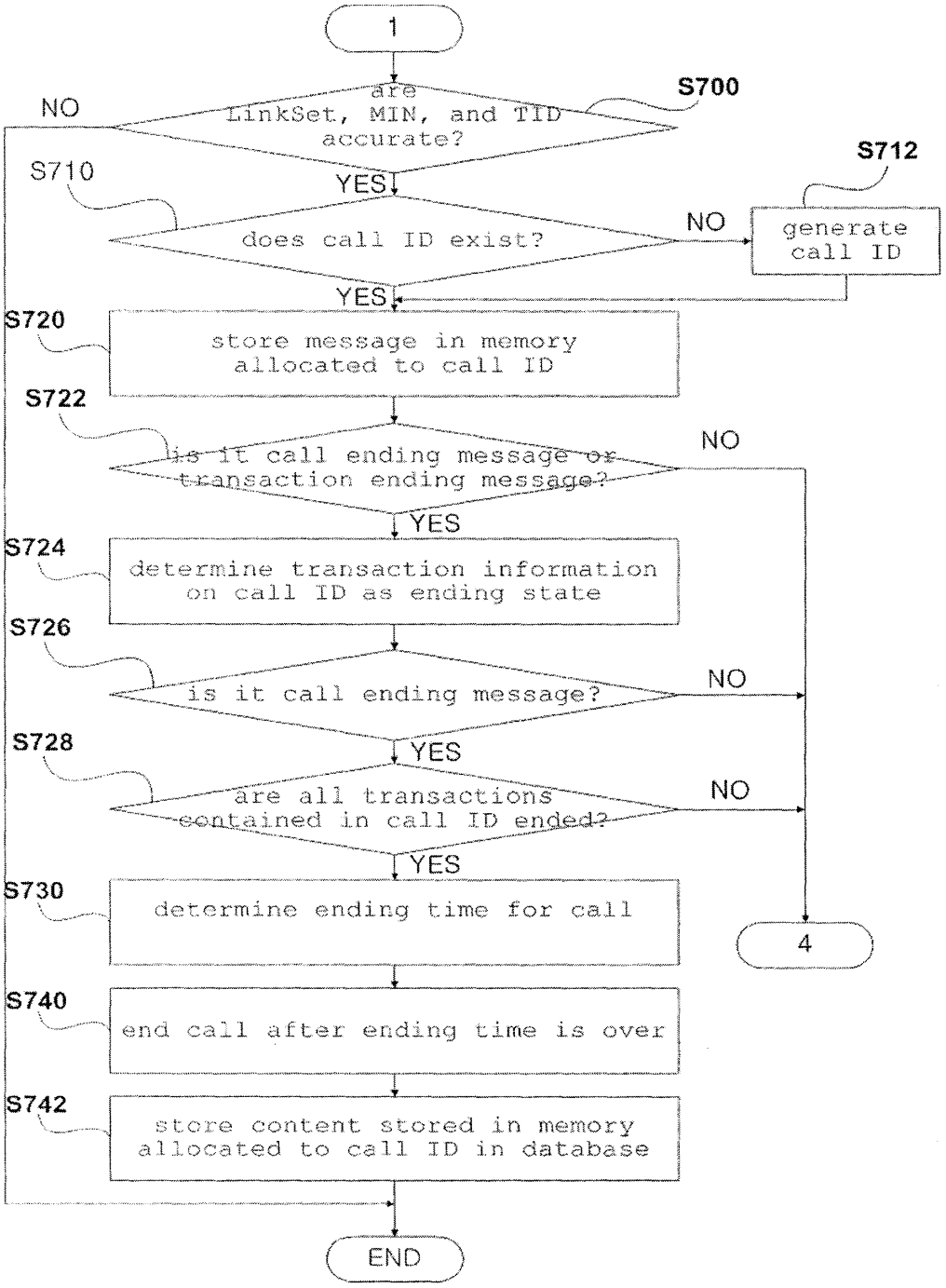

1
S700
are LinkSet, MIN, and TID accurate?
NO
S710
YES
does call ID exist?
NO
S712
generate call ID
YES
S720
store message in memory allocated to call ID
S722
is it call ending message or transaction ending message?
NO
YES
S724
determine transaction information on call ID as ending state
S726
is it call ending message?
NO
YES
S728
are all transactions contained in call ID ended?
NO
YES
S730
determine ending time for call
4
S740
end call after ending time is over
S742
store content stored in memory allocated to call ID in database
END

FIG. 8

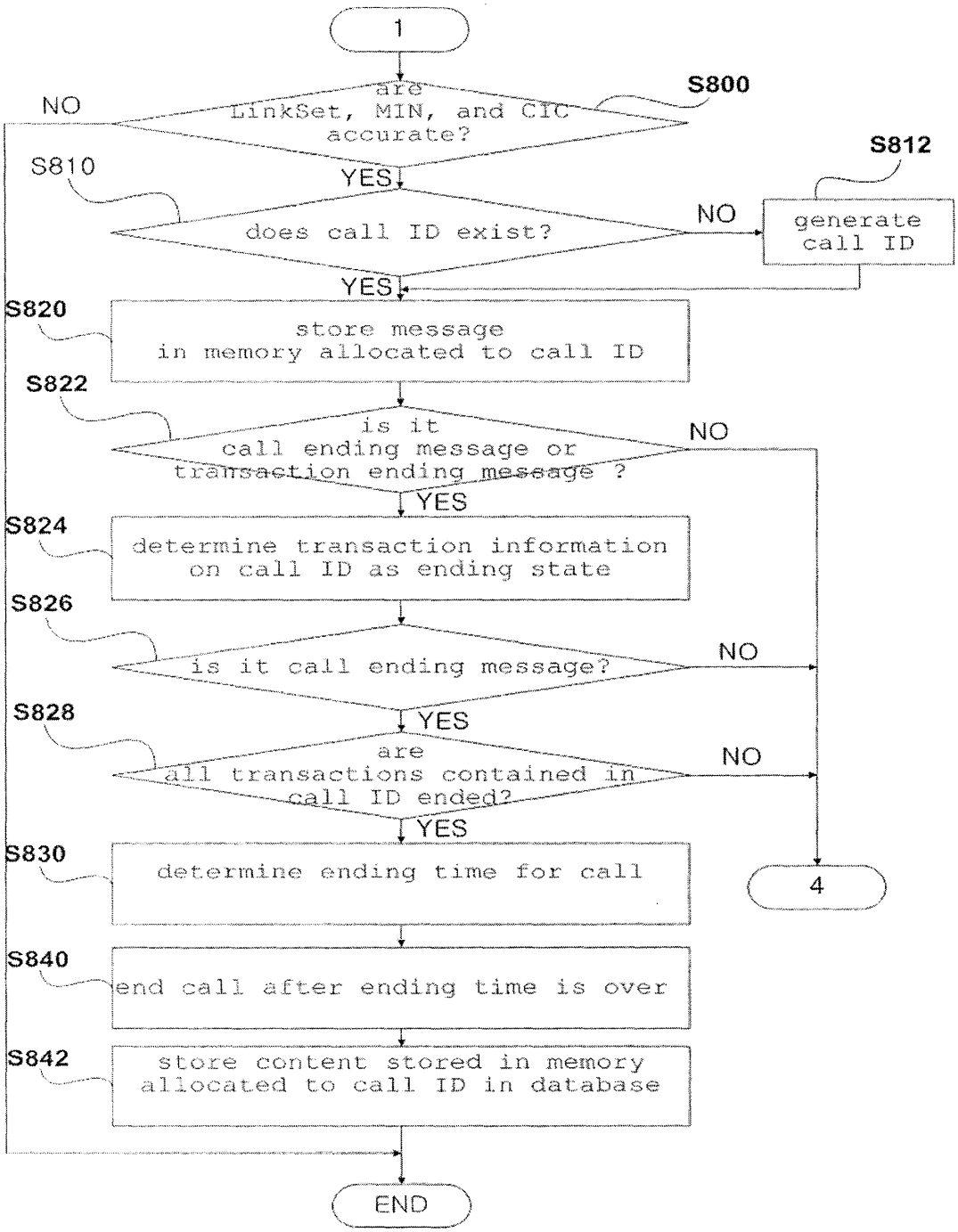
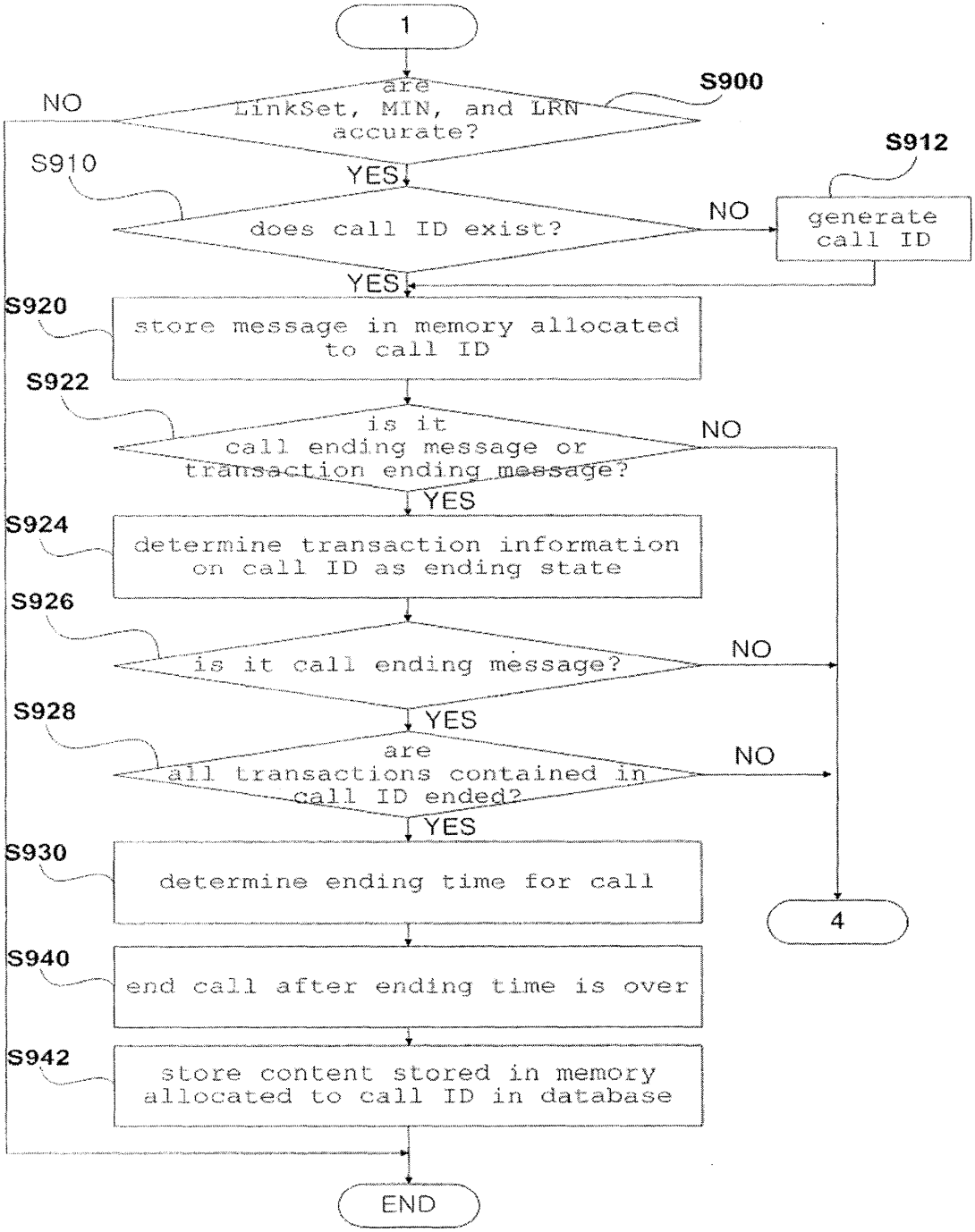
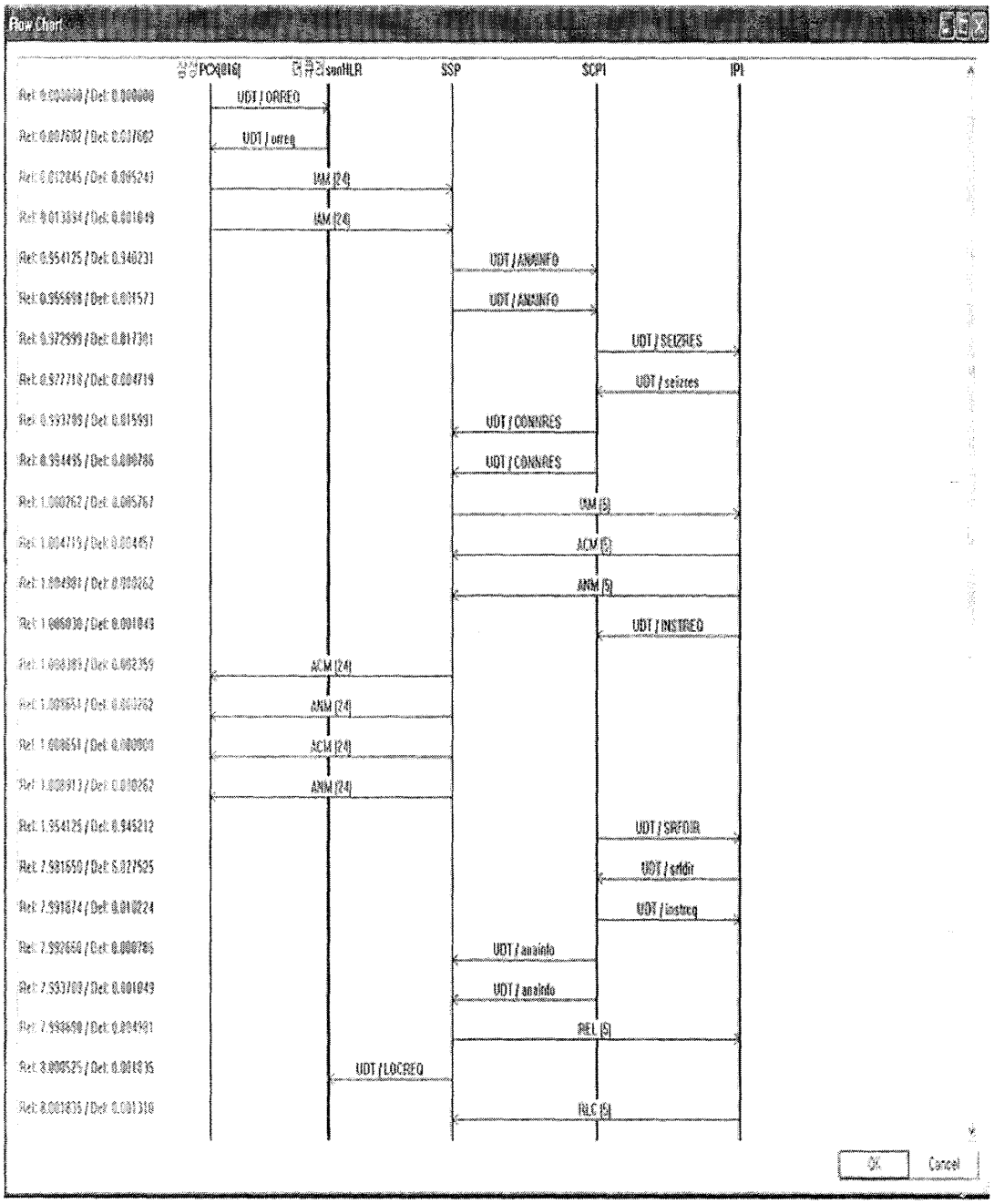

1
S800
are LinkSet, MIN, and CIC accurate?
NO
YES
S810
does call ID exist?
NO
S812
generate call ID
YES
S820
store message in memory allocated to call ID
S822
is it call ending message or transaction ending message ?
NO
YES
S824
determine transaction information on call ID as ending state
S826
is it call ending message?
NO
YES
S828
are all transactions contained in call ID ended?
NO
YES
S830
determine ending time for call
4
S840
end call after ending time is over
S842
store content stored in memory allocated to call ID in database
END

FIG. 9


1
S900
are LinkSet, MIN, and LRN accurate?
NO
YES
S910
does call ID exist?
NO
S912
generate call ID
YES
S920
store message in memory allocated to call ID
S922
is it call ending message or transaction ending message?
NO
YES
S924
determine transaction information on call ID as ending state
S926
is it call ending message?
NO
YES
S928
are all transactions contained in call ID ended?
NO
YES
S930
determine ending time for call
S940
end call after ending time is over
S942
store content stored in memory allocated to call ID in database
4
END

10/10

FIG. 10


Flow Chart
SSP
SCP1
IP1
UDT / ORREQ
UDT / orreq
IAM (24)
IAM (24)
UDT / ANNINFO
UDT / ANNINFO
UDT / SEIZRES
UDT / seizres
UDT / CONNRES
UDT / CONNRES
IAM (5)
ACM (5)
ANM (5)
UDT / INSTREQ
ACM (24)
ANM (24)
ACM (24)
ANM (24)
UDT / SRFDIR
UDT / srfdir
UDT / instreq
UDT / analdo
UDT / analdo
REL (5)
UDT / LOCREQ
RLC (5)
OK
Cancel

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2006/003036

A. CLASSIFICATION OF SUBJECT MATTER

H04Q 7/34(2006.01)i

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)
IPC8 : H04Q, H04M, H04L, G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Patents and applications for inventions since 1975

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search terms used)
eKIPASS, IEEE Xplore, Google

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-2004-0032560 A (ETRI) 17 April 2004 See claim 1 and figure 2.	1
A	KR 10-2001-0054212 A (ETRI) 2 July 2001 See abstract and figure 2.	1-10
A	KR 10-2001-0083960 A (KT) 6 September 2001 See abstract.	1-10
A	US 6,765,990 B2 (Steven Michael Freedman et al) 20 July 2004 See the whole document.	1-10

☐ 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 citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
07 DECEMBER 2006 (07.12.2006)	**11 DECEMBER 2006 (11.12.2006)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer CHUN, DAE NYUNG Telephone No. +82-42-481-5991

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR2006/003036

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 10-2004-0032560 A	17.04.2004	NONE	
KR 10-2001-0054212 A	07.02.2001	NONE	
KR 10-2001-0083960 A	06.09.2001	NONE	
US 6,765,990 B2	20.07.2004	NONE	

Electronic Acknowledgement Receipt

EFS ID:	8589537
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy inplementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	21912
Filer:	Michael J. Schallop/Veronica Pula
Filer Authorized By:	Michael J. Schallop
Attorney Docket Number:	RALEP018
Receipt Date:	08-OCT-2010
Filing Date:	02-MAR-2009
Time Stamp:	19:16:52
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	Transmittal Letter	RALEP018_IDS_Before_1st_OA.pdf	56528 360846d02c00e598c3909f3171296226f661c34e	no	2
Warnings:					
Information:					

2	Information Disclosure Statement (IDS) Filed (SB/08)	RALEP018_IDS_SB08_before_1st_OA_2_.pdf	103095 8128098e2ca59e35aeb8eb02c9782a2f34d0a87e	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Foreign Reference	RALE_Foreign_Ref_WO9965185.pdf	6077071 f063cbb3e0f18a62f5135d7984e5251b7551256c	no	49
Warnings:					
Information:					
4	Foreign Reference	RALE_Foreign_Ref_WO2007018363.pdf	1322623 37b720bd7d61efc44073aef18cbf624bab5e7d3b	no	37
Warnings:					
Information:					
		Total Files Size (in bytes):	7559317		

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	Gregory G. Raleigh	Examiner:	Not Assigned
Application No.:	12/380,773	Art Unit:	2445
Filed:	March 2, 2009	Docket No.:	RALEP018
Title:	VERIFIABLE SERVICE POLICY IMPLEMENTATION FOR INTERMEDIATE NETWORKING DEVICES		

INFORMATION DISCLOSURE STATEMENT
UNDER 37 CFR §§1.56 AND 1.97(b) BEFORE MAILING OF A FIRST OFFICE ACTION

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

Dear Sir:

The references listed in the attached PTO SB/08, may be material to examination of the above-identified patent application. Applicants disclose these references in compliance with their duty of disclosure pursuant to 37 CFR §§1.56 and 1.97. The Examiner is requested to make these references of official record in this application. Copies of the cited references are provided to the extent required by 37 CFR §1.98 and any applicable waivers.

This Information Disclosure Statement is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that these references indeed constitute prior art.

This Information Disclosure Statement is being filed (1) with the above-referenced application or (2) within three months of the filing date of the above-referenced application or (3) before the mailing date of a first Office Action on the merits or (4) before the mailing date of a first Office Action after filing of a Request for Continued Examination. Accordingly, it is believed that no fees are due in connection with the filing of this Information Disclosure Statement. However, if it is determined that any fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-0685 (Order No. RALEP018).

Respectfully submitted,
VAN PELT, YI & JAMES LLP

/Michael J. Schallop/

Michael J. Schallop
Registration No. 44,319
V (408) 207-4762
F (408) 973-2595

10050 N. Foothill Blvd, Ste 200
Cupertino, CA 95014

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.
12/380,773	03/02/2009	Gregory G. Raleigh	RALEP018	5719

21912 7590 02/03/2011

VAN PELT, YI & JAMES LLP
10050 N. FOOTHILL BLVD #200
CUPERTINO, CA 95014

EXAMINER	
CHANKONG, DOHM	
ART UNIT	PAPER NUMBER
2452	

NOTIFICATION DATE	DELIVERY MODE
02/03/2011	ELECTRONIC

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

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

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

usptocorrespondence@ip-patent.com

Office Action Summary	Application No.	Applicant(s)	
	12/380,773	RALEIGH, GREGORY G.	
	Examiner	Art Unit	
	DOHM CHANKONG	2452	

-- 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 *02 March 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

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

Priority under 35 U.S.C. § 119

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

a)☐ All b)☐ Some * c)☐ None of:

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

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

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

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

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/1/2010, 7/1/2010, 7/1/2010, 10/8/2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This non-final rejection is in response to Applicant's submission filed on 3/2/2009. Applicant presents claims 1-32 for examination.

I. INFORMATION DISCLOSURE STATEMENT

The examiner has considered the information disclosure statements filed on 7/1/2010 and 10/8/2010.

II. DOUBLE PATENTING

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., In re Berg, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

A. Claims 1-12 and 14-20 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-19 of copending Application No. 12/380769 ["'769 application"].

Although the conflicting claims are not identical, they are not patentably distinct from each other because the differences between them are obvious and not novel. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Instant application 12/380773	'769 application
Claim 1. A system, comprising: a processor of an intermediate networking device configured to: act as a service intermediary or intermediate connection between a first network and one or more communications devices;	**Claim 1**. A system, comprising: a processor of an intermediate networking device configured to: provide a service intermediary or intermediate connection between a first network and one or more communications devices;

implement a first service policy set for assisting control of the intermediate networking device use of a first service set on the first network, the first service policy set including one or more first service policies associated with the intermediate networking device or the one or more communications devices connected to the intermediate networking device, the first service set being one or more first network services used by the intermediate networking device or the one or more communications devices; and	implement a first service profile set for assisting control of the intermediate networking device use of a first service set on the first network, wherein the first service profile set includes one or more service profiles, each profile being associated with either the intermediate networking device or a communications device, each profile including a plurality of service policy settings;
monitor use of the first service set based on the first service policy set; and	monitor use of the first service set based on the first service profile set; and
a memory of the intermediate networking device coupled to the processor and configured to provide the processor with instructions, wherein the implementation of the first service policy set is verified.	a memory of the intermediate networking device coupled to the processor and configured to provide the processor with instructions, wherein the implementation of the first service profile set is verified.

While claim 1 of the instant application recites "service policies," claim 1 of the '769 application recites "service profiles." This minor difference in claim language does not render the claims patentably distinct because the terms have the same functionality.

Claims 2-12 of the instant application have identical claim language as claims 2-12 of the '769 application and therefore are not patentably distinct. Claims 14-20 of the instant application have identical claim language as claims 13-19 of the '769 application and therefore are not patentably distinct.

B. Claims 1-8 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8 of copending Application No. 12/380774 ["'774 application"].

Instant application 12/380773	'774 application
Claim 1. A system, comprising:	**Claim 1**. A system, comprising:
a processor of an intermediate networking device configured to:	a processor of an intermediate networking device configured to:
act as a service intermediary or intermediate connection between a first network and one or more communications devices;	provide a service intermediary or intermediate connection between a first network and one or more communications devices;
implement a first service policy set for assisting control of the intermediate networking device use of a first service set on the first network, the first service policy set including one or more first service policies	implement a first service policy set for assisting control of the intermediate networking device use of a first service on the first network, wherein the first service policy set includes one or more service policies, each

associated with the intermediate networking device or the one or more communications devices connected to the intermediate networking device, the first service set being one or more first network services used by the intermediate networking device or the one or more communications devices; and	policy being associated with either the intermediate networking device or a communications device; and
monitor use of the first service set based on the first service policy set; and	monitor use of the first service based on the first service policy set; and
a memory of the intermediate networking device coupled to the processor and configured to provide the processor with instructions, wherein the implementation of the first service policy set is verified.	a memory of the intermediate networking device coupled to the processor and configured to provide the processor with instructions, wherein the one or more of the communication devices include a service usage notification capability, and the implementation of the first service policy set is verified.

Claim 1 of the instant application recites a first service set that is one or more first network services while claim 1 of the ‘774 application simply recites a first service. Claim 1 of the '774 application also recites additional language relating to a service usage notification

capability. This language is found in claim 11 of the instant application. The differences between claim 1 of the instant application and claim 1 of the '774 application are obvious.

Claims 2-8 of the instant application have identical claim language as claims 2-8 of the '774 application and therefore are not patentably distinct.

C. Claims 1-8, 19, and 20 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8, 21, and 22 of copending Application No. 12/380771 ["'771 application"].

Instant application 12/380773	'771 application
Claim 1. A system, comprising:	**Claim 1**. A system, comprising:
a processor of an intermediate networking device configured to:	a processor of an intermediate networking device configured to: provide a service
act as a service intermediary or intermediate connection between a first network and one or more communications devices;	intermediary or intermediate connection between a first network and one or more communications devices;
implement a first service policy set for assisting control of the intermediate networking device use of a first service set on the first network, the first service policy set including one or more first service policies associated with the intermediate networking device or the one or more communications devices connected to the intermediate	implement a first service policy set for assisting control of the intermediate networking device use of a first service on the first network, wherein the first service policy set includes one or more service policies, each policy being associated with either the intermediate networking device or a communications device; and

networking device, the first service set being one or more first network services used by the intermediate networking device or the one or more communications devices; and	
monitor use of the first service set based on the first service policy set; and	monitor use of the first service based on the first service policy set; and
a memory of the intermediate networking device coupled to the processor and configured to provide the processor with instructions, wherein the implementation of the first service policy set is verified.	a memory of the intermediate networking device coupled to the processor and configured to provide the processor with instructions, wherein the implementation of the first service policy set is verified.

Claim 1 of the instant application recites a first service set that is one or more first network services while claim 1 of the ‘771 application simply recites a first service. The differences between claim 1 of the instant application and claim 1 of the ‘771 application are obvious. Similar remarks apply to claims 19 and 20 of the instant application and claims 21 and 22 of the '771 application.

Claims 2-8 of the instant application have identical claim language as claims 2-8 of the '771 application and therefore are not patentably distinct.

III. CLAIM REJECTIONS – 35 U.S.C. § 101

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.

A. Claim 20 is rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter.

Claim 20 is directed to a computer program product being embodied in a computer readable storage medium which, given its broadest reasonable interpretation, would typically covers forms of non-transitory tangible media and transitory propagating signals per se in view of the ordinary and customary meaning of computer readable media. When the broadest reasonable interpretation of a claim covers a signal per se, the claim must be rejected under 35 U.S.C. § 101 as covering non-statutory subject matter.

A claim drawn to such a computer readable medium (or the like) that covers both transitory and non-transitory embodiments may be amended to narrow the claim to cover only statutory embodiments to avoid a rejection under 35 U.S.C. § 101 by adding the limitation "non-transitory" to the claim. Such an amendment would typically not raise the issue of new matter, even when the specification is silent because the broadest reasonable interpretation relies on the ordinary and customary meaning that includes signals per se.

IV. CLAIM REJECTIONS – 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

A. Claims 1-8, 13, 19-27, 29, and 31 are rejected under 35 U.S.C. § 102(b) as being anticipated by Klinker et al., U.S. Patent Publication No. 20030088671 ["Klinker"].

Claims 1, 19, and 20

As to claim 1, Klinker discloses a system, comprising:

a processor of an intermediate networking device [0049: disclosing a router (i.e., intermediate networking device) may implement Klinker's flow control system (i.e., processor)] configured to:

act as a service intermediary or intermediate connection between a first network and one or more communications devices [Fig. 1c | 0051: disclosing the router may connect service providers to users (i.e., communication devices)];

implement a first service policy set for assisting control of the intermediate networking device use of a first service set on the first network [0049, 0054, 0056: disclosing the flow control system (which may be implemented in a router) is responsible for implementing and enforcing flow control policies (i.e., first service policy set) of a particular data flow (i.e., first service set)], the first service policy set including one or more first service policies associated with the intermediate networking device or the one or more communications devices connected to the intermediate networking device [0054:

the flow control policies are associated with a data flow related to a particular user device (i.e., communication devices)], the first service set being one or more first network services used by the intermediate networking device or the one or more communications devices [0054, 0056: the flows relate to data flows over a network connection (i.e., service used by the user device)]; and

monitor use of the first service set based on the first service policy set [0059: disclosing a controller that monitors flow characteristics as well as flow policies to be enforced]; and

a memory of the intermediate networking device coupled to the processor and configured to provide the processor with instructions [Fig. 2 «item 218»: disclosing a flow control system comprising a memory, 218 | 0049: disclosing that the flow control system is implemented in the router (i.e., intermediate networking device)],

wherein the implementation of the first service policy set is verified [0018: the system continuously detects violations (i.e., verifies) to a user's flow policy | 0056: the flow control system verifies that the network usage is within limits set by the service policies].

Claims 19 and 20 are rejected for at least the same reasons set forth for claim 1.

Claim 2

Klinker discloses wherein the one or more communications device include one or more mobile communications devices [0042: disclosing a palmtop or laptop], and the one or more first network services include one or more Internet based services [0015: disclosing Internet users].

Claim 3

Klinker discloses wherein the one or more communications device include one or more of the following: a mobile phone, a PDA [0042: disclosing a palmtop], an eBook reader, a music device, an entertainment/gaming device, a computer, laptop, a netbook, a home networking system, and a modem or communications device supporting machine to machine communications.

Claim 4

Klinker discloses wherein the intermediate networking device communicates, forwards, routes, passes or bridges network communications between the first network and one or more of the communications devices [0051: the router provides communications between users and multiple network service providers (i.e., first network)].

Claim 5

Klinker discloses wherein the intermediate networking device includes a first modem to connect with the first network and a second modem to connect with the one or more communications devices [Fig. 3: illustrating that the router is connected to a first network and users | 0051: disclosing that the router connects the users to multiple network providers. It is therefore inherent that the router has communications means to both the users and the network providers].

Claim 6

Klinker discloses wherein the intermediate networking device includes a first modem to connect with the first network and a second modem to connect with the one or more communications devices, and wherein the first modem communicates using one or more of the

following communication protocols: WiFi, WWAN, Bluetooth [0046: disclosing a radio wave transmission. It is well known in the art that Bluetooth is a type of radio wave transmission], Ziggby, satellite, DSL, and DOCSIS/cable [0004: disclosing xDSL and cable connections].

Claim 7

Klinker discloses wherein the intermediate networking device includes a first modem to connect with the first network and a second modem to connect with the one or more communications devices, and wherein the second modem communicates using one or more of the following communication protocols: WiFi, WWAN, Bluetooth [0046: disclosing a radio wave transmission. It is well known in the art that Bluetooth is a type of radio wave transmission], Ziggby, satellite, DSL, and DOCSIS/cable [0004: disclosing xDSL and cable connections].

Claim 8

Klinker discloses wherein the intermediate networking device includes one or more of the following: a WWAN to WiFi bridge or router, a femto cell, a wired WAN access router or gateway [0046: disclosing wired Ethernet connection], a DSL modem, a cable modem router, a gateway [0051: disclosing the router may include other routers running BGP], a satellite modem router or gateway, a cell phone, a handheld device, and a computer.

Claim 13

Klinker discloses wherein the processor of the intermediate networking device is further configured to:

execute a service processor, wherein the service processor implements a first service policy set for assisting control of the intermediate networking device use of a first service set on

a first network, and the service processor is stored on the intermediate networking device [0049: disclosing that the flow control system is implemented in the router (i.e., intermediate networking device) where the controller of the control system reads on the claimed service processor].

Claim 21

Klinker discloses a system, comprising:

a processor of an intermediate networking device [0049: disclosing a router (i.e., intermediate networking device) may implement Klinker's flow control system (i.e., processor)] configured to:

provide a service intermediary or intermediate connection between a first network and one or more communications devices [Fig. 1c | 0051: disclosing the router may connect service providers to users (i.e., communication devices)];

implement a first service policy set for assisting control of the intermediate networking device use of a first service set on a first network, wherein the first service policy set includes a plurality of service policies associated with the intermediate networking device or the one or more communications devices connected to the intermediate networking device [0049, 0054, 0056: disclosing the flow control system (which may be implemented in a router) is responsible for implementing and enforcing flow control policies (i.e., first service policy set) of a particular data flow (i.e., first service set)], and the first service set including one or more first network services used by the intermediate networking device or the one or more communications devices [0054,

0056: the flows relate to data flows over a network connection (i.e., service used by the user device)]; and

collect a plurality of service usage measurements for the one or more communications devices use of the first service set on the first network [0018: disclosing user statistics collection | 0064: disclosing a usage collector];

compare the plurality of service usage measurements to the first service policy set [0019, 0131; disclosing the flow control system compare requirements with monitored usage characteristics]; and

a memory of the communications device coupled to the processor and configured to provide the processor with instructions [Fig. 1B «items 28, 42»].

Claim 22

Klinker discloses wherein the plurality of service usage measurements include network based service usage information [0131: disclosing monitored performance and usage characteristics].

Claim 23

Applicant's specification defines a "CDR" as follows: "…CDRs, which as used herein refer to any network measure of service usage or service activity for voice and/or data traffic" [pg. 22, 0096]. Based on this definition, Klinker discloses wherein the plurality of service usage measurements include CDRs [[0131: disclosing monitored performance and usage characteristics].

Claim 24

Klinker discloses wherein the plurality of service usage measurements include device network assisted service usage information [0115: disclosing that distributed agents assist in the monitoring and provide collected usage information].

Claim 25

Klinker discloses wherein the processor of the intermediate networking device is further configured to:

monitor use of the first service set based on the first service policy set [0019].

Claim 26

Klinker discloses wherein the processor of the intermediate networking device is further configured to:

monitor use of the first service set based on the first service policy set [0019]; and

compare the plurality of service usage measurements to the monitored use [0019].

Claim 27

Klinker discloses the processor of the intermediate networking device is further configured to:

collect network based service usage information from a network device [0115: collecting usage information from a distributed agent]; and

compare the plurality of service usage measurements to the network based service usage information [0019, 00116].

Claim 29

Klinker discloses wherein the processor of the intermediate networking device is further configured to:

monitor use of the first service set based on the first service policy set [0019]; and

report service usage to a network device, wherein the report includes the monitored use and service usage information collected from the one or more communications devices [0017, 0052].

Claim 31

Klinker discloses wherein the processor of the intermediate networking device is further configured to:

monitor use of the first service set based on the first service policy set for each of the one or more communications devices, wherein each of the one or communications device is associated with a unique IP traffic flow [0054: disclosing that a particular data traffic flow is related to a particular IP address];

collect CDRs for service usage for each of the one or more communications devices [0080: collecting usage reports for each device]; and

compare the monitored use to the collected CDRs for each of the one or more communications devices [0131: comparing monitored usage with SLA requirements].

V. CLAIM REJECTIONS – 35 U.S.C. § 103

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

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

A. Claims 9-12, 14-18, and 28 are rejected under 35 U.S.C. § 103 as being unpatentable over Klinker in view of Pandya et al., U.S. Patent Publication No. 2004|0103193 ["Pandya"].

Claim 9

Klinker as modified by Pandya discloses wherein a first service processor is located on a first communications device in communication with the intermediate networking device [Pandya, Fig. 2 «items 12, 18» | 0030, 0031: disclosing communications devices connected to a router (i.e., intermediate networking device) | Fig. 13 «item 200»: disclosing an agent (i.e., service processor) located on a client communication device] and wherein the service processor implements the first service policy set for assisting control of the intermediate networking device use of the first service set on the first network [Klinker, 0115: disclosing that the flow analyzer may be distributed to flow agents which monitor and convey individual flow statistics & Pandya, Fig. 13 | 0040: disclosing that agents may be distributed into client communication devices | 0055: the agent modules monitor the activities of its associated device].

As noted in the foregoing mapping, while Klinker discloses distributing the flow analyzer (i.e., service processor) to agents in a network, he does not expressly disclose that the agents are located on a first communications device such as a client computer. However, such a feature was well known in the art at the time of Applicant's invention as evidenced by Pandya.

Like Klinker, Pandya is directed to a system for monitoring Internet usage over a network [Pandya, abstract]. Also like Klinker, Pandya discloses that the monitoring feature may be implemented in distributed agents (i.e., service processor) across a network which aid in enforcement of network policies [Pandya, 0040]. Pandya further discloses that the agents may be specifically implemented into a first communication device such as a client computer [0040].

It would have been obvious to one of ordinary skill in the art to have modified Klinker's agents and implemented them within client computers to aid in the enforcement of network policies. Such a modification to Klinker's agents is an example of using a known technique (Pandya's implementation of agents in client computers) to improve similar systems (Klinker's distributed agents) in the same way (at paragraph 12, Pandya discloses that implementing agents at user computers improves prior art monitoring systems by providing more accurate measurements of user response times). See MPEP § 2143.

Claim 10

Klinker discloses wherein a first portion of a first service processor is located on a first communications device in communication with the intermediate networking device, and a second portion of the first service processor is located on the intermediate networking device [Klinker, 0049, 0115: disclosing distributing the flow analyzer between the router and distributed agents & Pandya, 0040: disclosing agents may be implemented in client devices],, and wherein the service processor implements the first service policy set for assisting control of the intermediate networking device use of the first service set on the first network [Klinker, 0049, 0115: the distributed analyzers work together to enforce the usage policy].

See the rejection of claim 9 for reasons to combine Klinker and Pandya.

Claim 11

Klinker as modified by Pandya discloses wherein a first portion of a first service processor is located on a first communications device in communication with the intermediate networking device for service usage monitoring [Pandya, 0040: disclosing an agent (i.e., first portion of a first service processor) implemented on a client device (i.e., communications device) for enforcing system policies. The agents are part of a distributed system and therefore can be considered a "portion" of the distributed monitoring system] or service usage notification assistance or billing assistance, and a second portion of the first service processor is located on the intermediate networking device [Klinker, 0049, 0115: disclosing distributing the flow analyzer between the router and distributed agents], and wherein the service processor implements the first service policy set for assisting control of the intermediate networking device use of the first service set on the first network [Klinker, 0049, 0115: the distributed analyzers work together to enforce the usage policy].

See the rejection of claim 9 for reasons to combine Klinker and Pandya.

Claim 12

Klinker as modified by Pandya discloses wherein a first service processor is located on a first communications device in communication with the intermediate networking device [Pandya, 0040: disclosing an agent (i.e., first service processor) implemented on a client device (i.e., communications device) for enforcing system policies], and a second service processor is located on the intermediate networking device [Klinker, 0049, 0115: disclosing distributing the flow analyzer between the router and distributed agents], and wherein the first service processor implements the first service policy set for assisting control of the intermediate networking device

use of the first service set on the first network [Pandya, 0040], and the second service processor implements a second service policy set for assisting control of the intermediate networking device use of the first service set on the first network [Klinker, 0115, 0116: determining whether policy violations are occurring].

See the rejection of claim 9 for reasons to combine Klinker and Pandya.

Claim 14

Klinker as modified by Pandya discloses wherein the processor of the intermediate networking device is further configured to :

verify the implementation of the first service policy using a first service processor located on a first communications device [Pandya, 0040: disclosing that the distributed agents help control points to enforce system policies].

See the rejection of claim 9 for reasons to combine Klinker and Pandya.

Claim 15

Klinker as modified by Pandya discloses wherein the processor of the intermediate networking device is further configured to:

verify the implementation of the first service policy using a first service processor located on a first communications device if more than one user or communications device is communicating with the intermediate networking device [Pandya, Figs. 2, 4: disclosing multiple client devices connected to the router | 0055: the agent modules monitor the activities of its associated device].

See the rejection of claim 9 for reasons to combine Klinker and Pandya.

Claim 16

Klinker as modified by Pandya discloses the processor of the intermediate networking device is further configured to:

verify the implementation of the first service policy using a first service processor located on a first communications device [Klinker, 0115 & Pandya, 0055]; and

verify an implementation of a second service policy using a second service processor located on a second communications device [Klinker, 0115 & Pandya, 0055: disclosing that each agent is only responsible for the device on which it's implemented].

See the rejection of claim 9 for reasons to combine Klinker and Pandya.

Claim 17

Klinker as modified by Pandya discloses wherein the processor of the intermediate networking device is further configured to:

collect first service usage information from a first service processor executed on a first communications device to assist the monitored use of the first service [Pandya, 0055: the agents on the devices collect status and activities of the device to help in the enforcement of system policies].

See the rejection of claim 9 for reasons to combine Klinker and Pandya.

Claim 18

Klinker as modified by Pandya discloses wherein the processor of the intermediate networking device is further configured to:

collect first service usage information from a first service processor executed on a first communications device to assist the monitored use of the first service if more than one user or

communications device is communicating with the intermediate networking device [Pandya, Figs. 2, 4: disclosing multiple client devices connected to the router | 0055: the agent modules monitor the activities of its associated device].

See the rejection of claim 9 for reasons to combine Klinker and Pandya.

Claim 28

Klinker as modified by Pandya discloses the processor of the intermediate networking device is further configured to:

collect first service usage information from a first communications device [Klinker, 0115 & Pandya, 0040]; and

compare the plurality of service usage measurements to the first service usage information [Klinker, 0019, 0116].

See the rejection of claim 9 for reasons to combine Klinker and Pandya.

B. Claims 30 and 32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Klinker in view of Anderholm et al., U.S. Patent Publication No. 2005|0183143 ["Anderholm"].

Claim 30

Klinker as modified by Anderholm discloses wherein the processor of the intermediate networking device is further configured to:

monitor use of the first service set based on the first service policy set [Klinker, 0019]; and

report the monitored use to a network device [Klinker, 0052], wherein the report is encrypted or communicated using a secure protocol [Anderholm, 0045].

It would have been obvious to one of ordinary skill in the art to have modified Klinker's usage reports by encrypting them as taught in Anderholm. Such a modification to Klinker's usage reports would enable secure transmissions of the reports.

Claim 32

Klinker as modified by Anderholm discloses wherein the processor of the intermediate networking device is further configured to:

receive a downloaded new service processor [Anderholm, 0210: agents may be deployed to the user computers or network]; and

install the new service processor [Anderholm, 0148].

Klinker does not expressly disclose receiving and installing new agents. However, such a feature was well known in the art at the time of Applicant's invention as evidenced by Anderholm.

Like Klinker, Anderholm discloses a system for monitoring network usage and enforcing system policies [Anderholm, 0008]. Also like Klinker, Anderholm further discloses distributing monitoring agents across a network to perform the usage collection task [Anderholm, 0148]. Anderholm further discloses deploying (i.e., receiving at the user computer) and installing the agent at a computer.

It would have been obvious to one of ordinary skill in the art to have modified Klinker's usage monitoring system and distributed agents [Klinker, 0115] to include the functionality taught by Anderholm. Such a modification is an example of using a known technique (Anderholm's deployment of remote agents to client computers) to improve similar systems

(Klinker's distributed agents) in the same way (Klinker's system modified to enable downloading and installation of agents at client computers). See MPEP § 2143.

VI. CONCLUSION

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See attached PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DOHM CHANKONG whose telephone number is (571)272-3942. The examiner can normally be reached on Monday to Friday [10 am - 6 pm].

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thu Nguyen can be reached on (571)272-6967. 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.

/DOHM CHANKONG/
Primary Examiner, Art Unit 2452

Notice of References Cited	Application/Control No. 12/380,773	Applicant(s)/Patent Under Reexamination RALEIGH, GREGORY G.	
	Examiner DOHM CHANKONG	Art Unit 2452	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2003/0088671	05-2003	Klinker et al.	709/225
*	B	US-2004/0103193	05-2004	Pandya et al.	709/224
*	C	US-2005/0183143	08-2005	Anderholm et al.	726/022
*	D	US-2006/0085543	04-2006	Hrastar et al.	709/224
*	E	US-2008/0059474	03-2008	Lim, Keng	707/009
*	F	US-2008/0066149	03-2008	Lim, Keng	726/001
*	G	US-2008/0066150	03-2008	Lim, Keng	726/001
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S15	46	distribut$5 with (monitor $3) with (usage) same (polic$3)	US-PGPUB; USPAT	OR	ON	2011/01/27 14:28
S16	32	((user client) near3 device) with (monitor $3) with (usage) same (polic$3)	US-PGPUB; USPAT	OR	ON	2011/01/27 14:29
S18	29	((user client) near3 device) with (collect$3 monitor$3) with (usage) same (polic$3) not S16	US-PGPUB; USPAT	OR	ON	2011/01/27 14:31
S17	61	((user client) near3 device) with (collect$3 monitor$3) with (usage) same (polic$3)	US-PGPUB; USPAT	OR	ON	2011/01/27 14:31
S19	79	((user client) near3 device) with (collect$3 monitor$3) with (usage activity) and (polic$6) with (usage activity) and (distribut$5) with (monitor $3 collect$5)	US-PGPUB; USPAT	OR	ON	2011/01/27 14:32

S20	6	raleigh.inv. and (collect$3 and compar$3). clm.	US-PGPUB; USPAT	OR	ON	2011/01/27 15:25
L1	58	((user client) near3 device) with (collect$3 monitor$3) with (usage activity) and (polic$6) with (usage activity) and (download$3 install$5) with (agent)	US-PGPUB; USPAT	OR	ON	2011/01/28 10:07
L2	30	((user client) near3 device) with (collect$3 monitor$3) with (usage activity) and (polic$6) with (usage activity) and (download$3 and install$5) with (agent)	US-PGPUB; USPAT	OR	ON	2011/01/28 10:08
L4	32	agent with (collect$3 monitor$3) with (usage activity) and (polic$6) with (usage activity) and (download$3 and install$5) with (agent) not l2	US-PGPUB; USPAT	OR	ON	2011/01/28 10:09

L3	62	agent with (collect$3 monitor$3) with (usage activity) and (polic$6) with (usage activity) and (download$3 and install$5) with (agent)	US-PGPUB; USPAT	OR	ON	2011/01/28 10:09
L6	27	agent with (collect$3 monitor$3) with (usage activity) and (polic$6) with (usage activity) and (receiv$3 and install$5) with (agent) not l2 not l4	US-PGPUB; USPAT	OR	ON	2011/01/28 10:10
L5	57	agent with (collect$3 monitor$3) with (usage activity) and (polic$6) with (usage activity) and (receiv$3 and install$5) with (agent) not l2	US-PGPUB; USPAT	OR	ON	2011/01/28 10:10
L7	6	agent with (collect$3 monitor$3) with (usage activity) and (polic$6) with (usage activity) and (new and install$5) near3 (agent) not l2 not l4	US-PGPUB; USPAT	OR	ON	2011/01/28 10:11

EAST Search History (Interference)

<This search history is empty>

1/28/2011 10:34:14 AM
C:\Documents and Settings\dchankong\My Documents\EAST\Workspaces\12380773.wsp

PTO/SB/08 (08-03)

Substitute for form 1449/PTO				Complete if Known	
Information Disclosure Statement By Applicant *(Use as many sheets as necessary)*				Application No.:	12/380,773
				Filing Date	March 2, 2009
				First Named Inventor	Gregory G. Raleigh
				Art Unit	2445
				Examiner Name	Not Assigned
Sheet	1	of	4	Atty Docket No.	RALEP018

U.S. Patent Documents					
Examiner Initials	CiteNo.	Document Number Number-Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A.	US 2006/0048223	03-02-2006	LEE et al.	
	B.	US 6,965,667	11-15-2005	TRABANDT et al.	
	C.	US 2008/0268813	10-13-2008	Stephane H. Maes	
	D.	US 2007/0255848	11-01-2007	SEWALL et al.	
	E.	US 2008/0039102	02-14-2008	SEWALL et al.	
	F.	US 2006/0233108	10-19-2006	Murali R. Krishnan	
	G.	US 5,892,900	04-06-1999	GINTER et al.	
	H.	US 7,403,763	07-22-2008	Stephane H. Maes	
	I.	US 7,317,699	01-08-2008	GODFREY et al.	
	J.	US 7,353,533	04-1-2008	WRIGHT et al.	
	K.	US 7,322,044	01-22-2008	Scott E. Hrastar	
	L.	US 7,058,968	06-06-2006	ROWLAND et al.	
	M.	US 7,042,988	05-09-2006	JUITT et al.	
	N.	US 7,418,253	08-26-2008	Alan Kavanah	
	O.	US 7,242,920	04-10-2007	Robert P. Morris	
	P.	US 6,148,336	11-14-2000	THOMAS et al.	
	Q.	US 7,317,699	01-08-2008	GODFREY et al.	
	R.	US 7,325,037	01-29-2008	Karen L. Lawson	
	S.	US 6,141,686	10-31-2000	JACKOWSKI et al.	
	T.	US 2004/0044623	03-04-2004	WAKE et al.	
	U.	US 2006/0040642	02-23-2006	BORIS et al.	
	V.	US 2008/0229388	09-18-2008	Stephane H. Maes	
	W.	US 2008/0120688	05-22-2008	QIU et al.	
	X.	US 2003/0236745	12-25-2003	HARTSELL et al.	
	Y.	US 2008/0052387	02-28-2008	HEINZ et al.	
	Z.	US 2004/0019539	01-29-2004	RAMAN et al.	
	AA.	US 2004/0236547	11-25-2004	RAPPAPORT et al.	
	BB.	US 2002/0199001	12-26-2002	WENOCUR et al.	
	CC.	US 2004/0073672	04-15-2004	Fascenda	
	DD.	US 2006/0143098	06-29-2006	Lazaridis	
	EE.	US 6,098,878	08-08-2000	DENT et al.	
	FF.	US 2004/0198331	10-07-2004	COWARD et al.	
	GG.	US 2003/0004937	01-02-2003	SALMENKAITA et al.	
	HH.	US 2005/0107091	05-19-2005	VANNITHAMBY et al.	
	II.	US 2003/0224781	12-04-2003	MILFORD et al.	
	JJ.	US 2008/0189760	08-07-2008	ROSENBERG et al.	
	KK.	US 2005/0246282	11-03-2005	NASLUND et al.	
	LL.	US 2008/0316923	12-25-2008	FEDDERS et al.	
	MM.	US 2006/0026679	02-02-2006	Zakas	
	NN.	US 2008/0082643	04-03-2008	STORRIE et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /D.C./

PTO/SB/08 (08-03)

Substitute for form 1449/PTO				Complete if Known	
Information Disclosure Statement By Applicant *(Use as many sheets as necessary)*				Application No.:	12/380,773
				Filing Date	March 2, 2009
				First Named Inventor	Gregory G. Raleigh
				Art Unit	2445
				Examiner Name	Not Assigned
Sheet	2	of	4	Atty Docket No.	RALEP018

	OO.	US 2007/0140275	06-21-2007	BOWMAN et al.	
	PP.	US 2003/0182435	09-25-2003	REDLICH et al.	
	QQ.	US 6,263,055	07-17-2001	GARLAND et al.	
	RR.	US 5,940,472	08-17-1999	NEWMAN et al.	
	SS.	US 2008/0318550	12-25-2008	Deatley	
	TT.	US 2008/0298230	12-01-2008	LUFT et al.	
	UU.	US 2007/0220251	09-20-2007	ROSENBERG et al.	
	VV.	US 2007/0100981	05-03-2007	ADAMCZYK et al.	
	WW.	US 2007/0022289	01-25-2007	ALT et al.	
	XX.	US 2008/0095339	04-24-2008	ELLIOTT et al.	
	YY.	US 2006/0233166	10-19-2006	BOU-DIAB et al.	
	ZZ.	US 2008/0168523	07-10-2008	ANSARI et al.	
	AAA.	US 2006/0183462	08-17-2006	KOLEHAINEN et al.	
	BBB.	US 2006/0165060	07-27-2006	Dua	
	CCC.	US 2008/0177998	07-24-2008	APSANGI et al.	
	DDD.	US 2008/0064367	03-13-2008	NATH et al.	
	EEE.	US 2004/0168052	08-26-2004	CLISHAM et al.	
	FFF.	US 2005/0198377	09-08-2005	FERGUSON et al.	
	GGG.	US 2005/0216421	09-29-2005	BARRY et al.	
	HHH.	US 2006/0218395	09-28-2006	Maes	
	III.	US 2005/0055309	03-10-2005	WILLIAMS et al.	
	JJJ.	US 2003/0050837	03-13-2003	Kim	
	KKK.	US 2005/0266825	12-01-2005	Clayton	
	LLL.	US 2006/0178917	08-10-2006	Mikurak	
	MMM.	US 2007/0055694	03-08-2007	RUGE et al.	
	NNN.	US 2005/0097516	05-05-2005	DONNELLY et al.	
	OOO.	US 7,356,337	04-08-2008	Florence	
	PPP.	US 2007/0019670	01-25-2007	Falardeau	
	QQQ.	US 2004/0127200	07-01-2004	SHAW et al.	
	RRR.	US 2005/0166043	07-28-2005	ZHANG et al.	
	SSS.	US 7,349,695	03-25-2008	OOMMEN et al.	
	TTT.	US 2004/0098715	05-20-2004	AGHERA et al.	
	UUU.	US 2006/0072646	04-06-2006	FEHER et al.	
	VVV.	US 2006/0206904	09-14-2006	WATKINS et al.	
	WWW.	US 2005/0060266	03-17-2005	DEMELLO et al.	
	XXX.	US 6,047,268	04-04-2000	BARTOLI et al.	
	YYY.	US 6,639,975	10-28-2003	O'NEAL et al.	
	ZZZ.	US 6,539,082	03-25-2003	LOWE et al.	
	AAAA.	US 2008/0134330	06-05-2008	KAPOOR et al.	
	BBBB.	US 2004/0047358	03-11-2004	CHEN et al.	
	CCCC.	US 2007/0274327	11-29-2007	KAARELA et al.	
	DDDD.	US 2003/0161265	08-28-2003	CAO et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /D.C./

PTO/SB/08 (08-03)

Substitute for form 1449/PTO				Complete if Known	
Information Disclosure Statement By Applicant *(Use as many sheets as necessary)*				Application No.:	12/380,773
				Filing Date	March 2, 2009
				First Named Inventor	Gregory G. Raleigh
				Art Unit	2445
				Examiner Name	Not Assigned
Sheet	3	of	4	Atty Docket No.	RALEP018

	EEEE.	US 2008/0305793	12-11-2008	GALLAGHER et al.	
	FFFF.	US 2008/0083013	04-03-2008	SOLIMAN et al.	
	GGGG.	US 2004/0030705	02-12-2004	BOWMAN-AMUAH et al.	
	HHHH.	US 6,574,321	06-03-2003	COX et al.	
	IIII.	US 2006/0291477	12-28-2006	CROAK et al.	
	JJJJ.	US 2005/0266880	12-01-2005	Gupta	
	KKKK.	US 2003/0229900	12-11-2003	Reisman	
	LLLL.	US 2007/0198656	08-23-2007	MAZZAFERRI et al.	
	MMMM.	US 2003/0182420	09-25-2003	JONES et al.	
	NNNN.	US 2008/0225748	09-18-2008	KHEMANI et al.	
	OOOO.	US 2005/0250508	11-10-2005	GUO et al.	
	PPPP.	US 2008/0127304	05-29-2008	GINTER et al.	
	QQQQ.	US 7,289,489	10-30-2007	KUNG et al.	
	RRRR.	US 2003/0050070	03-13-2003	MASHINSKY et al.	
	SSSS.	US 6,996,076	02-07-2006	FORBES et al.	
	TTTT.	US 2008/0183	07-31-2008	PAUL et al.	
	UUUU.	US 2007/0226225	09-27-2007	YIU et al.	
	VVVV.	US 2007/0130315	06-07-2007	FRIEND et al.	
	WWWW.	US 2008/0059743	03-06-2008	BYCHKOV et al.	
	XXXX.	US 2008/0132268	06-05-2008	CHOI-GROGAN et al.	
	YYYY.	US 2003/0133408	07-17-2003	CHENG et al.	
	ZZZZ.	US 2005/0128967	06-16-2005	Scobbie	
	AAAAA.	US 2007/0140113	06-21-2007	Gemelos	
	BBBBB.	US 2002/0138601	09-26-2002	PIPONIUS et al.	
	CCCCC.	US 2002/0176377	11-28-2002	Hamilton	
	DDDDD.	US 2006/0034256	02-16-2006	ADDAGATLA et al.	
	EEEEE.	US 2005/0228985	10-13-2005	YLIKOSKI et al.	
	FFFFF.	US 2007/0036312	02-15-2007	CAI et al.	
	GGGGG.	US 2004/0082346	04-29-2004	SKYTT et al.	
	HHHHH.	US 7,142,876	11-28-2006	TROSSEN et al.	
	IIIII.	US 2008/0005561	01-03-2008	BROWN et al.	
	JJJJJ.	US 2007/0101426	05-03-2007	LEE et al.	
	KKKKK.	US 2008/0222692	09-11-2008	ANDERSSON et al.	
	LLLLL.	US 2008/0160958	04-03-2008	ABICHANDANI et al.	
	MMMMM	US 2006/0048223	03-02-2006	LEE et al.	
	NNNNN.	US 2007/0104126	5-10-2007	CALHOUN et al.	
	OOOOO.	US 2007/0243862	10-18-2007	COSKUN et al.	
	PPPPP.	US 2008/0109679	05-08-2008	WRIGHT et al.	
	QQQQQ.	US 2006/0242685	10-26-2006	HEARD et al.	
	RRRRR.	US 2008/0130656	06-05-2008	KIM et al.	
	SSSSS.	US 2005/0021995	01-27-2005	LAL et al.	
	TTTTT.	US 2008/0162704	04-03-2008	POPLETT et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /D.C./

PTO/SB/08 (08-03)

Substitute for form 1449/PTO				Complete if Known	
Information Disclosure Statement By Applicant *(Use as many sheets as necessary)*				Application No.:	12/380,773
				Filing Date	March 2, 2009
				First Named Inventor	Gregory G. Raleigh
				Art Unit	2445
				Examiner Name	Not Assigned
Sheet	4	of	4	Atty Docket No.	RALEP018

	UUUUU.	US 2008/0229385	09-18-2008	FEDER et al.	
	VVVVV.	US 2008/0098062	04-24-2008	Balia	

FOREIGN PATENT DOCUMENTS					
Examiner Initials	Cite No.	Foreign Patent Document Country Code–Number–Kind Code (known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1A	WO 2006/130960	12-14-2006	Mobidia, Inc.	
	1B	EP 1772988A1	04-11-2007	Huawei Technologies, Co., LTD.	
	1C	EP 1978772A1	10-08-2008	British Telecommunications	
	1D	WO 2007/053848	05-10-2007	Mobile Armor, LLC	
	1E	WO 2006/073837	07-13-2006	Symbol Technologies, Inc.	
	1F	WO 2004/028070	04-01-2004	Credant Technologies, Inc.	
	1G	WO 2004/095753	11-04-2004	Motorola Inc.	
	1H	WO 2003/014891	02-20-2003	The Boeing Company	
	1I	WO 2007/107701	09-27-2007	British Telecommunications	
	1J	EP 1463238	09-29-2004	Alcatel	
	1K	WO 2008/080430	07-10-2008	Telecom Italia S.P.A	
	1L	WO 2008/017837	02-14-2008	Symbian Software	
	1M	WO 2008/099802	08-21-2008	NEC Corporation	
	1N	WO 2007/001833	01-04-2007	Symbol Technologies	
	1O	EP 1739518	06-29-2005	Research In Motion	
	1P	WO 2007/069245	06-21-2007	Yoggie Security	
	1Q	WO 2008/066419	06-05-2008	Telefonaktiebolaget LM Ericsson	
	1R	WO 2006/050758	05-18-2006	Telefonaktiebolaget LM Ericsson	

Examiner	/Dohm Chankong/ (01/25/2011)	Date Considered

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

T[2] = Applicant is to place a check mark here if English language Translation is attached

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /D.C./

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12380773	RALEIGH, GREGORY G.
	Examiner	Art Unit
	DOHM CHANKONG	2452

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
east text search	1/26/11	DC

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

PTO/SB/08 (08-03)

Substitute for form 1449/PTO				Complete if Known	
Information Disclosure Statement By Applicant *(Use as many sheets as necessary)*				Application No.:	12/380,773
				Filing Date	March 2, 2009
				First Named Inventor	Gregory G. Raleigh
				Art Unit	2445
				Examiner Name	Not Assigned
Sheet	1	of	2	Atty Docket No.	RALEP018

U.S. Patent Documents					
Examiner Initials	CiteNo.	Document Number Number-Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS					
Examiner Initials	Cite No.	Foreign Patent Document Country Code–Number–Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	2A	WO 2006/077481	07-27-2006	True Context Corporation	
	2B	WO 2008/051379	05-02-2008	Verizon Services	
	2C	WO 2008/080139	07-03-2008	Integrated Mobile	
	2D	WO 2004/077797	09-10-2004	Boston Communications	
	2E	WO 2003/058880	04-17-2003	Telia AB	

NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T^2
	2F	HARTMANN et al., Agent-Based Banking Transactions & Information Retrieval-What about Performance Issues? 1999	
	2G	VAN EIJK, et al., GigaMobile, Agent Technology for Designing Personalized Mobile Service Brokerage, July 1, 2002	
	2H	YU LI, Dedicated E-Reading Devices: The State of the Art and Challenges, Scroll, Vol. 1, No. 1, 2008	
	2I	DIKAIAKOS et al., A Distributed Middleware Infrastructure for Personalized Services, November 24, 2003	
	2J	RAO et al., Evolution of Mobile Location-Based Services, Communication of the ACM, December 2003	
	2K	CHANDRASEKHAR et al., Femtocell Networks: A Survey, June 28, 2008	
	2L	HOSSAIN et al., Gain-Based Selection of Ambient Media Services in Pervasive Environments, 2008	
	2M	Author Unknown, 3GPP TS 23.203, V8.4.0, 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Policy and Charging Control Architecture (Release 8), December 2008	
	2N	Author Unknown, 3GPP TS 23.401, V8.4.0, 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; General Packer Radio Service (GPRS) Enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) Access (Release 8), December 2008	
	2O	STEPHAN STEGLICH, I-Centric User Interaction, November 21, 2003	
	2P	HAN et al., Information Collection Services for Qos-Aware Mobile Applications, 2005	
	2Q	ALONISTIOTI et al., Intelligent Architectures Enabling Flexible Service Provision and Adaptability, 2002	
	2R	ROLF OPPLIGER, Internet Security: Firewalls and Bey, Communications of the ACM, May 1997, Vol. 40. No.5	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /D.C./

PTO/SB/08 (08-03)

Substitute for form 1449/PTO				*Complete if Known*	
Information Disclosure Statement By Applicant *(Use as many sheets as necessary)*				Application No.:	12/380,773
				Filing Date	March 2, 2009
				First Named Inventor	Gregory G. Raleigh
				Art Unit	2445
				Examiner Name	Not Assigned
Sheet	2	of	2	Atty Docket No.	RALEP018

Examiner /Dohm Chankong/ (01/25/2011)	Date Considered

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

T[2] = Applicant is to place a check mark here if English language Translation is attached

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /D.C./

PTO/SB/08 (08-03)

Substitute for form 1449/PTO				Complete if Known	
Information Disclosure Statement By Applicant *(Use as many sheets as necessary)*				Application No.:	12/380,773
				Filing Date	March 2, 2009
				First Named Inventor	Gregory G. Raleigh
				Art Unit	2445
				Examiner Name	Not Assigned
Sheet	1	of	1	Atty Docket No.	RALEP018

U.S. Patent Documents					
Examiner Initials	CiteNo.	Document Number Number-Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS					
Examiner Initials	Cite No.	Foreign Patent Document Country Code–Number–Kind Code	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	3A	WO 2007/014630	02-08-2007	Telefonaktiebolaget LM Ericsson	WO 2007/014630
	3B	WO 2006/004467	01-12-2006	Telefonaktiebolaget LM Ericsson	WO 2006/004467

NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T^2
	3C	KNIGHT et al., Layer 2 and 3 Virtual Private Networks: Taxonomy, Technology, and Standardization Efforts, IEEE Communications Magazine, June 2004	
	3D	KOUTSOPOULOU et al., Middleware Platform for the Support of Charging Reconfiguration Actions, 2005	
	3E	NILSSON et al., A Novel MAC Scheme for Solving the QoS Parameter Adjustment Problem in IEEE802.11e EDCA, February 2006	
	3F	Author Unknown, Overview of GSM, GPRS, and UMTS, Chapter 2, November 4, 2008	
	3G	CHAOUCHI et al., Policy Based Networking in the Integration Effort Of 4G Networks and Services, 2004 IEEE	
	3H	ZHU et al., A Survey of Quality of Service in IEEE 802.11 Networks, IEEE Wireless Communications, August 2004	
	3I	KYRIAKAKOS et al., Ubiquitous Service Provision in Next Generation Mobile Networks, Proceedings of the 13th IST Mobile and Wireless Communications Summit, Lyon, France, June 2004	
	3J	FAROOQ et al., An IEEE 802.16 WiMax Module for the NS-3 Simulator, March 2-6, 2009	
	3K	Author Unknown, HP, IP Multimedia Services Charging, A White Paper from HP, January 2006	
	3L	Author Unknown, Kindle™ User's Guide 3rd Edition, Copyright 2004-2009	

Examiner /Dohm Chankong/ (01/25/2011)	Date Considered

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

T^2 = Applicant is to place a check mark here if English language Translation is attached

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /D.C./

PTO/SB/08 (08-03)

Substitute for form 1449/PTO				Complete if Known	
Information Disclosure Statement By Applicant *(Use as many sheets as necessary)*				Application No.:	12/380,773
				Filing Date	March 2, 2009
				First Named Inventor	Gregory G. Raleigh
				Art Unit	2445
				Examiner Name	Not Assigned
Sheet	1	of	2	Atty Docket No.	RALEP018

U.S. Patent Documents

Examiner Initials	Cite No.	Document Number Number-Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A.	US 2003/0088671	05-08-2003	KLINKER et al.	
	B.	US 2007/0248100	10-25-2007	ZUBERI et al.	
	C.	US 2008/0130534	06-05-2008	Tazuko Tomioka	
	D.	US 7,747,240	06-29-2010	BRISCOE et al.	
	E.	US 2006/0236095	10-19-2006	SMITH et al.	
	F.	US 2009/0054030	02-26-2009	Golds	
	G.	US 6,952,428	10-04-2005	NECKA et al.	
	H.	US 2010/0043068	02-18-2010	VARADHAN et al.	
	I.	US 2010/0071053	03-18-2010	ANSARI et al.	
	J.	US 2003/0005112	01-03-2003	Krautkremer	
	K.	US 2006/0045245	03-02-2006	AARON et al.	
	L.	US 2007/0076616	04-05-2007	NGO et al.	
	M.	US 2006/0190314	08-24-2006	Hernandez	
	N.	US 2009/0271514	10-29-2009	THOMAS et al.	
	O.	US 6,684,244	01-27-2004	GOLDMAN et al.	
	P.	US 2005/0055291	03-10-2005	BEVENTE et al.	
	Q.	US 2006/0019632	01-26-2006	CUNNINGHAM et al.	
	R.	US 2005/0238046	10-27-2005	HASSAN et al.	
	S.	US 5,577,100	11-19-1996	McGREGOR et al.	
	T.	US 6,198,915	03-06-2001	McGREGOR et al.	
	U.	US 6,650,887	11-18-2003	McGREGOR et al.	
	V.	US 7,245,901	07-17-2007	McGREGOR et al.	
	W.	US 7,373,136	05-13-2008	WATLER et al.	
	X.	US 6,725,031	04-20-2004	WATLER et al.	
	Y.	US 2002/0022472	02-21-2002	WATLER et al.	
	Z.	US 6,532,579	03-11-2003	SATO et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Foreign Patent Document Country Code–Number–Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	AA.	WO 1999/065185	12-16-1999	British Telecommunications	
	BB.	WO 2007/018363	08-02-2006	Upresto, Inc.	

NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T^2
	CC.		
	DD.		

Examiner /Dohm Chankong/ (01/25/2011)	Date Considered

PTO/SB/08 (08-03)

Substitute for form 1449/PTO				*Complete if Known*	
Information Disclosure Statement By Applicant *(Use as many sheets as necessary)*				Application No.:	12/380,773
				Filing Date	March 2, 2009
				First Named Inventor	Gregory G. Raleigh
				Art Unit	2445
				Examiner Name	Not Assigned
Sheet	2	of	2	Atty Docket No.	RALEP018

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

T[2] = Applicant is to place a check mark here if English language Translation is attached

PTO/SB/80 (11-08)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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: 69849

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: 69849

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:
Headwater Partners I, LLC
350 Marine Parkway, Suite 300
Redwood City, California 94065
U.S.A.

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: 18 MARCH, 2011
Name	David R. Johnson	Telephone: 650-517-2782
Title	Chief Financial Officer	

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.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	9904950
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy inplementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	21912
Filer:	Marc A. Sockol/Linda Brost
Filer Authorized By:	Marc A. Sockol
Attorney Docket Number:	RALEP018
Receipt Date:	18-APR-2011
Filing Date:	02-MAR-2009
Time Stamp:	21:38:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		160496POAand3-73bStmt041811.pdf	151608 29e0c799a670966b7018327b2acae1db98b2d351	yes	4

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Assignee showing of ownership per 37 CFR 3.73(b).	1	2
	Power of Attorney	3	4
Warnings:			
Information:			
	Total Files Size (in bytes):	151608	

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.

PTO/SB/96 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Gregory G. Raleigh

Application No./Patent No.: 12/380,773 Filed/Issue Date: March 2, 2009

Titled: Verifiable Service Policy Implementation for Intermediate Networking Devices

Headwater Partners I, LLC , a limited liability company

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. [X] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

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

A. [X] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 022799, Frame 0823, or for which a copy therefore is attached.

OR

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

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

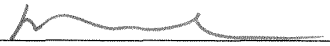
Reel _____, Frame _____, or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet(s).

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

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

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



Signature — April 18, 2011 (Date)

Marc A. Sockol, Reg. No. 40,823 (Printed or Typed Name) — Attorney of Record (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.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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
12/380,773	03/02/2009	Gregory G. Raleigh	RALEP018

CONFIRMATION NO. 5719

69849
SHEPPARD, MULLIN, RICHTER & HAMPTON LLP
390 Lytton Avenue
Palo Alto, CA 94301

POA ACCEPTANCE LETTER

OC000000047324780

Date Mailed: 04/26/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/18/2011.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/hchristian/

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
12/380,773	03/02/2009	Gregory G. Raleigh	RALEP018

CONFIRMATION NO. 5719

21912
VAN PELT, YI & JAMES LLP
10050 N. FOOTHILL BLVD #200
CUPERTINO, CA 95014

POWER OF ATTORNEY NOTICE

OC000000047324772

Date Mailed: 04/26/2011

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/18/2011.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/hchristian/

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

In re Application of: Gregory G. Raleigh Serial No.: 12/380,773 Filed: March 2, 2009	Examiner: Dohm Chankong Art Unit: 2452
Title: Verifiable Service Policy Implementation for Intermediate Networking Devices	

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

AMENDMENT AND RESPONSE

Sir:

In response to the Office Action dated February 3, 2011, the deadline for response ending on July 3, 2011 with the enclosed request for a two-month extension of time, please amend the above-identified application as follows:

In the Claims:

1. (Currently amended) A system, comprising:

at least one processor of a[[n]] first end user device, the first end user device capable of operating as an intermediate networking device, the at least one processor configured to:

use an intermediate networking device forwarding agent to forward traffic ~~act as a service intermediary or intermediate connection~~ between a first access network and one or more other end user ~~communications~~ devices according to a trusted intermediate networking device forwarding policy to implement an intermediate networking device forwarding service, the trusted intermediate networking device forwarding policy associated with one or more policy settings; and

provide a user interface to a first end user of the first end user device, the user interface capable of receiving a modification request to modify at least one of the one or more policy settings associated with the trusted intermediate networking device forwarding policy ~~implement a first service policy set for assisting control of the intermediate networking device use of a first service set on the first network, the first service policy set including one or more first service policies associated with the intermediate networking device or the one or more communications devices connected to the intermediate networking device, the first service set being one or more first network services used by the intermediate networking device or the one or more communications devices~~; and

~~monitor use of the first service set based on the first service policy set; and~~

[[a]] memory ~~of the intermediate networking device~~ coupled to the at least one processor and configured to provide the at least one processor with instructions[[,]]

~~wherein the implementation of the first service policy set is verified~~.

2. (Currently amended) The system recited in claim 1, wherein the one or more other end user ~~communications~~ devices includes one or more mobile ~~communications~~ devices~~, and the one or more first network services include one or more Internet based services~~.

3. (Currently amended) The system recited in claim 1, wherein the at least one processor is configured to communicate a state of the intermediate networking device forwarding service to a network element ~~the one or more communications device include one or more of the following: a mobile phone, a PDA, an eBook reader, a music device, an entertainment/gaming device, a computer, laptop, a netbook, a home networking system, and a modem or communications device supporting machine to machine communications~~.

4. (Currently amended) The system recited in claim 1, wherein the at least one of the one or more policy settings sets whether the intermediate networking device forwarding service is active ~~device communicates, forwards, routes, passes or bridges network communications between the first network and one or more of the communications devices~~.

5. (Currently amended) The system recited in claim 1, wherein the first end user ~~intermediate networking~~ device includes a first modem to connect with the access ~~first~~ network and a second modem to connect with the one or more other end user ~~communications~~ devices.

6. (Currently amended) The system recited in claim [[1]] 5, wherein the first modem and the second modem are configured to operate simultaneously ~~the intermediate networking device includes a first modem to connect with the first network and a second modem to connect with the one or more communications devices, and wherein the first modem communicates using one or more of the following communication protocols: WiFi, WWAN, Bluetooth, Ziggby, satellite, DSL, and DOCSIS/cable~~.

7. (Currently amended) The system recited in claim 1, wherein the first end user device receives a component of the trusted intermediate networking device forwarding policy from a network element ~~includes a first modem to connect with the first network and a second modem to connect with the one or more communications devices, and wherein the second modem communicates using one or more of the following communication protocols: WiFi, WWAN, Bluetooth, Ziggby, satellite, DSL, and DOCSIS/cable~~.

8. (Currently amended) The system recited in claim 1, wherein the first end user device receives a policy setting instruction from a network element ~~intermediate networking device includes one or more of the following: a WWAN to WiFi bridge or router, a femto cell, a wired WAN access router or gateway, a DSL modem, a cable modem router, a gateway, a satellite modem router or gateway, a cell phone, a handheld device, and a computer~~.

9. (Currently amended) The system recited in claim 1, wherein the ~~a first service processor is located on a~~ first end user ~~communications~~ device receives ~~in communication with~~ the trusted intermediate networking device forwarding policy over a secure channel[[,]] ~~and wherein the service processor implements the first service policy set for assisting control of the intermediate networking device use of the first service set on the first network~~.

10. (Currently amended) The system recited in claim 1, wherein the a first ~~portion of a first service processor is located on a first communications~~ end user device includes a service usage monitor configured to detect when the ~~in communication with the~~ intermediate networking device forwarding service might be useful to the user~~, and a second portion of the first service processor is located on the intermediate networking device, and wherein the service processor implements the first service policy set for assisting control of the intermediate networking device use of the first service set on the first network~~.

11. (Currently amended) The system recited in claim 10, wherein the at least one ~~a first portion of a first service~~ processor is configured to provide a user ~~located on a first communications device in communication with the intermediate networking device for service usage monitoring or service usage~~ notification when the service usage monitor detects that ~~assistance or billing assistance, and a second portion of the first service processor is located on~~ the intermediate networking device forwarding service might be useful to the user[[,]] ~~and wherein the service processor implements the first service policy set for assisting control of the intermediate networking device use of the first service set on the first network~~.

12. (Currently amended) The system recited in claim 1, further comprising a device agent configured to determine a status of the at least one of the one or more policy settings ~~wherein a first service processor is located on a first communications device in communication with the intermediate networking device, and a second service processor is located on the intermediate networking device, and wherein the first service processor implements the first service policy set for assisting control of the intermediate networking device use of the first service set on the first network, and the second service processor implements a second service policy set for assisting control of the intermediate networking device use of the first service set on the first network~~.

13. (Currently amended) The system recited in claim 12, wherein the device agent is further configured to communicate the status of the at least one of the one or more of the policy settings to a network element ~~processor of the intermediate networking device is further configured to:~~

~~execute a service processor, wherein the service processor implements a first service policy set for assisting control of the intermediate networking device use of a first service set on a first network, and the service processor is stored on the intermediate networking device~~.

14. (Currently amended) The system recited in claim 1, wherein the at least one processor ~~of the intermediate networking device~~ is further configured to allow or disallow the intermediate networking device forwarding service[[:]]

~~verify the implementation of the first service policy using a first service processor located on a first communications device~~.

15. (Currently amended) The system recited in claim 1, wherein the at least one processor ~~of the intermediate networking device~~ is further configured to perform one or more of:

set traffic speed;

identify one or more network types over which the intermediate networking device forwarding service is to be active or modified;

identify one or more particular networks, network identifiers, access point identifiers or

base station identifiers over which the intermediate networking device forwarding service is to be active or modified;

identify one or more geographic locations or regions in which the intermediate networking device forwarding service is to be active or modified;

identify one or more time windows during which the intermediate networking device forwarding service is to be active or modified;

identify one or more network congestion levels during which the intermediate networking device forwarding service is to be active or modified;

identify one or more quality of service classes for which the intermediate networking device forwarding service is to be active or modified;

identify one or more network destinations for which the intermediate networking device forwarding service is to be active or modified;

identify one or more applications for which the intermediate networking device forwarding service is to be active or modified;

identify one or more other end user devices for which the intermediate networking device forwarding service is to be active or modified;

identify a limit on the number of other end user devices for which the intermediate networking forwarding service is to be active or modified; and

identify one or more traffic types for which the intermediate networking device forwarding service is to be active or modified, the one or more traffic types including one or more of content type, file type, protocol type, class of service, transaction type, and level of quality of service

~~verify the implementation of the first service policy using a first service processor located on a first communications device if more than one user or communications device is communicating with the intermediate networking device~~.

16. (Currently amended) The system recited in claim 1, wherein the at least one processor ~~of the intermediate networking device~~ is further configured to notify a user when the intermediate networking device forwarding service is active[[:]]

~~verify the implementation of the first service policy using a first service processor~~

~~located on a first communications device; and~~

~~verify an implementation of a second service policy using a second service processor located on a second communications device~~.

17. (Currently amended) The system recited in claim 1, wherein the at least one processor ~~of the intermediate networking device~~ is further configured to notify a user when the intermediate networking device forwarding service is active over a roaming network[[:]]

~~collect first service usage information from a first service processor executed on a first communications device to assist the monitored use of the first service~~.

18. (Currently amended) The system recited in claim 1, wherein the at least one processor ~~of the intermediate networking device~~ is further configured to implement a different intermediate networking device forwarding service characteristic in accordance with the trusted intermediate networking device forwarding policy based on whether the first end user device is connected to a home network or a roaming network[[:]]

~~collect first service usage information from a first service processor executed on a first communications device to assist the monitored use of the first service if more than one user or communications device is communicating with the intermediate networking device~~.

19-32. (Canceled)

33. (New) The system of claim 1, wherein the at least one processor is configured to implement a different intermediate networking device forwarding service characteristic in accordance with the trusted intermediate networking device forwarding policy based on identification information of a particular other end user device or identification information of a particular user of a particular one of the one or more other end user devices.

34. (New) The system of claim 1, further comprising a device agent, and wherein the device agent is configured to notify a user when one of the one or more other end user devices attempts to or succeeds in connecting to the intermediate networking device forwarding service

of the first end user device.

35. (New) The system of claim 1, wherein the at least one of the one or more policy settings is configured to establish whether one of the one or more other end user devices can use the intermediate networking device forwarding service.

36. (New) The system of claim 1, wherein the at least one processor requires an authentication process before allowing modification of the at least one of the one or more policy settings.

37. (New) The system of claim 1, wherein the at least one processor is further configured to pass or redirect the traffic to one or more specific access network routing paths according to the trusted intermediate networking device forwarding policy.

38. (New) The system of claim 1, wherein the trusted intermediate networking device forwarding policy is established as trusted at least in part by storing the trusted intermediate networking device forwarding policy in an environment secure from user or application modification.

39. (New) The system of claim 1, wherein the trusted intermediate networking device forwarding policy is established as trusted at least in part by verifying the trusted intermediate networking device forwarding policy as consistent with a proper intermediate networking device forwarding policy.

40. (New) The system of claim 1, wherein the trusted intermediate networking device forwarding policy is established as trusted at least in part by verifying the trusted intermediate networking device forwarding policy as not including unauthorized code.

41. (New) The system of claim 1, wherein the trusted intermediate networking device forwarding policy is established as trusted at least in part by receiving the trusted intermediate

networking device forwarding policy over a secure link, and verifying the trusted intermediate networking device forwarding policy using a signature, certificate, hash or version configuration.

42. (New) The system of claim 1, wherein the trusted intermediate networking device forwarding policy is established as trusted at least in part by examining its execution environment or its storage environment.

43. (New) The system of claim 1, wherein the intermediate networking device forwarding agent is trusted.

44. (New) The system of claim 43, wherein the intermediate networking device forwarding agent is established as trusted at least in part by storing the intermediate networking device forwarding agent in an environment secure from user or application modification.

45. (New) The system of claim 43, wherein the intermediate networking device forwarding agent is established as trusted at least in part by verifying the intermediate networking device forwarding agent as consistent with a proper intermediate networking device forwarding agent.

46. (New) The system of claim 43, wherein the intermediate networking device forwarding agent is established as trusted at least in part by verifying the intermediate networking device forwarding agent as not including unauthorized code.

47. (New) The system of claim 43, wherein the trusted intermediate networking device forwarding agent is established as trusted at least in part by using a secure loader to verify the trusted intermediate networking device forwarding agent using a signature, certificate, hash or version configuration.

48. (New) The system of claim 43, wherein the intermediate networking device forwarding agent is established as trusted at least in part by examining its execution environment or its

storage environment.

49. (New) The system of claim 1, wherein the one or more policy settings is trusted.

50. (New) The system of claim 49, wherein the one or more policy settings is established as trusted at least in part by storing the one or more policy settings in an environment secure from unauthorized tampering.

51. (New) The system of claim 49, wherein the one or more policy settings is established as trusted at least in part by verifying the one or more policy settings as not having been tampered with.

52. (New) The system of claim 49, wherein the one or more policy settings is established as trusted at least in part by examining its storage environment.

53. (New) The system of claim 1, further comprising a network element capable of determining whether the intermediate networking device forwarding service is active on the first end user device.

54. (New) The system of claim 53, wherein, when the network element determines that the intermediate networking device forwarding service is active, a billing server updates a billing status to bill the user.

55. (New) The system of claim 53, wherein, when the network element determines that the intermediate networking device forwarding service is active and the billing status does not include forwarding service payments, a corrective action is taken.

56. (New) The system of claim 1, wherein the first end user device includes capability to connect with one or more of the following network access types: 2G, 3G, 4G, WiFi.

57. (New) The system of claim 1, wherein the first end user device connects to the one or more other end user devices using one or more of the following connection types: WiFi, Bluetooth, USB, Ethernet, FireWire, near field communication.

58. (New) The system of claim 1, wherein the first end user device can monitor service usage and can modify a predetermined policy setting when the service usage meets a predetermined condition.

59. (New) The system of claim 1, wherein a network element can monitor service usage and can initiate modification of a predetermined policy setting when the service usage meets a predetermined condition.

60. (New) A method comprising:

using a first end user device to forward traffic between a first access network and one or more other end user devices according to a trusted intermediate networking device forwarding policy to implement an intermediate networking device forwarding service, the trusted intermediate networking device forwarding policy associated with one or more policy settings; and

providing a user interface to a first end user of the first end user device, the user interface capable of receiving a modification request to modify at least one of the one or more policy settings associated with the intermediate networking device forwarding policy.

61. (New) A system comprising:

at least one processor of a network element on an access network, the at least one processor capable of provisioning intermediate networking device forwarding service, the intermediate networking device forwarding service provided by a first end user device on the access network, the first end user device capable of forwarding traffic between the access network and one or more other end user devices according to an intermediate networking device forwarding policy, the first end user device including a user interface capable of receiving user input regarding a change to a policy setting of the intermediate networking

device forwarding policy and further including a device agent capable of communicating an instruction corresponding to the user input to the at least one processor, the at least one processor configured to:

receive the instruction from the first end user device;

change the policy setting of the intermediate networking device forwarding policy according to the instruction; and

initiate provisioning of one or more service elements on the access network to implement the change to the policy setting associated with the intermediate networking device forwarding policy.

62. (New) The system of claim 61, wherein the instruction includes an instruction to activate or deactivate the intermediate networking device forwarding service.

63. (New) The system of claim 61, wherein the one or more service elements includes the first end user device.

64. (New) The system of claim 61, wherein the one or more service elements includes the network element.

65. (New) The system of claim 61, wherein the at least one processor is further configured to notify a user of the first end user device that activating the intermediate networking service might be helpful.

66. (New) The system of claim 61, wherein the one or more service elements includes a billing system configured to modify a billing arrangement of a user of the first end user device for the intermediate networking device forwarding service.

67. (New) The system of claim 66, wherein the at least one processor is further configured to determine the policy setting.

68. (New) The system of claim 67, wherein the policy setting sets whether the intermediate networking device forwarding service is active.

69. (New) The system of claim 68, wherein the at least one processor is further configured to communicate with the billing system to bill a user for the intermediate networking device forwarding service.

70. (New) A method, comprising:

receiving an instruction by a network element on an access network from a first end user device, the first end user device being capable of forwarding traffic between the access network and one or more other end user devices according to an intermediate networking device forwarding policy, the instruction requesting a change to a policy setting associated with the intermediate networking device forwarding policy;

changing the policy setting associated with the intermediate networking device forwarding policy according to the instruction; and

initiating provisioning of one or more service elements on the access network to implement the change to the policy setting associated with the intermediate networking device forwarding policy.

71. (New) A first end user device, comprising:

an intermediate networking device agent capable of forwarding traffic between an access network and one or more other end user devices to provide an intermediate networking device forwarding service in accordance with an intermediate networking device forwarding policy, the intermediate networking device forwarding policy associated with policy settings;

a user interface capable of receiving user input regarding a change to one of the policy settings associated with the intermediate networking device forwarding policy; and

a device agent capable of communicating an instruction corresponding to the user input to one or more network elements on the access network, the one or more network elements capable of initiating provisioning of the access network to modify the intermediate networking device forwarding service in accordance with the instruction.

72. (New) The end user device of claim 71, wherein the instruction includes an instruction to activate or deactivate the intermediate networking device forwarding service.

73. (New) A method, comprising:

receiving user input regarding a change to a policy setting of an intermediate networking device forwarding policy by an end user device, the end user device having an intermediate networking device agent capable of forwarding traffic between an access network and one or more other end user devices to provide an intermediate networking device forwarding service in accordance with the intermediate networking device forwarding policy;

communicating an instruction corresponding to the user input to one or more network elements on the access network; and

receiving an indication whether the change to the intermediate networking device forwarding service has been implemented.

74. (New) The system of claim 1, wherein the user interface is also capable of providing the user with an offer to pay for enabling the intermediate networking device forwarding service, and requiring a user acknowledgement prior to enabling the intermediate networking device forwarding service.

75. (New) The system of claim 17, wherein the at least one processor notifies the user of an indication of an intermediate networking device forwarding service payment term.

76. (New) The system of claim 75, wherein the user acknowledgement is sent to a network element to indicate user acceptance of the payment term.

77. (New) The system of claim 1, wherein the at least one processor is further configured to provide a user interface to at least one of the one or more other end user devices, the user interface configured to provide information regarding a status of the intermediate networking device forwarding service.

78. (New) The system of claim 77, wherein the status information includes one or more of:

forwarding or access network service sign up information or user entry,

forwarding or access network service authentication or secure logon information or user entry,

forwarding service purchase information or user entry,

forwarding service offer information or user entry,

forwarding service policy modification options information or user entry,

forwarding service status,

forwarding service management, and

forwarding service usage reporting.

REMARKS

Claims 1-32 were pending and rejected. Claims 1-18 are being amended. Claims 19-32 have been canceled. Claims 33-78 are being added. Claims 1-18 and 33-78 are now pending. Reconsideration is respectfully requested.

In section IIA, the Examiner issued a provisional obvious-type double patenting rejection of claims 1-12 and 14-20 over claims 1-19 of co-pending application No. 12/380,769. Applicant is amending claims 1-12 and 14-18 and has canceled claims 19 and 20. Accordingly, Applicant respectfully requests that the Examiner reconsider whether the obvious-type double patent rejection is still proper.

In section IIB, the Examiner issued a provisional obvious-type double patenting rejection of claims 1-8 over claims 1-8 of co-pending application No. 12/380,774. Applicant is amending claims 1-8. Accordingly, Applicant respectfully requests that the Examiner reconsider whether the obvious-type double patent rejection is still proper.

In section IIC, the Examiner issued a provisional obvious-type double patenting rejection of claims 1-8, 19 and 20 over claims 1-8, 21 and 22 of co-pending application No. 12/380,771. Applicant is amending claims 1-8 and has canceled claims 19 and 20. Accordingly, Applicant respectfully requests that the Examiner reconsider whether the obvious-type double patent rejection is still proper.

In section III, the Examiner rejected claim 20 under 35 USC § 101 as directed to nonstatutory subject matter. Claim 20 is being canceled. Accordingly, Applicant respectfully submits that the rejection of claim 20 is now moot, and respectfully requests that the rejection be withdrawn.

In section IV, the Examiner rejected claims 1-8, 13, 19-27, 29 and 31 under 35 USC § 102(b) as anticipated by Klinker. Klinker does not teach an end user device capable of operating as an intermediate networking device, as recited in claim 1 as amended. Further,

Klinker does not teach the at least one processor of a first end user device configured to "use an intermediate networking device forwarding agent to forward traffic between a first access network and one or more other end user devices according to a trusted intermediate networking device forwarding policy to implement an intermediate networking device forwarding service, the trusted intermediate networking device forwarding policy associated with one or more policy settings" or "provide a user interface to a first end user of the first end user device, the user interface capable of receiving a modification request to modify at least one of the one or more policy settings associated with the trusted intermediate networking device forwarding policy."

For at least these reasons, Applicant respectfully submits that claim 1 and claims 2-8 and 13, which depend from claim 1, are patentable for at least these reasons. Applicant respectfully requests that the rejection be withdrawn. Claims 19-27, 29 and 31 are being canceled. Accordingly, Applicant respectfully submits that the rejections of claims 19-27, 29 and 31 are now moot, and respectfully requests that the rejections be withdrawn.

In section V(A), the Examiner rejected claims 9-12, 14-18 and 28 under 35 USC § 103 over Kinker in view of Pandya. The Examiner noted that Kinker does not teach that the agents can be located on a communications device like a client computer. The Examiner then asserted that Pandya teaches such a feature. Pandya discloses a centrally located and controlled policy that controls multiple agents and control units. *See* paragraphs [0046] and [0073], and FIG. 4. Pandya does not teach an end user device capable of operating as an intermediate networking device, as recited in claim 1 as amended. Further, Klinker does not teach the at least one processor of a first end user device configured to "use an intermediate networking device forwarding agent to forward traffic between a first access network and one or more other end user devices according to a trusted intermediate networking device forwarding policy to implement an intermediate networking device forwarding service, the trusted intermediate networking device forwarding policy associated with one or more policy settings" or "provide a user interface to a first end user of the first end user device, the user interface capable of receiving a modification request to modify at least one of the one or more policy settings

associated with the trusted intermediate networking device forwarding policy."

For at least these reasons, Applicant respectfully submits that claims 9-12 and 14-18, which depend from claim 1, are patentable for at least these reasons. Applicant respectfully requests that the rejection be withdrawn. Claim 28 is being canceled. Accordingly, Applicant respectfully submits that the rejection of claim 28 is now moot, and respectfully requests that the rejection be withdrawn.

In section V(B), the Examiner rejected claims 30 and 32 under 35 USC § 103 as obvious over Klinker in view of Anderholm. Applicant is canceling claims 30 and 32. Accordingly, Applicant respectfully submits that the rejections of claims 30 and 32 are now moot, and respectfully requests that the rejections be withdrawn.

Support for claim 1 as amended is found at least in paragraphs [0086], [00100], [00144], [00151], [00152], [00153], [00154], [00155], [00156], [00157], [00158], [00159]], [00186], [00311], [00517], [00519]], [00520], [00521], [00522], [00523], [00525], [00526], [00527]], [00528], [00531], [00532], [00533], [00535], [00536], [00540], [00541], and [00542], and FIGS. 27A, 27B, 27C, 27D, 27E, 29A, 29B, and 29C. Support for claim 2 as amended is found at least in paragraphs [00144], [00404], [00514], and [00545]. Support for claim 3 as amended is found at least in paragraphs [00513], [00514], [00516], [00530], and [00541], and FIGS. 27A, 27B, and 27E. Support for claim 4 as amended is found at least in paragraphs [0081], [0082], [00101], [00155], [00161], [00162], [00514], [00530], [00534], and [00541], and FIGS. 27A, 27B, and 27E. Support for claim 5 as amended is found at least in paragraphs [00151], [00152], [00153], [00154], [00156], and [00513] – [00516]. Support for claim 6 as amended is found at least in paragraphs [00151], [00152], [00153], [00154], [00156], and [00513] – [00516]. Support for claim 7 as amended is found at least in paragraphs [00513] – [00516], [00530], [00541], and FIGS. 27A, 27B, and 27E. Support for claim 8 as amended is found at least in paragraphs [00513], [00514], [00516], [00530], [00541], and FIGS. 27A, 27B, and 27E. Support for claim 9 as amended is found at least in paragraphs 00186] and [00311], [00323], [00327], and [00531], and FIG. 29A. Support for

claim 10 as amended is found at least in paragraphs [00273], [00513], and [00514], and FIG. 27C. Support for claim 11 as amended is found at least in paragraphs [00525], [00526], [00532], and [00534], and FIG. 27C. Support for claim 12 as amended is found at least in paragraphs [00513], [00514], [00516], [00530], and [00541], and FIGS. 27A, 27B, and 27E. Support for claim 13 as amended is found at least in paragraphs [00513], [00514], [00516], [00530], and [00541], and FIGS. 27B, and 27E. Support for claim 14 as amended is found at least in paragraphs [00161], [00162], [0081], [0082], [00155], and [00534], and FIG. 27A. Support for claim 15 as amended is found at least in paragraphs [00151], [00152], [00153], [00154], [00155], [00204], [00207], [00213], [00219], [00236], [00244], [00245], [00274]], [00255], [00341], [00372], [00513], [00514], [00515], [00516], [00518], [00520], [00545], and FIG. 27A. Support for claim 16 as amended is found at least in paragraphs [00162], [00219], [00243], [00244], [00245], [00250], and [00251]. Support for claim 17 as amended is found at least in paragraphs [00162], [00219], [00243], [00244], [00245], [00250], and [00251], and FIG. 26D. Support for claim 18 as amended is found at least in paragraphs [00162], [00219], [00243], [00244], [00245], [00250], and [00251], and FIG. 26D. Support for claim 33 is found at least in paragraphs [00513], [00517], [00518], [00520], [00521], [00522], [00523], [00528], [00529], [00530], and [00545]. Support for claim 34 is found at least in paragraphs [00525], [00526], [00532], [00534], and [00545]. Support for claim 35 is found at least in paragraphs [00525], [00526], [00532], [00534], and [00545]. Support for claim 36 is found at least in paragraphs . [00531], [0081], [0083], [00100], [00194], [00204], [00464], [00521], and [00544]. Support for claim 37 is found at least in paragraphs [00156], [00157], [00158], and [00529]. Support for claim 38 is found at least in paragraphs [00186] and [00311], and FIGS. 29A, 29B, and 29C. Support for claim 39 is found at least in paragraphs [00186] and [00311], and FIGS. 29A, 29B, and 29C. Support for claim 40 is found at least in paragraphs [00186] and [00311], and FIGS. 29A, 29B, and 29C. Support for claim 41 is found at least in paragraphs [00186] and [00311], [00323], [00327], and [00531], and FIGS. 29A, 29B, and 29C. Support for claim 42 is found at least in paragraphs [00186] and [00311], and FIGS. 29A, 29B, and 29C. Support for claim 43 is found at least in paragraphs [00186] and [00311], and FIGS. 29A, 29B, and 29C. Support for claim 44 is found at least in paragraphs [00186] and [00311], and FIGS. 29A, 29B, and 29C. Support for claim 45 is found at least in paragraphs

[00186] and [00311], and FIGS. 29A, 29B, and 29C. Support for claim 46 is found at least in paragraphs [00186] and [00311], and FIGS. 29A, 29B, and 29C. Support for claim 47 is found at least in paragraphs [00186] and [00311], and FIGS. 29A, 29B, and 29C. Support for claim 48 is found at least in paragraphs [00186] and [00311], and FIGS. 29A, 29B, and 29C. Support for claim 49 is found at least in paragraphs [00186] and [00311], and FIGS. 29A, 29B, and 29C. Support for claim 50 is found at least in paragraphs [00186] and [00311], and FIGS. 29A, 29B, and 29C. Support for claim 51 is found at least in paragraphs [00186] and [00311], and FIGS. 27A, 27B, 27C, 27D, 27E, 29A, 29B, and 29C. Support for claim 52 is found at least in paragraphs [00186] and [00311], and FIGS. 29A, 29B, and 29C. Support for claim 53 is found at least in paragraphs [00513], [00514], [00516], [00530], [00541], and [00545], and FIGS. 27A, 27B, and 27E. Support for claim 54 is found at least in paragraphs [00242], [00249], [00252], [00253], [00289], [00537], [00539], [00541], [00512], [00514], [00515], [00520], [00529], and [00530], and FIGS. 27B and 27C. Support for claim 55 is found at least in paragraphs [00242], [00249], [00252], [00253], [00289], [00537], [00539], [00541], [00512], [00514], [00515], [00520], [00529], and [00530], and FIGS. 27B and 27C. Support for claim 56 is found at least in paragraphs [00144], [00145], [00151], [00156], [00157], [00158], [00515], and [00516]. Support for claim 57 is found at least in paragraphs [00135], [00136], [00144], [00145]], [00151], [00156], [00157], [00158], [00515], and [00516]. Support for claim 58 is found at least in paragraphs [00222], [00223], [00228], [00238], [00359], [00279], [00188], [00431], [00434], [00435], [00513], [00514], [00515], and [00516], and FIG. 27C. Support for claim 59 is found at least in paragraphs [0095], [00238], [00267], [00274], [00279], [00188], [00429], [00430], [00432], [00434], [00435], [00513], [00514], [00515], and [00516], and FIG. 27C. Support for claim 60 is found at least in paragraphs [0086], [00100], [00144], [00151], [00152], [00153], [00154], [00155], [00156], [00157], [00158], [00159]], [00186] & [00311], [00517], [00519]], [00520], [00521], [00522], [00523], [00525], [00526], [00527], [00528], [00531], [00532], and [00534], and FIGS. 27A, 27B, 27C, 27D, 27E, 29A, 29B, and 29C. Support for claim 61 is found at least in paragraphs [0086], [00100], [00144], [00151], [00152], [00153], [00154], [00155], [00156], [00157], [00158], [00159], [00186] & [00311], [00517], [00519], [00520], [00521], [00522], [00523], [00525], [00526], [00527], [00528], [00531], [00533], [00534], [00540], [00541], and [00542]. Support for claim 62 is found at

least in paragraphs [0081], [0082], [00161], [00162], [00155], and [00534], and FIG. 27A. Support for claim 63 is found at least in paragraphs [00188], [00222], [00223], [00228], [00238], [00279], [00359], [00431], [00434], [00435], [00513], [00514], [00515], [00516], and [00545], and FIG. 27C. Support for claim 64 is found at least in paragraphs [00188], [00222], [00223], [00228], [00238], [00279], [00359], [00431], [00434], [00435], [00513], [00514], [00515], [00516], and [00545], and FIG. 27C. Support for claim 65 is found at least in paragraphs [00162], [00219], [00243], [00244], [00245], [00250], and [00251]. Support for claim 66 is found at least in paragraphs [00242], [00249], [00252], [00253], [00289], [00537], [00539], [00541], [00512], [00514], [00515], [00520], [00529], and [00530], and FIGS. 27B, and 27C. Support for claim 67 is found at least in paragraphs [00513], [00514], [00516], [00530], and [00541], and FIGS. 27A, 27B, and 27E. Support for claim 68 is found at least in paragraphs [00513], [00514], [00516], [00530], and [00541], and FIGS. 27A, 27B, and 27E. Support for claim 69 is found at least in paragraphs [00242], [00249], [00252], [00253], [00289], [00537], [00539], [00541], [00512], [00514], [00515], [00520], [00529], and [00530], and FIGS. 27B, 27C. Support for claim 70 is found at least in paragraphs [0086], [00100], [00144], [00151], [00152], [00153], [00154], [00155], [00156], [00157], [00158], [00159], [00517], [00519]], [00520], [00521], [00522], [00523], [00525], [00526], [00527], [00528], [00531], [00532], [00533], [00534], [00540], [00541], and [00542]. Support for claim 71 is found at least in paragraphs 00158], [00159], [00517], [00519]], [00520], [00521], [00522], [00523], [00525], [00526], [00527], [00528], [00531], [00532], [00533], [00534], [00540], [00541], and [00542]. Support for claim 72 is found at least in paragraphs [0081], [0082], [00155], [00161], [00162], and [00534], and FIG. 27A. Support for claim 73 is found at least in paragraphs [0086], [00100], [00144], [00151], [00152], [00153], [00154], [00155], [00156], [00157], [00158], [00159], [00517], [00519]], [00520], [00521], [00522], [00523], [00525], [00526], [00527], [00528], [00531], [00532], [00533], [00534], [00540], [00541], and [00542]. Support for claim 74 is found at least in paragraphs [00526] and [00533], and FIGS. 26B and 26C. Support for claim 75 is found at least in paragraphs [00521], [00525], and [00534], and FIGS. 26B and 42C. Support for claim 76 is found at least in paragraphs [00521], [00525], and [00534], and FIGS. 26B and 42C. Support for claim 77 is found at least in paragraphs [00151], [00152], [00153], [00154], [00156], [00513], [00514], [00515], and [00516]. Support for claim

78 is found at least in paragraphs [00151], [00152], [00153], [00154], [00156], [00513], [00514], [00515], [00516], [00521], [00525], [00532], and [00541], and FIGS. 26B, 27G, and 42D.

If the Examiner has any questions or needs any additional information, the Examiner is invited to contact the undersigned.

Respectfully submitted,

Date: June 22, 2011 By: _____

Marc A. Sockol
Reg. No. 40,823
Customer Number 69849
Sheppard Mullin Richter & Hampton LLP
390 Lytton Avenue
Palo Alto, CA 94301

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being filed electronically via EFS-Web addressed to the Commissioner for Patents on:

Date: June 22, 2011 By: _____
Linda K. Brost

Electronic Patent Application Fee Transmittal

Application Number:	12380773
Filing Date:	02-Mar-2009
Title of Invention:	Verifiable service policy inplementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Filer:	Marc A. Sockol/Linda Brost
Attorney Docket Number:	RALEP018

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	2202	32	26	832
Independent claims in excess of 3	2201	2	110	220
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Extension - 2 months with $0 paid	2252	1	245	245
Miscellaneous:				
		Total in USD ($)		**1297**

Electronic Acknowledgement Receipt	
EFS ID:	10365317
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy inplementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	69849
Filer:	Marc A. Sockol/Linda Brost
Filer Authorized By:	Marc A. Sockol
Attorney Docket Number:	RALEP018
Receipt Date:	22-JUN-2011
Filing Date:	02-MAR-2009
Time Stamp:	17:07:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1297
RAM confirmation Number	3951
Deposit Account	504561
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 1.17 (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 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	**Document Description**	**File Name**	**File Size(Bytes)/ Message Digest**	**Multi Part /.zip**	**Pages (if appl.)**
1		160496AmendandRespChgofEntity062211.pdf	602464 abaad2e7f724658f2631cf49c1da310144377a19	yes	27
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	2	
	Miscellaneous Incoming Letter		3	3	
	Extension of Time		4	5	
	Amendment/Req. Reconsideration-After Non-Final Reject		6	6	
	Claims		7	20	
	Applicant Arguments/Remarks Made in an Amendment		21	27	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	33622 2df9cc647dba7eaf6a70caacb29d768a518dfe98	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	636086		

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.

PTO/SB/21 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission	27

Application Number	12/380,773
Filing Date	March 2, 2009
First Named Inventor	Gregory G. Raleigh
Art Unit	2452 Conf. No. 5719
Examiner Name	Dohm Chankong
Attorney Docket Number	26WV-160496 [RALEP018]

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☒ Amendment/Reply (22 pgs.)
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☒ Extension of Time Request (2 pgs.)
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement with PTO/SB/08a/b (__ pgs.)
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation, Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Other Enclosure(s) (please Identify below):
  Notice of Change of Entity Status from Large to Small (1 pg.)

Remarks

You are hereby authorized to charge any additional fee required or credit any overpayment to Deposit Account No. 50-4561.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Sheppard, Mullin, Richter & Hampton LLP Customer No. 69849		
Signature			
Printed name	Marc A. Sockol		
Date	June 22, 2011	Reg. No.	40,823

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this correspondence is being filed electronically via EFS-Web addressed to the Commissioner for Patents on the date shown below:

Signature			
Typed or printed name	Linda K. Brost	Date	June 22, 2011

This collection of information is required by 37 CFR 1.5. 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 2 hours 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.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Gregory G. Raleigh Serial No.: 12/380,773 Filed: March 2, 2009	Examiner: Dohm Chankong Art Unit: 2452
Title: Verifiable Service Policy Implementation for Intermediate Networking Devices	

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

NOTICE OF CHANGE OF ENTITY STATUS FROM LARGE TO SMALL

Dear Sir:

The Applicant herein is now entitled to claim small entity status for the above-referenced patent application, and shall henceforth pay fees due at the small entity rate.

Please change your records to reflect this change in entity status.

No fee should be required for this change of entity status, but if such fee is determined to be owed, please charge Deposit Account No. 50-4561 for the same.

Respectfully submitted,

Date: June 22, 2011

By: 

Marc A. Sockol
Reg. No. 40,823
Customer Number 69849
Sheppard Mullin Richter & Hampton LLP
390 Lytton Avenue
Palo Alto, CA 94301-1432

PTO/SB/22 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARMENT OF COMMERCE
Under the paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless if displays a valid OMB control number.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) FY 2009 ***(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)***	Docket Number (Optional) 26WV-160496 [RALEP018]
Application Number: 12/380,773	Filed: March 2, 2009
For: Verifiable Service Policy Implementation for Intermediate Networking Devices	
Art Unit: 2452	Examiner: Dohn Chankong

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	
☐ One month (37 CFR 1.17(a)(1))	$130	$65	$
☒ Two months (37 CFR 1.17(a)(2))	$490	$245	$ 245.00
☐ Three months (37 CFR 1.17(a)(3))	$1110	$555	$
☐ Four months (37 CFR 1.17(a)(4))	$1730	$865	$
☐ Five months (37 CFR 1.17(a)(5))	$2350	$1175	$

☒ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 50-4561.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the ☐ applicant/inventor.

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

☒ attorney or agent of record. Registration Number 40,823

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____.

Signature	June 22, 2011 Date
Marc A. Sockol, Reg. No. 40,823 Typed or printed name	(650) 815-2600 Telephone Number

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

☒ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
12/380,773	03/02/2009	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	06/22/2011	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 64	Minus	** 32	= 32	X $26 =	832	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 6	Minus	***4	= 2	X $110 =	220	OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE	1052	OR	TOTAL ADD'L FEE	

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

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

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

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

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

Legal Instrument Examiner:
/PARTHENIA D. MERRILL/

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	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/380,773	03/02/2009	2452	4466	RALEP018	32	4

CONFIRMATION NO. 5719

CORRECTED FILING RECEIPT

69849
SHEPPARD, MULLIN, RICHTER & HAMPTON LLP
390 Lytton Avenue
Palo Alto, CA 94301



Date Mailed: 06/23/2011

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Gregory G. Raleigh, Woodside, CA;

Assignment For Published Patent Application

Gregory G. Raleigh

Power of Attorney: The patent practitioners associated with Customer Number 69849

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/206,354 01/28/2009
and claims benefit of 61/206,944 02/04/2009
and claims benefit of 61/207,393 02/10/2009
and claims benefit of 61/207,739 02/13/2009

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)

If Required, Foreign Filing License Granted: 03/19/2009

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/380,773**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****

Title

Verifiable service policy implementation for intermediate networking devices

Preliminary Class

709

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	RALEIGH, Gregory G.
Art Unit	2452
Examiner Name	CHANKONG, Dohm
Attorney Docket Number	26WV-160496 [RALEP018]

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6651101		2003-11-18	GAI et al	
	2	7290283		2007-10-30	COPELAND III, John A.	
	3	7401338		2008-07-15	BOWEN et al	
	4	7197321		2007-03-27	ERSKINE et al	
	5	7516219		2009-04-07	MOGHADDAM et al	
	6	7647047		2010-01-12	MOGHADDAM et al	
	7	7929960		2011-04-19	MARTIN et al	
	8	7937069		2011-05-03	RASSAM, Frederic	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	RALEIGH, Gregory G.
	Art Unit	2452
	Examiner Name	CHANKONG, Dohm
	Attorney Docket Number	26WV-160496 [RALEP018]

	9	6563806		2003-05-13	YANO et al	
	10	6532235		2003-03-11	BENSON et al	
	11	7280816		2007-10-09	FRATTI et al	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20090125619		2009-05-14	ANTANI, Snehal S.	
	2	20080212470		2008-09-04	CASTANEDA et al	
	3	20080183812		2008-07-31	PAUL et al	
	4	20060178918		2006-08-10	MIKURAK	
	5	20070294395		2007-12-20	STRUB et al	
	6	20090287921		2009-11-19	ZHU et la	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	RALEIGH, Gregory G.
	Art Unit	2452
	Examiner Name	CHANKONG, Dohm
	Attorney Docket Number	26WV-160496 [RALEP018]

	7	20080167033		2008-07-10	BECKERS, Michel	
	8	20070298764		2007-12-27	CLAYTON	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Author Unknown, "Data Roaming Tariffs - Transparency Measures." EUROPA - Europe's Information Society Thematic Portal website, date unknown.	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	RALEIGH, Gregory G.
	Art Unit	2452
	Examiner Name	CHANKONG, Dohm
	Attorney Docket Number	26WV-160496 [RALEP018]

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

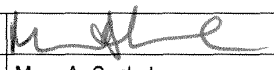
☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2011-07-21
Name/Print	Marc A. Sockol	Registration Number	40,823

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal	
Application Number:	12380773
Filing Date:	02-Mar-2009
Title of Invention:	Verifiable service policy implementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Filer:	Marc A. Sockol/Linda Brost
Attorney Docket Number:	RALEP018
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	10572221
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy implementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	69849
Filer:	Marc A. Sockol/Linda Brost
Filer Authorized By:	Marc A. Sockol
Attorney Docket Number:	RALEP018
Receipt Date:	21-JUL-2011
Filing Date:	02-MAR-2009
Time Stamp:	19:42:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	7844
Deposit Account	504561
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 1.17 (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 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	**Document Description**	**File Name**	**File Size(Bytes)/ Message Digest**	**Multi Part /.zip**	**Pages (if appl.)**
1		160496-RALEP018-IDS072111.pdf	443849 bf4646c737c5b899c6f4db5b656ad7b6d5746f52	yes	13
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Information Disclosure Statement (IDS) Form (SB08)		1	5	
	Non Patent Literature		6	13	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30270 4cbe2af5ef1efba717e37249fd647b15fa8bf569	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	474119		

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.
12/380,773	03/02/2009	Gregory G. Raleigh	RALEP018	5719

69849 7590 09/12/2011

SHEPPARD, MULLIN, RICHTER & HAMPTON LLP
390 Lytton Avenue
Palo Alto, CA 94301

EXAMINER	
CHANKONG, DOHM	
ART UNIT	PAPER NUMBER
2452	
MAIL DATE	DELIVERY MODE
09/12/2011	PAPER

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

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

Office Action Summary	Application No.	Applicant(s)	
	12/380,773	RALEIGH, GREGORY G.	
	Examiner	Art Unit	
	DOHM CHANKONG	2452	

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

Period for Reply

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

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

Status

1)☒ Responsive to communication(s) filed on *22 June 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1-18 and 33-78* is/are pending in the application.

5a) Of the above claim(s) *1-18 and 33-78* is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☐ Claim(s) _____ is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

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

Priority under 35 U.S.C. § 119

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

a)☐ All b)☐ Some * c)☐ None of:

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

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

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

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

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/21/2011*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This final rejection is in response to Applicant's amendment filed on 6/22/2011. Applicant amends claims 1-18, cancels claims 19-32, and adds claims 33-78. Accordingly, Applicant presents claims 1-18 and 33-78 for further examination.

I. INFORMATION DISCLOSURE STATEMENT

The examiner has considered the information disclosure statement filed on 7/21/2011.

II. ELECTION BY ORIGINAL PRESENTATION

Newly submitted claims 1-18 and 33-78 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

If, after an office action on an application, the applicant presents claims directed to an invention distinct from and independent of the invention previously claimed, the applicant will be required to restrict the claims to the invention previously claimed if the amendment is entered, subject to reconsideration and review as provided in 37 CFR 1.143 and 1.144. *See* MPEP § 821.03 (citing 37 CFR 1.145).

A. Original claim 1 and amended claim 1 are "independent" under the meaning provided by MPEP § 802.01.

The term "independent" (i.e., "unrelated) means that there is no disclosed relationship between the two or more inventions claimed, that is, they are unconnected in design, operation, and effect. MPEP § 802.01. Therefore, inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects.

Here, amended claim 1 recites a system with a first end user device that:

1. is capable of acting as an intermediate networking device where the end-user device forwards traffic between an access network and other end-user devices according to a trusted forwarding policy associated with policy settings; and

2. provides a user interface to access the first end user device allowing modification of policy settings on the first end-user device.

Original claim 1 recited an intermediate network device that:

1. acts as a service intermediary between a network and communication devices; and

2. implements a service policy set comprising service policies that are used to monitor services used by the intermediate network device or communication devices; and

3. verifying the implementation of the policy set.

There is no disclosure that the first end user device of amended claim 1 may be used together with the intermediate network device of original claim 1. The inventions have different designs (e.g., amended claim 1 requires providing a user interface that allows a user to modify policy settings), mode of operation (e.g., amended claim 1 requires implementing a forwarding policy at an end user device), and effect (e.g., amended claim 1 is directed to forwarding traffic between the end user devices and a network while original claim 1 is directed to monitoring use of service sets).

There is nothing in original claim 1 concerning end user devices, a first end user device acting as an intermediate device, the intermediate network device forwarding traffic between the end user devices and a network, or providing a user interface to the intermediate network device.

Moreover, dependent claims 2-18 have been extensively amended, replacing what had been claimed with entirely new features, and they share no subject matter with original claims 2-18.

In other words, Applicant hasn't merely amended the intermediate device to be a end user device or amended the service policy set to be a forwarding policy but instead has added entirely new features and functions that are unrelated to the originally claimed invention. For the foregoing reasons, the examiner believes that the amended claims are directed to an invention independent and distinct from the originally claimed invention.

Similar remarks apply to independent claims 60, 61, 70, 71, and 73.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 1-18 and 33-78 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

II. CONCLUSION

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DOHM CHANKONG whose telephone number is (571)272-3942. The examiner can normally be reached on Monday to Friday [10 am - 6 pm].

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thu Nguyen can be reached on (571)272-6967. 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.

/DOHM CHANKONG/
Primary Examiner, Art Unit 2452

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12380773	RALEIGH, GREGORY G.
	Examiner	Art Unit
	DOHM CHANKONG	2452

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
east text search	1/26/11	DC
consulted with QAS Beatriz Prieto and SPE Thu Nguyen concerning possible election by original presentation	9/6/11	DC

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	RALEIGH, Gregory G.
Art Unit	2452
Examiner Name	CHANKONG, Dohm
Attorney Docket Number	26WV-160496 [RALEP018]

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6651101		2003-11-18	GAI et al	
	2	7290283		2007-10-30	COPELAND III, John A.	
	3	7401338		2008-07-15	BOWEN et al	
	4	7197321		2007-03-27	ERSKINE et al	
	5	7516219		2009-04-07	MOGHADDAM et al	
	6	7647047		2010-01-12	MOGHADDAM et al	
	7	7929960		2011-04-19	MARTIN et al	
	8	7937069		2011-05-03	RASSAM, Frederic	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /D.C./

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	RALEIGH, Gregory G.
	Art Unit	2452
	Examiner Name	CHANKONG, Dohm
	Attorney Docket Number	26WV-160496 [RALEP018]

	9	6563806		2003-05-13	YANO et al	
	10	6532235		2003-03-11	BENSON et al	
	11	7280816		2007-10-09	FRATTI et al	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20090125619		2009-05-14	ANTANI, Snehal S.	
	2	20080212470		2008-09-04	CASTANEDA et al	
	3	20080183812		2008-07-31	PAUL et al	
	4	20060178918		2006-08-10	MIKURAK	
	5	20070294395		2007-12-20	STRUB et al	
	6	20090287921		2009-11-19	ZHU et la	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /D.C./

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	RALEIGH, Gregory G.
	Art Unit	2452
	Examiner Name	CHANKONG, Dohm
	Attorney Docket Number	26WV-160496 [RALEP018]

	7	20080167033		2008-07-10	BECKERS, Michel	
	8	20070298764		2007-12-27	CLAYTON	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Author Unknown, "Data Roaming Tariffs - Transparency Measures." EUROPA - Europe's Information Society Thematic Portal website, date unknown.	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/Dohm Chankong/ (09/07/2011)	Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /D.C./

PTO/SB/30 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Request for Continued Examination (RCE) Transmittal

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	12/380,773
Filing Date	March 2, 2009
First Named Inventor	Gregory G. RALEIGH
Art Unit	2452 Conf. No. 5719
Examiner Name	Dohm Chankong
Attorney Docket Number	26WV-160496 [RALEP018]

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2

1. Submission required under 37 CFR 1.114 Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

   a. ☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

      i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

      ii. ☐ Other _____

   b. ☒ Enclosed

      i. ☒ Amendment/Reply (12 pages)
      ii. ☐ Affidavit(s)/ Declaration(s)
      iii. ☐ Information Disclosure Statement (IDS)
      iv. ☒ Other Petition for Extension of Time (1 page)

2. Miscellaneous

   Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a

   a. ☐ period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

   b. ☐ Other _____

3. Fees The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.
   The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments, to

   a. ☒ Deposit Account No. 50-4561.

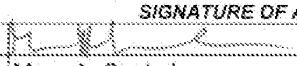
      i. ☒ RCE fee required under 37 CFR 1.17(e)
      ii ☒ Extension of time fee (37 CFR 1.136 and 1.17)
      iii ☐ Other _____

   b. ☐ Check in the amount of $ _____ enclosed

   c. ☐ Payment by credit card (Form PTO-2038 enclosed)

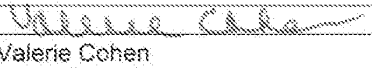
WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Signature		Date	March 9, 2012
Name (Print/Type)	Marc A. Sockol	Registration No.	40,823

CERTIFICATE OF TRANSMISSION

I hereby certify that this correspondence is being filed electronically via EFS-Web addressed to the Commissioner for Patents on the date shown below:

Signature			
Name (Print/Type)	Valerie Cohen	Date	March 9, 2012

This collection of information is required by 37 CFR 1.114. This 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: Mail Stop RCE, 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.

American LegalNet, Inc.
www.FormsWorkflow.com

PTO/SB/22 (09-11)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARMENT OF COMMERCE
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

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) 26WV-160496 [RALEP018]
Application Number: 12/380,773	Filed: March 2, 2009
For: VERIFIABLE SERVICE POLICY IMPLEMENTATION FOR INTERMEDIATE NETWORKING DEVICES	
Art Unit: 2452	Examiner: Dohm Chankong

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	
☐ One month (37 CFR 1.17(a)(1))	$150	$75	$
☐ Two months (37 CFR 1.17(a)(2))	$560	$280	$
☒ Three months (37 CFR 1.17(a)(3))	$1270	$635	$ 1,270.00
☐ Four months (37 CFR 1.17(a)(4))	$1980	$990	$
☐ Five months (37 CFR 1.17(a)(5))	$2690	$1345	$

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 50-4561.

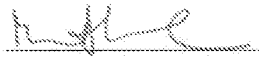
WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the ☐ applicant/inventor.

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

☒ attorney or agent of record. Registration Number 40,823.

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____.



Signature

March 9, 2012
Date

Marc A. Sockol, Reg. No. 40,823
Typed or printed name

(650) 815-2600
Telephone Number

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

☒ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Gregory G. RALEIGH Serial No.: 12/380,773 Filed: March 2, 2009	Examiner: Dohm Chankong Art Unit: 2452 Confirmation No.: 5719
Title: VERIFIABLE SERVICE POLICY IMPLEMENTATION FOR INTERMEDIATE NETWORKING DEVICES	

AMENDMENT WITH RCE

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

Sir:

In response to the Office Action dated September 12, 2011, the deadline for response ending on March 12, 2012 with the enclosed request for a three-month extension of time and RCE, please amend the above-identified application as follows and consider the following remarks.

REMARKS

Claims 1-18 and 33-78 were pending and rejected. Claims 1-78 are being canceled. Claims 79-94 are being added. Claims 79-94 are now pending. Reconsideration is respectfully requested.

The Examiner asserted that claims 1-18 as amended and claims 33-78 as added were directed to an invention independent or distinct from the invention of the claims as originally filed and examined. Accordingly, Applicant is canceling claims 1-18 and 33-78, and intends to pursue them in continuations/divisions. Applicant is adding new claims 79-94. New claims 79-94 effectively resurrect claims 1, 19 and 20 of the original independent claims, with certain amendments to clarify the invention and to address the rejections presented in the first office action. Claims 80-92 depend from claim 79, and thus are necessarily part of the invention of claim 79.

For convenience, Applicant provides the following redlined versions of claims 79, 93 and 94 to show the amendments made relative to the original claims 1, 20 and 19, respectively.

79. (New) A first end-user device capable of operating as an intermediate networking device, the first end-user device ~~system~~ comprising:

at least one processor ~~of an intermediate networking device~~ configured to:

act as a service intermediary or intermediate connection between a first network and one or more other end-user ~~communications~~ devices;

implement a first service policy set for assisting in control of the ~~intermediate networking device~~ use of a first service set on the first network, the first service policy set including one or more first service policies associated with the first end-user ~~intermediate networking~~ device or the one or more other end-user ~~communications~~ devices ~~connected to the intermediate networking device~~, the first service set including ~~being~~ one or more first network services used by the first end-user ~~intermediate networking~~ device or the one or more other end-user ~~communications~~ devices; and

monitor use or attempted use of the first service set based on the first service policy set; and

[[a]] memory ~~of the intermediate networking device~~ coupled to the at least one processor and configured to provide the at least one processor with instructions;

~~wherein the implementation of the first service policy set is verified~~.

93. (New) A ~~computer program product, the~~ computer program product ~~being~~ embodied in a non-transitory computer readable storage medium and comprising computer instructions for:

enabling a first end-user device capable of operating as an intermediate networking device to operate as ~~providing~~ a service intermediary or to provide an intermediate connection between a first network and one or more end-user ~~communications~~ devices;

implementing a first service policy set for assisting in control of the ~~intermediate networking device~~ use of a first service set on the first network, the first service policy set including one or more first service policies associated with the first end-user ~~intermediate networking~~ device or the one or more other end-user ~~communications~~ devices ~~connected to the intermediate networking device~~, the first service set including ~~being~~ one or more first network services used by the first end-user ~~intermediate networking~~ device or the one or more other end-user ~~communications~~ devices; and

monitoring use or attempted use of the first service set based on the first service policy set~~, wherein the implementation of the first service policy set is verified~~.

94. (New) A method performed by a first end-user device capable of operating as an intermediate networking device, the method comprising:

enabling a first end-user device to operate as ~~providing~~ a service intermediary or to provide an intermediate connection between a first network and one or more end-user ~~communications~~ devices;

implementing a first service policy set for assisting in control of the ~~intermediate networking device~~ use of a first service set on the first network, the first service policy set including one or more first service policies associated with the first end-user ~~intermediate networking~~ device or the one or more other end-user ~~communications~~ devices ~~connected to the intermediate networking device~~, the first service set including ~~being~~ one or more first network services used by the first end-user ~~intermediate networking~~ device or the one or more other end-user ~~communications~~ devices; and

monitoring use or attempted use of the first service set based on the first service policy set~~, wherein the implementation of the first service policy set is verified~~.

As can be readily seen, Applicant is amending claim 79 to narrow the "system" to an end-user device capable of operating as an intermediate networking device and to narrow the communications devices to other end-user devices. Applicant is also amending claim 79 to specify that one or more processors can perform the listed functions. Further, Applicant is amending claim 79 to specify that the first service policy set may be verified or not. Claims 93 and 94 are being amended similarly. Applicant respectfully submits that these amendments do not materially alter the focus of the original claims, and thus maintain the claims within the scope of the invention elected by original presentation.

Referring to the first office action dated February 3, 2011, we provide the following comments:

In section IIA, the Examiner issued a provisional obvious-type double patenting rejection of claims 1-12 and 14-20 over claims 1-19 of co-pending application No. 12/380,769. Applicant canceled these claims and added new claims 79-94. Applicant respectfully requests that the Examiner reconsider whether the obvious-type double patent rejection is still proper.

In section IIB, the Examiner issued a provisional obvious-type double patenting rejection of claims 1-8 over claims 1-8 of co-pending application No. 12/380,774. Applicant

canceled these claims and added new claims 79-94. Applicant respectfully requests that the Examiner reconsider whether the obvious-type double patent rejection is still proper.

In section IIC, the Examiner issued a provisional obvious-type double patenting rejection of claims 1-8, 19 and 20 over claims 1-8, 21 and 22 of co-pending application No. 12/380,771. Applicant canceled these claims and added new claims 79-94. Applicant respectfully requests that the Examiner reconsider whether the obvious-type double patent rejection is still proper.

In section III, the Examiner rejected claim 20 under 35 USC § 101 as directed to nonstatutory subject matter. Claim 20 is being canceled. Claim 93 is being added. Applicant responds to the rejection with regard to new claim 93. Claim 93 includes the limitation "non-transitory." Accordingly, Applicant respectfully submits that the rejection of claim 20 is not applicable to new claim 93.

In section IV, the Examiner rejected claims 1-8, 13, 19-27, 29 and 31 under 35 USC § 102(b) as anticipated by *Klinker*. Claims 1-8, 13, 19-27, 29 and 31 are being canceled. Claims 79, 93 and 94 are being added. Applicant respectfully responds to the rejection with regard to new claims 79, 93 and 94. *Klinker* teaches a router that routes data over multiple networks. *Klinker* does not teach an end-user device capable of operating as an intermediate networking device, as recited in claims 79, 93 and 94. Accordingly, Applicant respectfully submit that the rejection is not applicable to new claims 79, 93 or 94.

In section V(A), the Examiner rejected claims 9-12, 14-18 and 28 under 35 USC § 103 over *Kinker* in view of *Pandya*. The Examiner noted that *Kinker* does not teach that the agents can be located on a communications device like a client computer. The Examiner then asserted that *Pandya* teaches such a feature. *Pandya* discloses a centrally located and controlled policy that controls multiple agents and control units. See paragraphs [0046] and [0073], and FIG. 4. *Pandya* does not teach an end-user device capable of operating as an intermediate networking device, as recited in claim 79, 93 and 94. Accordingly, Applicant respectfully submit that the rejection is not applicable to new claims 79, 93 or 94.

In section V(B), the Examiner rejected claims 30 and 32 under 35 USC § 103 as obvious over *Klinker* in view of *Anderholm*. The Examiner noted that *Klinker* does not teach encrypting usage reports. The Examiner then asserted that *Anderholm* teaches such a feature. *Anderholm* does not teach an end-user device capable of operating as an intermediate networking device, as recited in claim 79, 93 and 94. Accordingly, Applicant respectfully submit that the rejection is not applicable to new claims 79, 93 or 94.

Support for the amendments to claim 79 can be found at least in paragraphs [0086], [00100], [00144], [00151], [00152], [00153], [00154], [00155], [00156], [00157], [00158], [00159]], [00186], [00311], [00517], [00519]], [00520], [00521], [00522], [00523], [00525], [00526], [00527]], [00528], [00531], [00532], [00533], [00535], [00536], [00540], [00541], and [00542], and FIGS. 27A, 27B, 27C, 27D, 27E, 29A, 29B, and 29C. Support for claim 80 as amended is found at least in paragraphs [0081], [0082], [00101], [00155], [00161], [00162], [00514], [00530], [00534], and [00541], and FIGS. 27A, 27B, and 27E. Support for claim 81 as amended is found at least in paragraphs [00151], [00152], [00153], [00154], [00156], and [00513] – [00516]. Support for claim 82 is found at least in paragraphs [00144], [00145], [00151], [00156], [00157], [00158], [00515], and [00516]. Support for claim 83 is found at least in paragraphs [00135], [00136], [00144], [00145]], [00151], [00156], [00157], [00158], [00515], and [00516]. Support for claim 84 as amended is found at least in paragraphs [00151], [00152], [00153], [00154], [00155], [00204], [00207], [00213], [00219], [00236], [00244], [00245], [00274]], [00255], [00341], [00372], [00513], [00514], [00515], [00516], [00518], [00520], [00545], and FIG. 27A. Support for claim 85 as amended is found at least in paragraphs [00151], [00152], [00153], [00154], [00155], [00204], [00207], [00213], [00219], [00236], [00244], [00245], [00274]], [00255], [00341], [00372], [00513], [00514], [00515], [00516], [00518], [00520], [00545], and FIG. 27A. Support for claim 86 as amended is found at least in paragraphs [00162], [00219], [00243], [00244], [00245], [00250], and [00251]. Support for claim 87 as amended is found at least in paragraphs [00162], [00219], [00243], [00244], [00245], [00250], and [00251], and FIG. 26D. Support for claim 88 as amended is found at least in paragraphs [00162], [00219], [00243], [00244], [00245], [00250], and [00251], and FIG. 26D. Support for claim 89 is found at least in paragraphs [00513], [00517], [00518], [00520], [00521], [00522], [00523], [00528], [00529], [00530], and [00545]. Support

for claim 90 is found at least in paragraphs [00525], [00526], [00532], [00534], and [00545]. Support for claim 91 is found at least in paragraphs [00222], [00223], [00228], [00238], [00359], [00279], [00188], [00431], [00434], [00435], [00513], [00514], [00515], and [00516], and FIG. 27C. Support for claim 92 is found at least in original claim 21. Support for the amendments to claim 93 can be found at least in paragraphs [0086], [00100], [00144], [00151], [00152], [00153], [00154], [00155], [00156], [00157], [00158], [00159]], [00186], [00311], [00517], [00519]], [00520], [00521], [00522], [00523], [00525], [00526], [00527]], [00528], [00531], [00532], [00533], [00535], [00536], [00540], [00541], and [00542], and FIGS. 27A, 27B, 27C, 27D, 27E, 29A, 29B, and 29C. Support for the amendments to claim 94 can be found at least in paragraphs [0086], [00100], [00144], [00151], [00152], [00153], [00154], [00155], [00156], [00157], [00158], [00159]], [00186], [00311], [00517], [00519]], [00520], [00521], [00522], [00523], [00525], [00526], [00527]], [00528], [00531], [00532], [00533], [00535], [00536], [00540], [00541], and [00542], and FIGS. 27A, 27B, 27C, 27D, 27E, 29A, 29B, and 29C. Applicant respectfully submits that no new matter is being added.

If the Examiner has any questions or needs any additional information, the Examiner is invited to contact the undersigned.

Respectfully submitted,

Date: March 9, 2012 By: _____

Marc A. Sockol
Reg. No. 40,823
Customer Number 69849
Sheppard Mullin Richter & Hampton LLP
379 Lytton Avenue
Palo Alto, CA 94301

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being filed electronically via EFS-Web addressed to the Commissioner for Patents on:

Date: March 9, 2012 By: _____
Valerie Cohen

Electronic Patent Application Fee Transmittal

Application Number:	12380773
Filing Date:	02-Mar-2009
Title of Invention:	Verifiable service policy implementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Filer:	Marc A. Sockol/Valerie Cohen
Attorney Docket Number:	26WV-160496 [RALEP018]

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with $0 paid	1253	1	1270	1270

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	930	930
		Total in USD ($)		**2200**

Electronic Acknowledgement Receipt	
EFS ID:	12273450
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy implementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	69849
Filer:	Marc A. Sockol/Valerie Cohen
Filer Authorized By:	Marc A. Sockol
Attorney Docket Number:	26WV-160496 [RALEP018]
Receipt Date:	09-MAR-2012
Filing Date:	02-MAR-2009
Time Stamp:	19:10:29
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$2200
RAM confirmation Number	6423
Deposit Account	504561
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)	

File Listing:					
Document Number	**Document Description**	**File Name**	**File Size(Bytes)/ Message Digest**	**Multi Part /.zip**	**Pages (if appl.)**
1	Request for Continued Examination (RCE)	RCE.pdf	250031 4de1c08af42a8a9d67282b403c980fd0b99aa3b5	no	1
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
2	Extension of Time	Ext.pdf	202398 4958e39176fc2b1393d470ff97e418ee64ead720	no	1
Warnings:					
Information:					
3		Resp.pdf	1754866 bea6272f48a236192b33dbeb232382e09c1edf32	yes	12

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment Submitted/Entered with Filing of CPA/RCE	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	12

Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	32266 d17b5e787f9f8e3419d08727b27530379d54d36a	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	2239561	

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.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/380,773	Filing Date 03/02/2009	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	03/09/2012	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	* 16	Minus	** 64	= 0	X $30 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 3	Minus	***6	= 0	X $125 =	0	OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)					
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/PEARLIE A. FENNELL/

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.

LISTING OF THE CLAIMS

Please replace prior listings of the claims with the following listing of the claims:

1-78. (Canceled)

79. (New) A first end-user device capable of operating as an intermediate networking device, the first end-user device comprising:

at least one processor configured to:

act as a service intermediary or intermediate connection between a first network and one or more other end-user devices;

implement a first service policy set for assisting in control of the use of a first service set on the first network, the first service policy set including one or more first service policies associated with the first end-user device or the one or more other end-user devices, the first service set including one or more first network services used by the first end-user device or the one or more other end-user devices; and

monitor use or attempted use of the first service set based on the first service policy set; and

memory coupled to the at least one processor and configured to provide the at least one processor with instructions.

80. (New) The first end-user device of claim 79, wherein the first service policy set assists in controlling whether the first end-user device is authorized to operate as the intermediate networking device.

81. (New) The first end-user device of claim 79, wherein the first end-user device further comprises a first modem to connect with the access network and a second modem to connect with the one or more other end-user devices.

82. (New) The first end-user device of claim 79, wherein the first network includes one of a 2G, 3G, 4G or WiFi network.

83. (New) The first end-user device of claim 79, wherein the first end-user device connects to the other end-user devices using one or more of the following connection types: WiFi, Bluetooth, USB, Ethernet, FireWire, near field communication.

84. (New) The first end-user device of claim 79, wherein the at least one processor is further configured to perform one or more of:

identify one or more network types over which the first end-user device is authorized to act as the intermediate networking device;

identify one or more particular networks, network identifiers, access point identifiers or base station identifiers over which the first end-user device is authorized to act as the intermediate networking device;

identify one or more geographic locations or regions in which the intermediate networking device forwarding service is to be active or modified;

identify one or more time windows during which the first end-user device is authorized to act as the intermediate networking device;

identify one or more network congestion levels during which the first end-user device is authorized to act as the intermediate networking device;

identify one or more quality of service classes for which the first end-user device is authorized to act as the intermediate networking device;

identify one or more network destinations for which the first end-user device is authorized to act as the intermediate networking device;

identify one or more applications for which the first end-user device is authorized to act as the intermediate networking device;

identify one or more other end-user devices for which the first end-user device is authorized to act as the intermediate networking device;

identify a limit on the number of other end-user devices for which the first end-user device is authorized to act as the intermediate networking forwarding service; and

identify one or more traffic types for which the first end-user device is authorized to act as the intermediate networking device, the one or more traffic types including one or more of content type, file type, protocol type, class of service, transaction type, and level of quality of service.

85. (New) The first end-user device of claim 79, wherein the at least one processor is further configured to set traffic speed.

86. (New) The first end-user device of claim 79, wherein the at least one processor is further configured to notify a user when the first end-user device is authorized to act as the intermediate networking device.

87. (New) The first end-user device of claim 79, wherein the at least one processor is further configured to notify a user when the first end-user device is authorized to act as the intermediate networking device over a roaming network.

88. (New) The first end-user device of claim 79, wherein the at least one processor is further configured to implement a different intermediate networking device service characteristic in accordance with the first service policy set based on whether the first end-user device is connected to a home network or a roaming network.

89. (New) The first end-user device of claim 79, wherein the at least one processor is configured to implement a different intermediate networking device service characteristic in accordance with the first service policy set based on identification information of a particular one of the one or more other end-user devices or identification information of a particular user of a particular one of the one or more other end-user devices.

90. (New) The first end-user device of claim 79, further comprising a device agent, and wherein the device agent is configured to notify a user when one of the one or more other end-user devices attempts to or succeeds in connecting to the first end user device.

91. (New) The first end-user device of claim 79, wherein the first end-user device can monitor service usage and can modify a predetermined policy setting when the service usage meets a predetermined condition.

92. (New) The first end-user device of claim 79, further comprising

collecting a plurality of service usage measurements for the one or more other end-user devices use of the first service set on the first network; and

evaluating the plurality of service usage measurements based on the first service policy set.

93. (New) A computer program product embodied in a non-transitory computer readable storage medium and comprising computer instructions for:

enabling a first end-user device capable of operating as an intermediate networking device to operate as a service intermediary or to provide an intermediate connection between a first network and one or more end-user devices;

implementing a first service policy set for assisting in control of the use of a first service set on the first network, the first service policy set including one or more first service policies associated with the first end-user device or the one or more other end-user devices, the first service set including one or more first network services used by the first end-user device or the one or more other end-user devices; and

monitoring use or attempted use of the first service set based on the first service policy set.

94. (New) A method performed by a first end-user device capable of operating as an intermediate networking device, the method comprising:

enabling a first end-user device to operate as a service intermediary or to provide an intermediate connection between a first network and one or more end-user devices;

implementing a first service policy set for assisting in control of the use of a first service set on the first network, the first service policy set including one or more first service policies associated with the first end-user device or the one or more other end-user devices, the first service set including one or more first network services used by the first end-user device or the one or more other end-user devices; and

monitoring use or attempted use of the first service set based on the first service policy set.

Document code: WFEE

United States Patent and Trademark Office
Sales Receipt for Accounting Date: 08/14/2012

FFIELDS ADJ #00000001 Mailroom Dt: 03/09/2012
Seq No: 6423 Sales Acctg Dt: 03/12/2012 504561 12380773
01 FC : 1253 1270.00 CR

Document code: WFEE

United States Patent and Trademark Office
Sales Receipt for Accounting Date: 08/15/2012

CSIAS1 ADJ #00000001 Mailroom Dt: 03/09/2012
Seq No: 6423 Sales Acctg Dt: 03/12/2012 504561 12380773
02 FC : 1801 930.00 CR

Document code: WFEE

United States Patent and Trademark Office
Sales Receipt for Accounting Date: 08/15/2012

CSIAS1 SALE #00000001 Mailroom Dt: 03/09/2012 504561 12380773

01	FC : 2801	465.00	DA
02	FC : 2253	635.00	DA

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Gregory G. Raleigh
Art Unit	2452
Examiner Name	Dohm Chankong
Attorney Docket Number	26WV-160496 [RALEP018]

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5794142		1998-08-11	VANTTILA et al.	
	2	5903845		1999-05-11	BUHRMANN et al.	
	3	5933778		1999-08-03	BUHRMANN et al.	
	4	6078953		2000-06-20	VAID et al.	
	5	6317584		2001-11-13	ABU-AMARA et al.	
	6	6449479		2002-09-10	SANCHEZ, Eduardo	
	7	6603969		2003-08-05	VUORISTO et al.	
	8	6658254		2003-12-02	PURDY et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

	9	6785889		2004-08-31	WILLIAMS, Peter	
	10	6829596		2004-12-07	FRAZEE, Steve	
	11	6829696		2004-12-07	BALMER et al.	
	12	6920455		2005-07-19	WESCHLER, Paul	
	13	6998985		2006-02-14	REISMAN et al.	
	14	7024200		2006-04-04	McKENNA et al.	
	15	7027408		2006-04-11	NABKEL, et al.	
	16	7092696		2006-08-15	HOSAIN et al.	
	17	7158792		2007-01-02	COOK et al.	
	18	7174174		2007-02-06	BORIS et al.	
	19	7180855		2007-02-20	LIN	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

	20	7280818		2007-10-09	CLAYTON, Steve	
	21	7324447		2008-01-29	MORFORD	
	22	7421004		2008-09-02	FEHER, Kamilo	
	23	7450591		2008-11-11	KORLING, et al.	
	24	7486185		2009-02-03	CULPEPPER et al.	
	25	7574731		2009-08-11	FASCENDA, Anthony C.	
	26	7580857		2009-08-25	VanFLEET, et al.	
	27	7617516		2009-11-10	HUSLAK, et al.	
	28	7620065		2009-11-17	FALARDEAU, Eric	
	29	7620162		2009-11-17	AARON et al.	
	30	7668903		2010-02-23	EDWARDS, et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

	31	7720505		2010-05-18	GOPI, et al.	
	32	7797204		2010-09-14	BALENT, Bruce F.	
	33	7848768		2010-12-07	OMORI, et al.	
	34	7868778		2011-01-11	KENWRIGHT, David Norris	
	35	7873705		2011-01-18	KALISH, Dan	
	36	7882029		2011-02-01	WHITE, Craig R.	
	37	7941184		2011-05-10	PRENDERGAST et al.	
	38	7957511		2011-06-07	DRUDIS et al.	
	39	7975184		2011-07-05	GOFF et al.	
	40	7986935		2011-07-26	D'SOUZA et al.	
	41	8005459		2011-08-23	BALSILLIE, Jim	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

	42	8010080		2011-08-30	THENTHIRUPERAI, et al.	
	43	8010081		2011-08-30	ROSKOWSKI, Steve	
	44	8015133		2011-09-06	WU, et al.	
	45	8015234		2011-09-06	LUM et al.	
	46	8023425		2011-09-20	RALEIGH, Gregory G.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20020120540		2002-08-29	KENDE et al.	
	2	20020131404		2002-09-19	MEHTA et al.	
	3	20030013434		2003-01-16	ROSENBERG et al.	
	4	20040132427		2004-07-08	LEE et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

	5	20040249918		2004-12-09	SUNSHINE	
	6	20050048950		2005-03-03	MORPER	
	7	20050254435		2005-11-17	MOAKLEY et al.	
	8	20060014519		2006-01-19	MARSH et al.	
	9	20060112016		2006-05-25	ISHIBASHI	
	10	20060199608		2006-09-07	DUNN et al.	
	11	20060258341		2006-11-16	MILLER et al.	
	12	20070093243		2007-04-26	KAPADEKAR et al.	
	13	20070259673		2007-11-08	WILLARS et al.	
	14	20070263558		2007-11-15	SALOMONE	
	15	20080010452		2008-01-10	HOLTZMAN et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

	16	20080049630		2008-02-28	KOZISEK et al.	
	17	20080060066		2008-03-06	WYNN et al.	
	18	20080062900		2008-03-13	RAO	
	19	20080147454		2008-06-19	WALKER et al.	
	20	20080162637		2008-07-03	ADAMCZYK et al.	
	21	20080164304		2008-07-10	NARASIMHAN	
	22	20080167027		2008-07-10	GAUTIER et al.	
	23	20080207167		2008-08-28	BUGENHAGEN	
	24	20080221951		2008-09-11	STANFORTH et al.	
	25	20080256593		2008-10-16	VINBERG	
	26	20080311885		2008-12-18	DAWSON et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

	27	20080318547		2008-12-25	BALLOU et al.	
	28	20080319879		2008-12-25	CARROLL et al.	
	29	20090005005		2009-01-01	FORSTALL et al.	
	30	20090068984		2009-03-12	BURNETT	
	31	20090077622		2009-03-19	BAUM et al.	
	32	20090197585		2009-08-06	AARON, Jeffrey A.	
	33	20090257379		2009-10-15	ROBINSON et al.	
	34	20090286507		2009-11-19	O'NEAL et al.	
	35	20090288140		2009-11-19	HUBER et al.	
	36	20100017506		2010-01-21	FADELL	
	37	20100042675		2010-02-18	FUJII	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

	38	20100082431		2010-04-01	RAMER et al.	
	39	20100188975		2010-07-29	RALEIGH, Gregory G.	
	40	20100188990		2010-07-29	RALEIGH, Gregory G.	
	41	20100188992		2010-07-29	RALEIGH, Gregory G.	
	42	20100188994		2010-07-29	RALEIGH, Gregory G.	
	43	20100191576		2010-07-29	RALEIGH, Gregory G.	
	44	20100191612		2010-07-29	RALEIGH, Gregory G.	
	45	20100191846		2010-07-29	RALEIGH, Gregory G.	
	46	20100192170		2010-07-29	RALEIGH, Gregory G.	
	47	20100192212		2010-07-29	RALEIGH, Gregory G.	
	48	20100195503		2010-08-05	RALEIGH, Gregory G.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

	49	20100197268		2010-08-05	RALEIGH, Gregory G., et al.	
	50	20100198698		2010-08-05	RALEIGH, Gregory G., et al.	
	51	20100198939		2010-08-05	RALEIGH, Gregory G., et al.	
	52	20100325420		2010-12-23	KANEKAR	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2010088413	WO		2010-08-05	Headwater Partners I LLC		☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Search Report and Written Opinion mailed 23 March 2010 from International Serial Number PCT/US2010/021393 filed 19 January 2010.	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Marc A. Sockol/	Date (YYYY-MM-DD)	2012-05-08
Name/Print	Marc A. Sockol	Registration Number	40823

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
5 August 2010 (05.08.2010)

PCT

(10) International Publication Number
WO 2010/088413 A1

(51) International Patent Classification:
H04L 29/08 (2006.01)

(21) International Application Number:
PCT/US2010/022438

(22) International Filing Date:
28 January 2010 (28.01.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

61/206,354	28 January 2009 (28.01.2009)	US
61/206,944	4 February 2009 (04.02.2009)	US
61/207,393	10 February 2009 (10.02.2009)	US
61/207,739	13 February 2009 (13.02.2009)	US
12/380,780	2 March 2009 (02.03.2009)	US
61/270,353	6 July 2009 (06.07.2009)	US
12/695,019	27 January 2010 (27.01.2010)	US
12/695,021	27 January 2010 (27.01.2010)	US

(71) Applicant *(for all designated States except US)*: **HEADWATER PARTNERS I LLC** [US/US]; 12995 Woodside Road, Suite 400, Woodside, CA 94062 (US).

(72) Inventor: **RALEIGH, Gregory, G.**; 12995 Woodside Road, Suite 400, Woodside, CA 94062 (US).

(74) Agent: **SCHALLOP, Michael, J.**; Van Pelt, Yi & James LLP, 10050 N. Foothill Blvd., Suite 200, Cupertino, CA 95014 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

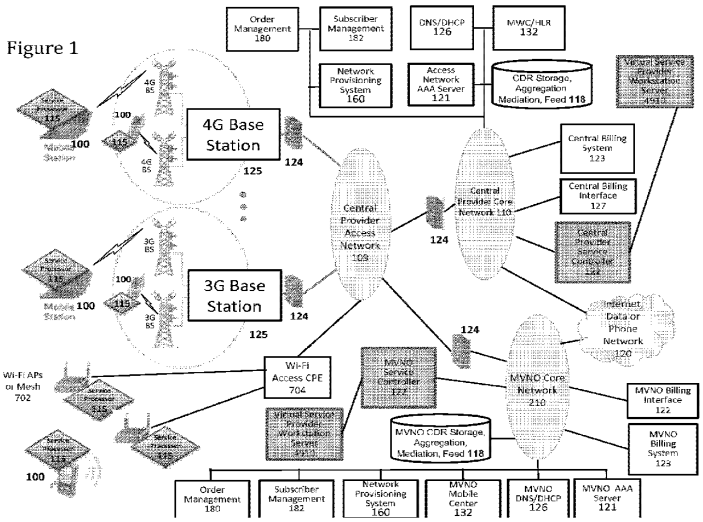
(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

(54) **Title**: ENHANCED ROAMING SERVICES AND CONVERGED CARRIER NETWORKS WITH DEVICE ASSISTED SERVICES AND A PROXY

Figure 1



(57) **Abstract**: Enhanced roaming services and converged networks with device assisted services and a proxy is provided. In some embodiments, enhanced roaming services and converged networks with device assisted services and a proxy includes collecting device generated service usage information for one or more devices in wireless communication on the wireless network; and providing the device generated service usage information in a syntax and a communication protocol that can be used by other network devices to augment or replace network generated service usage information for the one or more devices in wireless communication on the wireless network.

WO 2010/088413 A1

ENHANCED ROAMING SERVICES AND CONVERGED CARRIER NETWORKS WITH DEVICE ASSISTED SERVICES AND A PROXY

CROSS REFERENCE TO OTHER APPLICATIONS

[0001] This application claims priority to U.S. Provisional Patent Application No. 61/206,354 (Attorney Docket No. RALEP001+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed January 28, 2009, U.S. Provisional Patent Application No. 61/206,944 (Attorney Docket No. RALEP002+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed February 4, 2009, U.S. Provisional Application No. 61/207,393 (Attorney Docket No. RALEP003+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed February 10, 2009, U.S. Provisional Patent Application No. 61/207,739 (Attorney Docket No. RALEP004+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed on February 13, 2009, U.S. Provisional Patent Application No. 61/270,353 (Attorney Docket No. RALEP022+) entitled DEVICE ASSISTED CDR CREATION, AGGREGATION, MEDIATION AND BILLING filed on July 6, 2009, which are incorporated herein by reference for all purposes.

[0002] This application is a continuation in part of co-pending U.S. Patent Application No. 12/380,780 (Attorney Docket No. RALEP007), entitled AUTOMATED DEVICE PROVISIONING AND ACTIVATION, filed on March 2, 2009, which is incorporated herein by reference for all purposes, and which claims priority to U.S. Provisional Patent Application No. 61/206,354 (Attorney Docket No. RALEP001+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed January 28, 2009, U.S. Provisional Patent Application No. 61/206,944 (Attorney Docket No. RALEP002+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed February 4, 2009, U.S. Provisional Application No. 61/207,393 (Attorney Docket No. RALEP003+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed February 10, 2009, and U.S. Provisional Patent Application No. 61/207,739 (Attorney Docket No. RALEP004+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed on February 13, 2009, which are incorporated herein by reference for all purposes; U.S. Patent Application No. 12/695,019 (Attorney Docket No. RALEP022) entitled DEVICE ASSISTED CDR CREATION,

AGGREGATION, MEDIATION AND BILLING filed on January 27, 2010, which is incorporated herein by reference for all purposes, and U.S. Provisional Patent Application No. 61/206,354 (Attorney Docket No. RALEP001+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed January 28, 2009, U.S. Provisional Patent Application No. 61/206,944 (Attorney Docket No. RALEP002+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed February 4, 2009, U.S. Provisional Application No. 61/207,393 (Attorney Docket No. RALEP003+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed February 10, 2009, U.S. Provisional Patent Application No. 61/207,739 (Attorney Docket No. RALEP004+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed on February 13, 2009, U.S. Provisional Patent Application No. 61/270,353 (Attorney Docket No. RALEP022+) entitled DEVICE ASSISTED CDR CREATION, AGGREGATION, MEDIATION AND BILLING filed on July 6, 2009, and U.S. Provisional Patent Application No. 61/264,126 (Attorney Docket No. RALEP0028+) entitled DEVICE ASSISTED SERVICES ACTIVITY MAP filed on November 24, 2009, which are incorporated herein by reference for all purposes; and U.S. Patent Application No. 12/695,021 (Attorney Docket No. RALEP029) entitled QUALITY OF SERVICE FOR DEVICE ASSISTED SERVICES filed on January 27, 2010, which claims priority to U.S. Provisional Patent Application No. 61/206,354 (Attorney Docket No. RALEP001+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed January 28, 2009, U.S. Provisional Patent Application No. 61/206,944 (Attorney Docket No. RALEP002+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed February 4, 2009, U.S. Provisional Application No. 61/207,393 (Attorney Docket No. RALEP003+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed February 10, 2009, U.S. Provisional Patent Application No. 61/207,739 (Attorney Docket No. RALEP004+) entitled SERVICES POLICY COMMUNICATION SYSTEM AND METHOD filed on February 13, 2009, U.S. Provisional Patent Application No. 61/252,151 (Attorney Docket No. RALEP025+) entitled SECURITY TECHNIQUES FOR DEVICE ASSISTED SERVICES, filed on October 15, 2009, and U.S. Provisional Patent Application No. 61/252,153 (Attorney Docket No. RALEP026+) entitled DEVICE GROUP PARTITIONS AND SETTLEMENT PLATFORM filed on October 15, 2009, which are incorporated herein by reference for all purposes.

BACKGROUND OF THE INVENTION

[0003] With the advent of mass market digital communications and content distribution, many access networks such as wireless networks, cable networks and DSL (Digital Subscriber Line) networks are pressed for user capacity, with, for example, EVDO (Evolution-Data Optimized), HSPA (High Speed Packet Access), LTE (Long Term Evolution), WiMax (Worldwide Interoperability for Microwave Access), and Wi-Fi (Wireless Fidelity) wireless networks increasingly becoming user capacity constrained. Although wireless network capacity will increase with new higher capacity wireless radio access technologies, such as MIMO (Multiple-Input Multiple-Output), and with more frequency spectrum being deployed in the future, these capacity gains are likely to be less than what is required to meet growing digital networking demand.

[0004] Similarly, although wire line access networks, such as cable and DSL, can have higher average capacity per user, wire line user service consumption habits are trending toward very high bandwidth applications that can quickly consume the available capacity and degrade overall network service experience. Because some components of service provider costs go up with increasing bandwidth, this trend will also negatively impact service provider profits.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Various embodiments are disclosed in the following detailed description and the accompanying drawings.

[0006] **Figure 1** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing in accordance with some embodiments.

[0007] **Figure 2** illustrates another wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing in accordance with some embodiments.

[0008] **Figure 3** illustrates another wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing in accordance with some embodiments.

[0009] **Figure 4** illustrates provisioning of a wireless network for providing device assisted CDR creation, aggregation, mediation and billing in accordance with some embodiments.

[0010] **Figure 5** illustrates a network architecture for providing device assisted CDRs in accordance with some embodiments.

[0011] **Figure 6** illustrates another network architecture for providing device assisted CDRs in accordance with some embodiments.

[0012] **Figure 7** illustrates another network architecture for providing device assisted CDRs in accordance with some embodiments.

[0013] **Figure 8** illustrates another network architecture for providing device assisted CDRs in accordance with some embodiments.

[0014] **Figure 9** is a functional diagram illustrating a device based service processor and a service controller in accordance with some embodiments.

[0015] **Figure 10** provides a table summarizing various service processer functional elements in accordance with some embodiments.

[0016] **Figure 11** provides a table summarizing various service controller functional elements in accordance with some embodiments.

[0017] **Figure 12** illustrates a device stack providing various service usage measurement from various points in the networking stack for a service monitor agent, a billing agent, and an access control integrity agent to assist in verifying the service usage measures and billing reports in accordance with some embodiments.

[0018] **Figure 13** illustrates an embodiment similar to Figure 12 in which some of the service processor is implemented on the modem and some of the service processor is implemented on the device application processor in accordance with some embodiments.

[0019] **Figure 14** illustrates various embodiments of intermediate networking devices that include a service processor for the purpose of verifiable service usage measurement, reporting, and billing reports in accordance with some embodiments.

[0020] **Figure 15** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including a proxy server in accordance with some embodiments.

[0021] **Figure 16** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including a service provider network in accordance with some embodiments, involving one or more of service controllers, service processors, and/or proxy server/routers.

[0022] **Figure 17** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including a service provider network in accordance with some embodiments, involving one or more of service controllers, service processors, and/or proxy server/routers.

[0023] **Figure 18** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including a service provider network in accordance with some embodiments, involving one or more of service controllers and/or proxy server/routers.

[0024] **Figure 19** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including two service provider networks in accordance with some embodiments.

[0025] **Figure 20** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including two service provider networks in accordance with some embodiments, involving one or more of service controllers and/or service processors.

[0026] **Figure 21** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including two service provider networks in accordance with some embodiments.

[0027] **Figure 22** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including two service provider networks in accordance with some embodiments, involving one or more of service controllers, service processors, and/or proxy server/routers.

[0028] **Figure 23** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including two service provider networks in accordance with some embodiments, involving one or more of service controllers and/or proxy server/routers.

DETAILED DESCRIPTION

[0029] The invention can be implemented in numerous ways, including as a process; an apparatus; a system; a composition of matter; a computer program product embodied on a computer readable storage medium; and/or a processor, such as a processor configured to execute instructions stored on and/or provided by a memory coupled to the processor. In this specification, these implementations, or any other form that the invention may take, may be referred to as techniques. In general, the order of the steps of disclosed processes may be altered within the scope of the invention. Unless stated otherwise, a component such as a processor or a memory described as being configured to perform a task may be implemented as a general component that is temporarily configured to perform the task at a given time or a specific component that is manufactured to perform the task. As used herein, the term 'processor' refers to one or more devices, circuits, and/or processing cores configured to process data, such as computer program instructions.

[0030] A detailed description of one or more embodiments of the invention is provided below along with accompanying figures that illustrate the principles of the invention. The invention is described in connection with such embodiments, but the invention is not limited to any embodiment. The scope of the invention is limited only by the claims and the invention encompasses numerous alternatives, modifications and equivalents. Numerous specific details are set forth in the following description in order to provide a thorough understanding of the invention. These details are provided for the purpose of example and the invention may be practiced according to the claims without some or all of these specific details. For the purpose of clarity, technical material that is known in the technical fields related to the invention has not been described in detail so that the invention is not unnecessarily obscured.

[0031] There are many new types of digital devices where it is becoming desirable, for example, to connect these devices to wireless networks including wireless wide area networks (WWAN, such as 3G and 4G) and/or wireless local area (WLAN) networks. These

devices include, for example, consumer electronics devices, business user devices, and machine to machine devices that benefit from flexible wide area data connections and the Internet. Example devices include netbooks, notebooks, mobile Internet devices, personal navigation (e.g., GPS enabled) devices, music and multimedia players, eReaders, industrial telemetry, automotive emergency response and diagnostics, 2-way home and industrial power metering and control, vending machines, parking meters, and many other devices. For example, it is highly advantageous to offer service usage and service billing plans for such devices that are more optimal for each type of device and each type of desired user experience. To accomplish this, more sophisticated service usage measuring and service usage billing systems are needed as compared to the conventional network based techniques in existence today. By providing more flexibility in service measurement and billing, more advantageous and cost effective service plans can be created for, for example, the new WWAN connected devices cited above for all three markets (e.g., consumer, business and machine to machine) that still maintain the necessary profit margins for the WWAN carriers to be successful with these various service businesses.

[0032] Accordingly, various embodiments disclosed herein provide for a new and flexible augmentation or replacement for existing carrier network service usage measurement, service usage accounting, and service usage billing systems and techniques.

[0033] A charging data record (CDR) is a term that as used herein defines a formatted measure of device service usage information, typically generated by one or more network functions or device functions that supervise, monitor, control, account for, charge for, report, synchronize usage accounting or records and/or bill for network access or other service or purchase transactions for the device. To simplify the discussion, the term charging data record or CDR is often used interchangeably herein to refer to several different types of service usage records. For example, the term CDR is used herein interchangeably with one or more of other industry terms or record types including, for example, CDRs, flow data records (FDRs), start/stop records, interim accounting records, IP data records (IPDRs), call data records, micro-CDRs, service charging bucket accounting records, record types that include usage information identifying QoS level, QoS class, and/or other QoS classifier, records that include usage information identifying traffic type or class or other traffic identifier, records that identify traffic protocol, records that identify usage or purchase transactions, records that report a purchase transaction, etc. One of ordinary skill in the art

will appreciate that in many of the embodiments the term CDR and/or many other terms can be interchanged for a given application or purpose. Any of these terms can refer in various embodiments to the lowest level of usage accounting records or can refer to various levels of charging record aggregation that may occur in the various network or device elements described herein.

[0034] CDRs typically form the basis for recording device network service usage, and often form the basis for billing for such usage. Various embodiments are provided herein for device assisted CDR creation, mediation, and billing. There are many limitations to the capabilities of service usage recording, aggregation and/or billing when CDRs are generated exclusively by network based functions or equipment. Accordingly, by either augmenting network based service usage measures with device based service usage measures, or by replacing network based service usage measures with device based service usage measures, it is possible to create a CDR generation, aggregation, mediation and/or billing solution that has superior or more desirable capabilities/features. While in theory, many of the service usage measures that can be evaluated on a device can also be evaluated in the network data path using various network equipment technologies including, for example, deep packet inspection (DPI), there are many examples where measuring service usage at the device is either more desirable or more practical, or in some cases it is the only way to obtain the desired measure. Such examples include but are not limited to the following:

- Application layer service usage measures (e.g., traffic usage categorized by application or by combinations of application, destination, and/or content type);
- Usage measures that do not involve user traffic but instead involve network overhead traffic (e.g., basic connection maintenance traffic, signaling traffic, network logon/AAA/authentication/monitoring traffic, service software update traffic);
- Usage that is associated with services that are charged to another entity other than the end user (e.g., basic network connection service offer traffic, traffic associated with providing network access to or downloading service marketing information, traffic associated with advertiser sponsored services, traffic associated with content provider sponsored services, 911 service traffic);
- Usage measures involving encrypted traffic (e.g., traffic that is run over encrypted networking protocols or between secure end points);

- Implementing service usage measure collection and/or service usage billing across multiple networks that may have different and in some cases incompatible, inaccessible (to the CDR system of record) or incomplete service usage measurement capabilities;
- Service usage measurement and/or service usage billing capabilities that are not supported by the present network gateways, routers, MWC/HLRs, AAA, CDR aggregation, CDR mediation, billing and/or provisioning systems;
- New service usage measures and/or new service usage billing capabilities that are desirable to implement in a manner that does not require major changes or upgrades to the existing network gateways, routers, MWC/HLRs, AAA, CDR aggregation, CDR mediation, billing and/or provisioning systems;
- New service usage measures and/or new service usage billing capabilities that are desirable to implement in a manner that allows for rapid definition and implementation of new service measures and/or billing plans;
- New service usage measures and/or new service usage billing capabilities that are desirable to implement in a manner that may be implemented in a manner that enables multiple device group definitions in which each device group gets a customized programmable definition for service usage collection, accounting and/or billing;
- Multi device billing;
- Multi user billing;
- Intermediate device billing with single user and multi user with and without multi device;
- Content downloads from a specific source to a specific application with the content being of a specific type or even identified down to a particular content ID; and/or
- Various other single event transactions used for billing purposes.

For these and other reasons, it is desirable to provide a system/process that utilizes device assisted service usage measures that provides either an enhancement of existing network based service usage CDR system capabilities and techniques and/or a replacement for network based CDR system capabilities and techniques.

[0035] In some embodiments, techniques, such as a system and/or process, that utilize device assisted service usage measures include one or more of the following: (1) receiving a service usage measure from a device in communication with a wireless network, (2) verifying

or protecting the validity of the service usage measure, (3) generating a CDR based on the service usage measure (e.g., device assisted CDR), (4) aggregating CDRs, and (5) mediating the CDR with network CDRs. In some embodiments, the techniques also include providing a design and provisioning of devices/network equipment to recognize the CDRs. In some embodiments, the techniques also include provisioning to recognize that the device belongs to a Device Assisted Services (DAS) device group and that corresponding CDRs should be accepted and mediated. In some embodiments, the device assisted CDRs are also generated using formats, network communications protocols, network device authentication and/or provisioning to allow device assisted CDRs into the network CDR system, encryption, and/or signatures as required by the network (e.g., to comply with network generated CDR requirements or based on any other network and/or service provider requirements and/or standards).

[0036] In some embodiments, mediation rules include multi device, multi user, single user devices, and/or intermediate networking devices that can be single user or multi user, as described herein.

[0037] In some embodiments, a device assisted CDR generator collects device based service usage measures that are used as the basis for, or as an enhancement (e.g., as a supplement or in addition) to, one or more (e.g., network generated) CDRs that provide one or more networking functions with properly formatted service usage reports that the network function(s) accepts as being transmitted from an authorized source, read, and utilized for helping to determine the service usage of a device or group of devices. In some embodiments, the network functions that the device assisted CDR generator shares CDRs with typically include one or more of the following: service usage/CDR aggregation and/or mediation servers, gateways, routers, communication nodes, Mobile Wireless Centers (MWCs, including HLRs), databases, AAA systems, billing interfaces, and billing systems. For example, the process of CDR creation in the CDR generator typically includes either using one or more device based measures of service usage, or one or more device based measures of service usage in combination with one or more network based measures of service usage, possibly processing one or more of such service usage measures according to a set of CDR creation, CDR aggregation, and/or CDR mediation rules to arrive at a final device usage measure that is, for example, then formatted with the proper syntax, framed, possibly encrypted and/or signed, and encapsulated in a communication protocol or packet suitable for

sharing with network functions. In some embodiments, the CDR generator resides in the device. In some embodiments, the CDR generator resides in a network server function that receives the device assisted service usage measures, along with possibly network based usage measures, and then creates a CDR (e.g., in the service controller 122).

[0038] In some embodiments, the device assisted CDR generator can reside in the service processor (e.g., service processor 115), for example, in the service usage history or billing server functions. In some embodiments, the device assisted CDR generator resides in the device itself, for example, within the service processor functions, such as the billing agent or the service monitor agent.

[0039] There are several factors that are considered in the various embodiments in order to create a useful, reliable, and secure device assisted CDR system, including, for example, but not limited to:

- Identification of each device based service usage measure with one or more usage transaction codes;
- Verification of the device based usage measure(s);
- Secure communication of the device based usage measures to the network;
- Efficient (e.g., low bandwidth) communication of the device based service usage measure;
- Coordination/comparison/aggregation of the device based service usage measure with network based service usage measure(s);
- Formatting the device based service usage measure into a CDR that can be properly communicated to the network functions and/or equipment that process service usage information;
- Causing the network based functions and/or equipment used for CDR collection, aggregation, mediation and/or billing to recognize, authorize, and accept communications and CDRs from the device assisted CDR generator, reading and properly implementing the correct network session context for the CDR so that the CDR is properly associated with the correct device /user/session;
- Implementing the CDR aggregation rules that determine how to collect and aggregate the device assisted CDRs as they are reported through the network CDR system hierarchy;

- Implementing the mediation rules that determine how the various device based service usage transaction code measures are combined and mediated with the other device based service usage transaction code measures to result in consistent service usage information for each of the transaction code categories maintained in the network;
- Implementing the mediation rules that determine how the device assisted CDRs are combined and mediated with network based CDRs to result in consistent service usage information for each of the transaction code categories maintained in the network;
- Implementing mediation rules to reconcile the variances between network based CDR usage measures and device assisted CDR usage measures;
- Classification of one or more device groups, with each group having the capability to uniquely define the service usage collection, accounting, and/or billing rules;
- Collecting CDRs generated on networks other than the home network so that service usage may be measured, accounted for, and/or billed for across multiple networks;
- Multi device billing;
- Multi user billing; and/or
- Intermediate device billing with single user and multi user with and without multi device.

[0040] In some embodiments, verification of the relative accuracy of the device assisted service usage measure is provided. Given that, for example, the service usage measure is often being generated on an end user device or a device that is readily physically accessed by the general public or other non-secure personnel from a network management viewpoint, in some embodiments, the device agents used in one or more of the service processor 115 agents are protected from hacking, spoofing, and/or other misuse. Various techniques are provided herein for protecting the integrity of the agents used for generating the device assisted service usage measures.

[0041] In some embodiments, the service usage measures are verified by network based cross checks using various techniques. For example, network based cross checks can provide valuable verification techniques, because, for example, it is generally not possible or at least very difficult to defeat well designed network based cross checks using various techniques, such as those described herein, even if, for example, the measures used to protect

the device agents are defeated or if no device protection measures are employed. In some embodiments, network based cross checks used to verify the device assisted service usage measures include comparing network based service usage measures (e.g., CDRs generated by service usage measurement apparatus in the network equipment, such as the BTS/BSCs 125, RAN Gateways 410, Transport Gateways 420, Mobile Wireless Center/HLRs 132, AAA 121, Service Usage History/CDR Aggregation, Mediation, Feed 118, or other network equipment), sending secure query/response command sequences to the service processor 115 agent(s) involved in device assisted CDR service usage measurement or CDR creation, sending test service usage event sequences to the device and verifying that the device properly reported the service usage, and using various other techniques, such as those described herein with respect to various embodiments.

[0042] In some embodiments, one or more of the following actions are taken if the device based service usage measure is found to be in error or inaccurate: bill the user for usage overage or an out of policy device, suspend the device, quarantine the device, SPAN the device, and/or report the device to a network administration function or person.

[0043] In some embodiments, the CDR syntax used to format the device assisted service usage information into a CDR and/or network communication protocols for transmitting CDRs are determined by industry standards (e.g., various versions of 3GPP TS 32.215 format and 3GPP2 TSG-X X.S0011 or TIA-835 format). In some embodiments, for a given network implementation the network designers will specify modifications of the standard syntax, formats and/or network communication/transmission protocols. In some embodiments, for a given network implementation the network designers will specify syntax, formats, and/or network communication/transmission protocols that are entirely different than the standards.

[0044] In some embodiments, within the syntax and formatting for the CDR the device assisted service usage is typically categorized by a transaction code. For example, the transaction code can be similar or identical to the codes in use by network equipment used to generate CDRs, or given that the device is capable of generating a much richer set of service usage measures, the transaction codes can be a superset of the codes used by network equipment used to generate CDRs (e.g., examples of the usage activities that can be labeled as transaction codes that are more readily supported by device assisted CDR systems as compared to purely network based CDR systems are provided herein).

[0045] In some embodiments, the device sends an identifier for a usage activity tag, an intermediate server determines how to aggregate into CDR transaction codes and which CDR transaction code to use.

[0046] In some embodiments, the device service processor 115 compartmentalizes usage by pre-assigned device activity transaction codes (e.g., these can be sub-transactions within the main account, transactions within a given bill-by-account transaction or sub-transactions within a bill-by-account transaction). The device implements bill-by-account rules to send different usage reports for each bill-by-account function. In some embodiments, the service controller 122 programs the device to instruct it on how to compartmentalize these bill-by-account service usage activities so that they can be mapped to a transaction code.

[0047] In some embodiments, the device reports less compartmentalized service usage information and the service controller 122 does the mapping of service usage activities to CDR transaction codes, including in some cases bill-by-account codes.

[0048] In some embodiments, the CDR sent to 118 or other network equipment, for example, can include various types of transaction codes including, for example, a raw device usage CDR, a bill-by-account (e.g., a sub-activity transaction code) CDR, a billing offset CDR, and/or a billing credit CDR. For example, the decision logic (also referred to as business rules or CDR aggregation and mediation rules) that determines how these various types of CDR transaction codes are to be aggregated and mediated by the core network and the billing system can be located in the network equipment (e.g., a network element, such as service usage 118), in the service controller 122, and/or in the billing system 123.

[0049] In some embodiments, the device assisted CDR generator uses the device assisted service usage measures to generate a CDR that includes service usage information, service usage transaction code(s), and, in some embodiments, network information context. In some embodiments, the service usage information, transaction code, and/or network information context is formatted into communication framing, syntax, encryption/signature, security and/or networking protocols that are compatible with the formatting used by conventional networking equipment to generate CDRs. For example, this allows networking equipment used for CDR collection, recording, aggregation, mediation, and/or conversion to billing records to properly accept, read, and interpret the CDRs that are generated with the assistance of device based service usage measurement. In some embodiments, the device

assisted service measures are provided to an intermediate network server referred to as a service controller (e.g., service controller 122). In some embodiments, the service controller uses a CDR feed aggregator for a wireless network to collect device generated usage information for one or more devices on the wireless network; and provides the device generated usage information in a syntax (e.g., charging data record (CDR)), and a communication protocol (e.g., 3GPP or 3GPP2, or other communication protocol(s)) that can be used by the wireless network to augment or replace network generated usage information for the one or more devices on the wireless network.

[0050] In some embodiments, mediation rules include multi device, multi user, single user devices, intermediate networking devices that can be single user or multi user. For example, the device assisted CDRs can be formatted by the device assisted CDR generator to include a transaction code for one user account, even though the CDRs originate from multiple devices that all belong to the same user. This is an example for a multi-user device assisted CDR billing solution. In another example for a multi-user device assisted CDR billing solution, device assisted CDRs from multiple devices and multiple users can all be billed to the same account (e.g., a family plan or a corporate account), but the bill-by-account CDR transaction records can be maintained through the billing system so that sub-account visibility is provided so that the person or entity responsible for the main account can obtain visibility about which users and/or devices are creating most of the service usage billing. For example, this type of multi-user, multi-device device assisted CDR billing solution can also be used to track types of service usage and/or bill for types of service usage that are either impossible or at least very difficult to account and/or bill for with purely network based CDR systems. In some embodiments, bill-by-account CDR transaction records can be used to provide sponsored transaction services, account for network chatter, provide service selection interfaces, and other services for multi-user or multi-device service plans.

[0051] In addition to conventional single user devices (e.g., cell phones, smart phones, netbooks/notebooks, mobile internet devices, personal navigation devices, music players, electronic eReaders, and other single user devices) device assisted service usage measurement and CDRs are also useful for other types of network capable devices and/or networking devices, such as intermediate networking devices (e.g., 3G/4G WWAN to WLAN bridges/routers/gateways, femto cells, DOCSIS modems, DSL modems, remote access/backup routers, and other intermediate network devices). For example, in such

devices, particularly with a secure manner to verify that the device assisted service usage measures are relatively accurate and/or the device service processor 115 software is not compromised or hacked, many new service provider service delivery and billing models can be supported and implemented using the techniques described herein. For example, in a WiFi to WWAN bridge or router device multiple user devices can be supported with the same intermediate networking device in a manner that is consistent and compatible with the central provider's CDR aggregation and/or billing system by sending device assisted CDRs as described herein that have a service usage and/or billing code referenced to the end user and/or the particular intermediate device.

[0052] In some embodiments, the device assisted CDRs generated for the intermediate networking device are associated with a particular end user in which there can be several or many end users using the intermediate networking device for networking access, and in some embodiments, with each end user being required to enter a unique log-in to the intermediate networking device. For example, in this way, all devices that connect using WiFi to the intermediate networking device to get WWAN access generate CDRs can either get billed to a particular end user who is responsible for the master account for that device, or the CDRs can get billed in a secure manner, with verified relative usage measurement accuracy to multiple end users from the same intermediate networking device. In another example, an end user can have one account that allows access to a number of intermediate networking devices, and each intermediate networking device can generate consistent device assisted CDRs with transaction codes for that end user regardless of which intermediate networking device the end user logs in on.

[0053] In some embodiments, some of the services provided by the intermediate networking device are billed to a specific end user device assisted CDR transaction code, while other bill-by-account services are billed to other transaction code accounts, such as sponsored partner transaction service accounts, network chatter accounts, sponsored advertiser accounts, and/or service sign up accounts. For example, in this manner, various embodiments are provided in which intermediate networking devices (e.g., a WWAN to WiFi router/bridge) can sold to one user but can service and be used to bill other users (e.g., and this can be covered in the first purchasing user's service terms perhaps in exchange for a discount), or such intermediate networking devices can be located wherever access is desired

without concern that the device will be hacked into so that services can be acquired without charge.

[0054] In some embodiments, various types of service usage transactions are billed for on the intermediate networking device, to any of one or more users, in which the information required to bill for such services is not available to the central provider or MVNO network equipment, just as is the case with, for example, conventional single user devices. In view of the various embodiments and techniques described herein, those skilled in the art will appreciate that similar service models are equally applicable not just to WWAN to WiFi intermediate networking devices, but also to the Femto Cell, remote access router, DOCSIS, DSL and other intermediate WWAN to WiFi networking devices.

[0055] **Figure 1** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing in accordance with some embodiments. As shown, Figure 1 includes a 4G/3G/2G wireless network operated by, for example, a central provider. As shown, various wireless devices 100 are in communication with base stations 125 for wireless network communication with the wireless network, and other devices 100 are in communication with Wi-Fi Access Points (APs) or Mesh 702 for wireless communication to Wi-Fi Access CPE 704 in communication with central provider access network 109. In some embodiments, each of the wireless devices 100 includes a service processor 115 (as shown), and each service processor connects through a secure control plane link to a service controller 122. In some embodiments, the network based service usage information (e.g., CDRs) is obtained from one or more network elements. As shown, an MVNO core network 210 also includes a CDR storage, aggregation, mediation, feed 118, a MVNO billing interface 122, and a MVNO billing system 123 (and other network elements as shown in Figure 1). A Virtual Service Provider Work Station 4910 (also referred to herein as a service design interface) provides a user interface to central provider service designers, MVNO service designers or other service designers for the purpose of simplifying and organizing the process of service design as described herein.

[0056] As shown in Figure 1, a CDR storage, aggregation, mediation, feed 118 (e.g., service usage 118, including a billing aggregation data store and rules engine) is a functional descriptor for, in some embodiments, a device/network level service usage information collection, aggregation, mediation, and reporting function located in one or more of the networking equipment components attached to one or more of the sub-networks shown in

Figure 1 (e.g., central provider access network 109 and/or central provider core network 110), which is in communication with the service controller 122, and a central billing interface 127. As shown in Figure 1, service usage 118 is shown as a function in communication with the central provider core network 110. In some embodiments, the CDR storage, aggregation, mediation, feed 118 function is located elsewhere in the network or partially located in elsewhere or integrated with as part of other network elements. In some embodiments, CDR storage, aggregation, mediation, feed 118 functionality is located or partially located in the AAA server 121 and/or the mobile wireless center/Home Location Register(HLR) 132 (as shown, in communication with a DNS/DHCP server 126). In some embodiments, service usage 118 functionality is located or partially located in the base station, base station controller and/or base station aggregator, collectively referred to as base station 125 in Figure 1. In some embodiments, CDR storage, aggregation, mediation, feed 118 functionality is located or partially located in a networking component in the central provider access network 109, a networking component in the core network 110, the central billing system 123, the central billing interface 127, and/or in another network component or function. This discussion on the possible locations for the network based and device based service usage information collection, aggregation, mediation, and reporting function (e.g., CDR storage, aggregation, mediation, feed 118) can be easily generalized as described herein and as shown in the other figures described herein by one of ordinary skill in the art. Also as shown in Figure 1, the service controller 122 is in communication with the central billing interface 123 (also sometimes referred to as the external billing management interface or billing communication interface) 127, which is in communication with the central billing system 123. As shown, an order management 180 and subscriber management 182 are also in communication with the central provider core network 110 for facilitating order and subscriber management of services for the devices 100 in accordance with some embodiments.

[0057] In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) provides a device/network level service usage information collection, aggregation, mediation, and reporting function. In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) collects device generated usage information for one or more devices on the wireless network (e.g., devices 100); and provides the device generated usage information in a syntax and a communication

protocol that can be used by the wireless network to augment or replace network generated usage information for the one or more devices on the wireless network. In some embodiments, the syntax is a charging data record (CDR), and the communication protocol is selected from one or more of the following: 3GPP, 3GPP2, or other communication protocols. In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) includes a service usage data store (e.g., a billing aggregator) and a rules engine for aggregating the collected device generated usage information. In some embodiments, the syntax is a charging data record (CDR), and the network device is a CDR feed aggregator, and the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) also aggregates CDRs for the one or more devices on the wireless network; applies a set of rules to the aggregated CDRs using a rules engine (e.g., bill by account, transactional billing, and/or any other billing or other rules for service usage information collection, aggregation, mediation, and reporting), and communicates a new set of CDRs for the one or more devices on the wireless network to a billing interface or a billing system (e.g., providing a CDR with a billing offset by account/service). In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) communicates a new set of CDRs for the one or more devices on the wireless network to a billing interface or a billing system. In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) communicates with a service controller to collect the device generated usage information for the one or more devices on the wireless network. In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) communicates with a service controller, in which the service controller is in communication with a billing interface or a billing system. In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) communicates the device generated usage information to a billing interface or a billing system. In some embodiments, the CDR storage, aggregation, mediation, feed (and/or other network elements or combinations of network elements) communicates with a transport gateway and/or a Radio Access Network (RAN) gateway to collect the network generated usage information for the one or more devices on the wireless network. In some embodiments, the service controller 122 communicates the device generated service usage information to the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements).

[0058] In some embodiments, the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) performs rules for performing a bill by account aggregation and mediation function. In some embodiments, the service controller 122 in communication with the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) performs a rules engine for aggregating and mediating the device generated usage information. In some embodiments, a rules engine device in communication with the CDR storage, aggregation, mediation, feed 118 (and/or other network elements or combinations of network elements) performs a rules engine for aggregating and mediating the device generated usage information.

[0059] In some embodiments, the rules engine is included in (e.g., integrated with/part of) the CDR storage, aggregation, mediation, feed 118. In some embodiments, the rules engine and associated functions, as described herein, is a separate function/device. In some embodiments, the service controller 122 performs some or all of these rules engine based functions, as described herein, and communicates with the central billing interface 127. In some embodiments, the service controller 122 performs some or all of these rules engine based functions, as described herein, and communicates with the central billing system 123.

[0060] In some embodiments, duplicate CDRs are sent from the network equipment to the billing system 123 that is used for generating service billing. In some embodiments, duplicate CDRs are filtered to send only those CDRs/records for devices controlled by the service controller and/or service processor (e.g., the managed devices). For example, this approach can provide for the same level of reporting, lower level of reporting, and/or higher level of reporting as compared to the reporting required by the central billing system 123.

[0061] In some embodiments, a bill-by-account billing offset is provided. For example, bill-by-account billing offset information can be informed to the central billing system 123 by providing a CDR aggregator feed that aggregates the device based service usage data feed to provide a new set of CDRs for the managed devices to the central billing interface 127 and/or the central billing system 123. In some embodiments, transaction billing is provided using similar techniques. For example, transaction billing log information can be provided to the central billing interface 127 and/or the central billing system 123.

[0062] In some embodiments, the rules engine (e.g., performed by the service usage 118 or another network element, as described herein) provides a bill-by-account billing offset. For example, device generated usage information (e.g., charging data records (CDRs)) includes a transaction type field (e.g., indicating a type of service for the associated service usage information). The rules engine can apply a rule or a set of rules based on the identified service associated with the device generated usage information to determine a bill-by-account billing offset (e.g., a new CDR can be generated to provide the determined bill-by-account billing offset). In some examples, the determined bill-by-account billing offset can be provided as a credit to the user's service usage account (e.g., a new CDR can be generated with a negative offset for the user's service usage account, such as for network chatter service usage, or transactional service usage, or for any other purposes based on one or more rules performed by the rules engine).

[0063] As another example, for a transactional service, a first new CDR can be generated with a negative offset for the user's service usage account for that transactional service related usage, and a second new CDR can be generated with a positive service usage value to charge that same service usage to the transactional service provider (e.g., Amazon, eBay, or another transactional service provider). In some embodiments, the service controller 122 generates these two new CDRs, and the service usage 118 stores, aggregates, and communicates these two new CDRs to the central billing interface 127. In some embodiments, the service controller 122 generates these two new CDRs, and the service usage 118 stores, aggregates, and communicates these two new CDRs to the central billing interface 127, in which the central billing interface 127 applies rules (e.g., performs the rules engine for determining the bill-by-account billing offset).

[0064] In some embodiments, the service controller 122 sends the device generated CDRs to the rules engine (e.g., service usage 118), and the rules engine applies one or more rules, such as those described herein and/or any other billing/service usage related rules as would be apparent to one of ordinary skill in the art. In some embodiments, the service controller 122 generates CDRs similar to other network elements, and the rules (e.g., bill-by-account) are performed in the central billing interface 127. For example, for the service controller 122 to generate CDRs similar to other network elements, in some embodiments, the service controller 122 is provisioned on the wireless network and behaves substantially

similar to other CDR generators on the network) as would be apparent to one of ordinary skill in the art.

[0065] In some embodiments, the service controller 122 is provisioned as a new type of networking function that is recognized as a valid and secure source for CDRs by the other necessary elements in the network (e.g., the Service Usage History/ CDR Aggregation and Mediation Server 118). In some embodiments, in which the network apparatus typically only recognize CDRs from certain types of networking equipment (e.g., RAN Gateway 410 or Transport Gateway 420 (as shown in Figure 3)), then the Service Controller 122 can provide authentication credentials to the other networking equipment that indicate it is one of the approved types of equipment (e.g., for purposes of generating/providing CDRs). In some embodiments, the link between the Service Controller 122 and the necessary CDR aggregation and mediation equipment is secured, authenticated, encrypted and/or signed.

[0066] In some embodiments, the CDR storage, aggregation, mediation, feed 118 discards the network based service usage information (e.g., network based CDRs) received from one or more network elements. In these embodiments, the service controller 122 can provide the device based service usage information (e.g., device based CDRs) to the CDR storage, aggregation, mediation, feed 118 (e.g., the CDR storage, aggregation, mediation, feed 118 can just provide a store, aggregate, and communication function(s)), and the device based service usage information is provided to the central billing interface 127 or the central billing system 123.

[0067] In some embodiments, the device based CDRs and/or new CDRs generated based on execution of a rules engine as described herein is provided only for devices that are managed and/or based on device group, service plan, or any other criteria, categorization, and/or grouping.

[0068] **Figure 2** illustrates another wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing in accordance with some embodiments. As shown in Figure 2, some devices 100 are in communication with DOCSIS Head End 125 and some devices 100 are in communication with DSLAM 125, which are in communication with the central provider access network 109.

[0069] **Figure 3** illustrates another wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing in accordance with some

embodiments. Referring now to the 4G/3G/2G access network as shown in Figure 3, the 4G/3G and 3G/2G base stations/nodes 125 are in communication with a 4G/3G/2G Radio Access Network (RAN) gateway 410 via a radio access network 405, which are in communication with a 4G/3G/2G transport gateway 420 via an access transport network 415. The central provider core network 110 is in network communication with the access transport network 415 (e.g., via a dedicated/leased line, and as shown, via a firewall 124). The Internet, data, and/or phone network 120 is available via a firewall 124 and the transport gateway(s) 420, as shown. Also, as shown, a network apparatus provisioning system 160, order management 180, and subscriber management 182 are in communication with the central provider core network 110. As shown, a AAA server 121, a mobile wireless center/Home Location Register(HLR) 132, a DNS/DHCP 126, and CDR storage, aggregation, mediation, feed 118 are also in communication with the access transport network 415. The central billing system 123 and the central billing interface 127 are shown in communication with the central provider core network 110.

[0070] As shown, Figure 3 includes a 4G/3G/2G wireless network operated by, for example, a central provider. In some embodiments, each of the wireless devices 100 includes a service processor 115 (as shown), and each service processor connects through a secure control plane link to a service controller 122. In some embodiments, the network based service usage information (e.g., network generated CDRs) is obtained from Radio Access Network (RAN) gateway(s) 410 and/or transport gateway(s) 420. In some embodiments, device based service usage information (e.g., device assisted CDRs) are generated by the service processor 115 and/or service controller 122 for some or all of the wireless devices 100 using similar techniques as described herein, and in some embodiments, such device based service usage information (e.g., device assisted CDRs) is sent to the CDR storage, aggregation, mediation, feed 118 (e.g., the CDR storage, aggregation, mediation, feed 118 can just provide a store, aggregate, and communication function(s)), and/or to the central billing interface 127 or the central billing system 123, as similarly described herein with respect to various embodiments.

[0071] **Figure 4** illustrates provisioning of a wireless network for providing device assisted CDR creation, aggregation, mediation and billing in accordance with some embodiments. As shown in Figure 4, the provisioning of various network equipment is provided as shown to recognize each other as an authorized source of CDRs (e.g., this can be

done manually or in an automated manner). For example, order management 180, subscriber management, billing interface 127, billing system 123, network provisioning system 160, service controller 122, access network AAA server 121, mobile wireless center 132, and CDR storage, aggregation, mediation feed 118 communicate with each other for such provisioning, which can be implemented using various techniques. In some embodiments, the various network elements are provisioned to recognize device assisted CDRs being generated by the service controller 122, which, for example, can be provided to the billing interface 127 and/or the billing system 123. In some embodiments, network generated CDRs are provided by RAN/Access gateway 410, aggregation/transport gateway 425, and/or base station controller 125. In some embodiments, other network elements generate/receive/store device assisted CDRs.

[0072] In some embodiments, provisioning of various network equipment is provided to recognize a given device as belonging to a device group that supports a service usage and/or billing plan that relies upon and/or utilizes device assisted CDRs.

[0073] In some embodiments, the CDR formats, transaction codes, and CDR transmission destinations are programmed for each device that generates CDRs, including the service controller 122 (e.g., in some embodiments, the service controller 122 is the intermediary for CDRs) and/or service processor 115 (e.g., in some embodiments, the device sends CDRs to network CDR aggregation or billing interface 127/billing system 123 with no intermediate server function).

[0074] While Figures 4 through 8 provide various embodiments in the context of wireless 3G/4G networks, it will be apparent to one of ordinary skill in the art that these techniques can similarly be applied to other types of access networks including, for example, WiFi, cable, DSL, fiber, satellite, and/or other networks.

[0075] **Figure 5** illustrates a network architecture for providing device assisted CDRs in accordance with some embodiments. As shown, network generated CDRs are sent from various network elements to the CDR storage, aggregation, mediation, feed 118 and the service controller 122, as shown in dashed lines with arrows in Figure 5. In some embodiments, the network generated CDRs are used for verification of device assisted service (DAS) usage and/or billing information. In some embodiments, the network generated CDRs are provided to the service controller 122, and the service controller 122

implements aggregation and/or mediation rules to examine and, in some cases, aggregate and/or mediate network generated/based CDRs with device assisted/based CDRs.

[0076] In some embodiments, device assisted CDRs are sent from the service controller 122 to CDR storage, aggregation, mediation, feed 118 and communicated to the billing system 123, as shown in solid lines with arrows in Figure 5. In some embodiments, CDR storage, aggregation, mediation, feed 118 uses DAS service usage CDRs to augment network generated/based CDRs with bill-by-account transaction codes (e.g., as similarly described herein). In some embodiments, CDR storage, aggregation, mediation, feed 118 implements aggregation and/or mediation rules to account for DAS CDR usage amount in a new bill-by-account transaction code and removes the same service usage amount from the bulk device account transaction code. In some embodiments, a first DAS CDR is sent for the new bill by account transaction code, and a second DAS CDR is sent to be used as a correction (credit) to the main device usage account transaction code, and CDR storage, aggregation, mediation, feed 118 implements the rules to perform this mediation. In some embodiments, a first DAS CDR is used for a given bill-by-account transaction code, and a second DAS CDR is used as the main device account transaction code, in which the service controller 122 (or device) has already implemented the mediation rules so that CDR storage, aggregation, mediation, feed 118 simply passes such DAS CDRs to billing after aggregating them.

[0077] **Figure 6** illustrates another network architecture for providing device assisted CDRs in accordance with some embodiments. Figure 6 also shows the communication of device assisted CDRs and network generated CDRs using solid and dashed lines with arrows, respectively. As shown, in some embodiments, CDR storage, aggregation, mediation, feed 118 sends network based CDRs to service controller 122 for various purposes, such as those previously described herein.

[0078] In some embodiments, service controller 122 sends DAS CDRs to billing for various uses by the billing system 123. In some embodiments, the billing system 123 uses DAS service usage CDRs to augment network based CDRs with bill-by-account transaction codes. In some embodiments, the billing system 123 implements aggregation and/or mediation rules to account for DAS CDR usage amount in a new bill-by-account transaction code and removes the same service usage amount from the bulk device account transaction code. In some embodiments, a first DAS CDR is sent for the new bill by account transaction

code, and a second DAS CDR is sent to be used as a correction (credit) to the main device usage account transaction code, and the billing system 123 implements the rules to perform this mediation. In some embodiments, a first DAS CDR is used for a given bill-by-account transaction code, and a second is used as the main device account transaction code, in which the service controller 122 (or device) has already implemented the mediation rules so that the billing system 123 simply passes such DAS CDRs after aggregating them.

[0079] **Figure 7** illustrates another network architecture for providing device assisted CDRs in accordance with some embodiments. Figure 7 also shows the communication of device assisted CDRs and network generated CDRs using solid and dashed lines with arrows, respectively. Figure 7 is similar to Figure 6, except as shown in Figure 7, service usage information is passed through the billing interface 127 instead of the billing CDR aggregation interface. For example, the service usage detailed bill-by-account information and offset (credit) information can be formatted as a CDR or can be formatted in a higher level syntax as required by the billing interface 127.

[0080] **Figure 8** illustrates another network architecture for providing device assisted CDRs in accordance with some embodiments. Figure 8 also shows the communication of device assisted CDRs and network generated CDRs using solid and dashed lines with arrows, respectively. In some embodiments, as shown in Figure 8, the central provider need not modify the existing CDR storage, aggregation, mediation, feed 118, so the additional aggregation and mediation rules discussed above with respect to Figure 5 are implemented as a new layer of rules in a new network function, shown as secondary DAS CDR aggregation mediation 118A, that is located between the billing system and the CDR storage, aggregation, mediation, feed 118. For example, this new network function (e.g., secondary DAS CDR aggregation mediation 118A) can reside in the network (as shown) or in the service processor 115, in the service controller 122, or elsewhere in the network or on the device. In some embodiments, the CDRs described herein include QoS tagging information specifying the QoS level for the service usage. In these embodiments, a service controller (e.g., or other network element providing similar functions for this purpose) is used to provide a centralized function to collect and organize QoS tagged charging records and aggregate, format and/or mediate those records into a format that is compatible with and can be processed by a billing system. In some embodiments, a service controller is used for collection, mediation, and/or transmission to billing of device assisted charging records that include charging level.

[0081] In some embodiments, charging records that include QoS tags are used to verify QoS policy adherence in the device. In some embodiments, charging records that include QoS tags are used to verify QoS policy adherence in other network elements (e.g., proxy router or server, other network elements that reserve, establish, provision or control QoS channels). In some embodiments, the QoS policies being verified are one or more of QoS level authorization policy, QoS request policy, QoS reservation policy, QoS provisioning policy, QoS control policy, QoS charging or accounting policy, QoS billing policy, QoS roaming policy, and/or QoS notification policy.

[0082] In some embodiments, a service controller (e.g., or other network element providing similar functions for this purpose) is used for collection, aggregation and/or transmission of QoS tagged usage records for the purpose of displaying to a user interface to inform a user of status of QoS related charging, accounting, service plan and/or billing. In some embodiments, the user interface is a device user interface. In some embodiments, the user interface is an web site user interface.

[0083] In some embodiments, a service controller (e.g., or other network element providing similar functions for this purpose) is used for collection, aggregation, and/or transmission of QoS tagged usage records for the purpose of synchronizing a user interface to inform a user of status of QoS related charging, accounting, service plan, and/or billing.

[0084] **Figure 9** is a functional diagram illustrating a device based service processor 115 and a service controller 122 in accordance with some embodiments. For example, this provides relatively full featured device based service processor implementation and service controller implementation. As shown, this corresponds to a networking configuration in which the service controller 122 is connected to the Internet, data, and/or phone network 120 and not directly to the access network 1610. As shown, a data plane (e.g., service traffic plane) communication path is shown in solid line connections and control plane (e.g., service control plane) communication path is shown in dashed line connections. As will be apparent, the division in functionality between one device agent and another is based on, for example, design choices, networking environments, devices and/or services/applications, and various different combinations can be used in various different implementations. For example, the functional lines can be re-drawn in any way that the product designers see fit. As shown, this includes certain divisions and functional breakouts for device agents as an illustrative implementation, although other, potentially more complex, embodiments can include

different divisions and functional breakouts for device agent functionality specifications, for example, in order to manage development specification and testing complexity and workflow. In addition, the placement of the agents that operate, interact with or monitor the data path can be moved or re-ordered in various embodiments. For example, the functional elements shown in Figure 9 are described below with respect to Figures 10 and 11.

[0085] As shown in Figure 9, service processor 115 includes a service control device link 1691. For example, as device based service control techniques involving supervision across a network become more sophisticated, it becomes increasingly important to have an efficient and flexible control plane communication link between the device agents and the network elements communicating with, controlling, monitoring, or verifying service policy. In some embodiments, the service control device link 1691 provides the device side of a system for transmission and reception of service agent to/from network element functions. In some embodiments, the traffic efficiency of this link is enhanced by buffering and framing multiple agent messages in the transmissions. In some embodiments, the traffic efficiency is further improved by controlling the transmission frequency or linking the transmission frequency to the rate of service usage or traffic usage. In some embodiments, one or more levels of security or encryption are used to make the link robust to discovery, eavesdropping or compromise. In some embodiments, the service control device link 1691 also provides the communications link and heartbeat timing for the agent heartbeat function. As discussed below, various embodiments disclosed herein for the service control device link 1691 provide an efficient and secure solution for transmitting and receiving service policy implementation, control, monitoring and verification information with other network elements.

[0086] As shown in Figure 9, the service controller 122 includes a service control server link 1638. In some embodiments, device based service control techniques involving supervision across a network (e.g., on the control plane) are more sophisticated, and for such it is increasingly important to have an efficient and flexible control plane communication link between the device agents (e.g., of the service processor 115) and the network elements (e.g., of the service controller 122) communicating with, controlling, monitoring, or verifying service policy. For example, the communication link between the service control server link 1638 of service controller 122 and the service control device link 1691 of the service processor 115 can provide an efficient and flexible control plane communication link, a service control link 1653 as shown in Figure 9, and, in some embodiments, this control plane

communication link provides for a secure (e.g., encrypted) communications link for providing secure, bidirectional communications between the service processor 115 and the service controller 122. In some embodiments, the service control server link 1638 provides the network side of a system for transmission and reception of service agent to/from network element functions. In some embodiments, the traffic efficiency of this link is enhanced by buffering and framing multiple agent messages in the transmissions (e.g., thereby reducing network chatter). In some embodiments, the traffic efficiency is further improved by controlling the transmission frequency and/or linking the transmission frequency to the rate of service usage or traffic usage. In some embodiments, one or more levels of security and/or encryption are used to secure the link against potential discovery, eavesdropping or compromise of communications on the link. In some embodiments, the service control server link 1638 also provides the communications link and heartbeat timing for the agent heartbeat function.

[0087] In some embodiments, the service control server link 1638 provides for securing, signing, encrypting and/or otherwise protecting the communications before sending such communications over the service control link 1653. For example, the service control server link 1638 can send to the transport layer or directly to the link layer for transmission. In another example, the service control server link 1638 further secures the communications with transport layer encryption, such as TCP TLS SSH version 1 or 2 or another secure transport layer protocol. As another example, the service control server link 1638 can encrypt at the link layer, such as using IPSEC, various possible VPN services, other forms of IP layer encryption and/or another link layer encryption technique.

[0088] As shown in Figure 9, the service controller 122 includes an access control integrity server 1654. In some embodiments, the access control integrity server 1654 collects device information on service policy, service usage, agent configuration and/or agent behavior. For example, the access control integrity server 1654 can cross check this information to identify integrity breaches in the service policy implementation and control system. In another example, the access control integrity server 1654 can initiate action when a service policy violation or a system integrity breach is suspected.

[0089] In some embodiments, the access control integrity server 1654 (and/or some other agent of service controller 122) acts on access control integrity agent 1694 reports and error conditions. Many of the access control integrity agent 1654 checks can be

accomplished by the server. For example, the access control integrity agent 1654 checks include one or more of the following: service usage measure against usage range consistent with policies (e.g., usage measure from the network and/or from the device); configuration of agents; operation of the agents; and/or dynamic agent download.

[0090] In some embodiments, the access control integrity server 1654 (and/or some other agent of service controller 122) verifies device service policy implementations by comparing various service usage measures (e.g., based on network monitored information, such as by using IPDRs or CDRs, and/or local service usage monitoring information) against expected service usage behavior given the policies that are intended to be in place. For example, device service policy implementations can include measuring total data passed, data passed in a period of time, IP addresses, data per IP address, and/or other measures such as location, downloads, email accessed, URLs, and comparing such measures expected service usage behavior given the policies that are intended to be in place.

[0091] In some embodiments, the access control integrity server 1654 (and/or some other agent of service controller 122) verifies device service policy, and the verification error conditions that can indicate a mismatch in service measure and service policy include one or more of the following: unauthorized network access (e.g., access beyond ambient service policy limits); unauthorized network speed (e.g., average speed beyond service policy limit); network data amount does not match policy limit (e.g., device not stop at limit without re-up/revising service policy); unauthorized network address; unauthorized service usage (e.g., VOIP, email, and/or web browsing); unauthorized application usage (e.g., email, VOIP, email, and/or web); service usage rate too high for plan, and policy controller not controlling/throttling it down; and/or any other mismatch in service measure and service policy. Accordingly, in some embodiments, the access control integrity server 1654 (and/or some other agent of service controller 122) provides a policy/service control integrity service to continually (e.g., periodically and/or based on trigger events) verify that the service control of the device has not been compromised and/or is not behaving out of policy.

[0092] As shown in Figure 9, service controller 122 includes a service history server 1650. In some embodiments, the service history server 1650 collects and records service usage or service activity reports from the Access Network AAA Server 1621 and the Service Monitor Agent 1696. For example, although service usage history from the network elements can in certain embodiments be less detailed than service history from the device, the

service history from the network can provide a valuable source for verification of device service policy implementation, because, for example, it is extremely difficult for a device error or compromise event on the device to compromise the network based equipment and software. For example, service history reports from the device can include various service tracking information, as similarly described above. In some embodiments, the service history server 1650 provides the service history on request to other servers and/or one or more agents. In some embodiments, the service history server 1650 provides the service usage history to the device service history 1618. In some embodiments, for purposes of facilitating the activation tracking service functions (described below), the service history server 1650 maintains a history of which networks the device has connected to. For example, this network activity summary can include a summary of the networks accessed, activity versus time per connection, and/or traffic versus time per connection. As another example, this activity summary can further be analyzed or reported to estimate the type of service plan associated with the traffic activity for the purpose of bill sharing reconciliation.

[0093] As shown in Figure 9, service controller 122 includes a policy management server 1652. In some embodiments, the policy management server 1652 transmits policies to the service processor 115 via the service control link 1653. In some embodiments, the policy management server 1652 manages policy settings on the device (e.g., various policy settings as described herein with respect to various embodiments) in accordance with a device service profile. In some embodiments, the policy management server 1652 sets instantaneous policies on policy implementation agents (e.g., policy implementation agent 1690). For example, the policy management server 1652 can issue policy settings, monitor service usage and, if necessary, modify policy settings. For example, in the case of a user who prefers for the network to manage their service usage costs, or in the case of any adaptive policy management needs, the policy management server 1652 can maintain a relatively high frequency of communication with the device to collect traffic and/or service measures and issue new policy settings. In this example, device monitored service measures and any user service policy preference changes are reported, periodically and/or based on various triggers/events/requests, to the policy management server 1652. In this example, user privacy settings generally require secure communication with the network (e.g., a secure service control link 1653), such as with the policy management server 1652, to ensure that various aspects of user privacy are properly maintained during such configuration requests/policy settings transmitted over the network. For example, information can be compartmentalized to

service policy management and not communicated to other databases used for CRM for maintaining user privacy.

[0094] In some embodiments, the policy management server 1652 provides adaptive policy management on the device. For example, the policy management server 1652 can issue policy settings and objectives and rely on the device based policy management (e.g., service processor 115) for some or all of the policy adaptation. This approach can require less interaction with the device thereby reducing network chatter on service control link 1653 for purposes of device policy management (e.g., network chatter is reduced relative to various server/network based policy management approaches described above). This approach can also provide robust user privacy embodiments by allowing the user to configure the device policy for user privacy preferences/settings so that, for example, sensitive information (e.g., geo-location data, website history) is not communicated to the network without the user's approval. In some embodiments, the policy management server 1652 adjusts service policy based on time of day. In some embodiments, the policy management server 1652 receives, requests or otherwise obtains a measure of network availability and adjusts traffic shaping policy and/or other policy settings based on available network capacity.

[0095] As shown in Figure 9, service controller 122 includes a network traffic analysis server 1656. In some embodiments, the network traffic analysis server 1656 collects/receives service usage history for devices and/or groups of devices and analyzes the service usage. In some embodiments, the network traffic analysis server 1656 presents service usage statistics in various formats to identify improvements in network service quality and/or service profitability. In other embodiments, the network traffic analysis server 1656 estimates the service quality and/or service usage for the network under variable settings on potential service policy. In other embodiments, the network traffic analysis server 1656 identifies actual or potential service behaviors by one or more devices that are causing problems for overall network service quality or service cost.

[0096] As shown in Figure 9, service controller 122 includes a beta test server 1658. In some embodiments, the beta test server 1658 publishes candidate service plan policy settings to one or more devices. In some embodiments, the beta test server 1658 provides summary reports of network service usage or user feedback information for one or more candidate service plan policy settings. In some embodiments, the beta test server 1658

provides a mechanism to compare the beta test results for different candidate service plan policy settings or select the optimum candidates for further policy settings optimization.

[0097] As shown in Figure 9, service controller 122 includes a service download control server 1660. In some embodiments, the service download control server 1660 provides a download function to install and/or update service software elements (e.g., the service processor 115 and/or agents/components of the service processor 115) on the device, as described herein.

[0098] As shown in Figure 9 service controller 122 includes a billing event server 1662. In some embodiments, the billing event server 1662 collects billing events, provides service plan information to the service processor 115, provides service usage updates to the service processor 115, serves as interface between device and central billing server 1619, and/or provides trusted third party function for certain ecommerce billing transactions.

[0099] As shown in Figure 9, the Access Network AAA server 1621 is in network communication with the access network 1610. In some embodiments, the Access Network AAA server 1621 provides the necessary access network AAA services (e.g., access control and authorization functions for the device access layer) to allow the devices onto the central provider access network and the service provider network. In some embodiments, another layer of access control is required for the device to gain access to other networks, such as the Internet, a corporate network and/or a machine to machine network. This additional layer of access control can be implemented, for example, by the service processor 115 on the device. In some embodiments, the Access Network AAA server 1621 also provides the ability to suspend service for a device and resume service for a device based on communications received from the service controller 122. In some embodiments, the Access Network AAA server 1621 also provides the ability to direct routing for device traffic to a quarantine network or to restrict or limit network access when a device quarantine condition is invoked. In some embodiments, the Access Network AAA server 1621 also records and reports device network service usage (e.g., device network service usage can be reported to device service history 1618).

[00100] As shown in Figure 9, the device service history 1618 is in network communication with the access network 1610. In some embodiments, the device service history 1618 provides service usage data records used for various purposes in various

embodiments. In some embodiments, the device service history 1618 is used to assist in verifying service policy implementation. In some embodiments, the device service history 1618 is used to verify service monitoring. In some embodiments, the device service history 1618 is used to verify billing records and/or billing policy implementation. In some embodiments, the device service history 1618 is used to synchronize and/or verify the local service usage counter.

[00101] As shown in Figure 9, the central provider billing server 1619 is in network communication with the access network 1610. In some embodiments, the central provider billing server 1619 provides a mediation function for central provider billing events. For example, the central provider billing server 1619 can accept service plan changes. In some embodiments, the central provider billing server 1619 provides updates on device service usage, service plan limits and/or service policies. In some embodiments, the central provider billing server 1619 collects billing events, formulates bills, bills service users, provides certain billing event data and service plan information to the service controller 122 and/or device 100.

[00102] As shown in Figure 9, in some embodiments, modem selection and control 1811 selects the access network connection and is in communication with the modem firewall 1655, and modem drivers 1831, 1815, 1814, 1813, 1812 convert data traffic into modem bus traffic for one or more modems and are in communication with the modem selection and control 1811. In some embodiments, different profiles are selected based on the selected network connection (e.g., different service profiles/policies for WWAN, WLAN, WPAN, Ethernet and/or DSL network connections), which is also referred to herein as multimode profile setting. For example, service profile settings can be based on the actual access network (e.g., home DSL/cable or work network) behind the Wi-Fi not the fact that it is Wi-Fi (or any other network, such as DSL/cable, satellite, or T-1), which is viewed as different than accessing a Wi-Fi network at the coffee shop. For example, in a Wi-Fi hotspot situation in which there are a significant number of users on a DSL or T-1 backhaul, the service controller can sit in a service provider cloud or an MVNO cloud, the service controls can be provided by a VSP capability offered by the service provider or the service controller can be owned by the hotspot service provider that uses the service controller on their own without any association with an access network service provider. For example, the service processors can be controlled by the service controller to divide up the available bandwidth at the hotspot

according to QoS or user sharing rules (e.g., with some users having higher differentiated priority (potentially for higher service payments) than other users). As another example, ambient services (as similarly described herein) can be provided for the hotspot for verified service processors.

[00103] In some embodiments, the service processor 115 and service controller 122 are capable of assigning multiple service profiles associated with multiple service plans that the user chooses individually or in combination as a package. For example, a device 100 starts with ambient services that include free transaction services wherein the user pays for transactions or events rather than the basic service (e.g., a news service, eReader, PND service, pay as you go session Internet) in which each service is supported with a bill by account capability to correctly account for any subsidized partner billing to provide the transaction services (e.g., Barnes and Noble may pay for the eReader service and offer a revenue share to the service provider for any book or magazine transactions purchased from the device 100). In some embodiments, the bill by account service can also track the transactions and, in some embodiments, advertisements for the purpose of revenue sharing, all using the service monitoring capabilities disclosed herein. After initiating services with the free ambient service discussed above, the user may later choose a post-pay monthly Internet, email and SMS service. In this case, the service controller 122 would obtain from the billing system 123 in the case of network based billing (or in some embodiments, the service controller 122 billing event server 1622 in the case of device based billing) the billing plan code for the new Internet, email and SMS service. In some embodiments, this code is cross referenced in a database (e.g., the policy management server 1652) to find the appropriate service profile for the new service in combination with the initial ambient service. The new superset service profile is then applied so that the user maintains free access to the ambient services, and the billing partners continue to subsidize those services, the user also gets access to Internet services and may choose the service control profile (e.g., from one of the embodiments disclosed herein). The superset profile is the profile that provides the combined capabilities of two or more service profiles when the profiles are applied to the same device 100 service processor. In some embodiments, the device 100 (service processor 115) can determine the superset profile rather than the service controller 122 when more than one "stackable" service is selected by the user or otherwise applied to the device. The flexibility of the service processor 115 and service controller 122 embodiments described

herein allow for a large variety of service profiles to be defined and applied individually or as a superset to achieve the desired device 100 service features.

[00104] As shown in Figure 9, an agent communication bus 1630 represents a functional description for providing communication for the various service processor 115 agents and functions. In some embodiments, as represented in the functional diagram illustrated in Figure 9, the architecture of the bus is generally multipoint to multipoint so that any agent can communicate with any other agent, the service controller or in some cases other components of the device, such user interface 1697 and/or modem components. As described below, the architecture can also be point to point for certain agents or communication transactions, or point to multipoint within the agent framework so that all agent communication can be concentrated, or secured, or controlled, or restricted, or logged or reported. In some embodiments, the agent communication bus is secured, signed, encrypted, hidden, partitioned and/or otherwise protected from unauthorized monitoring or usage. In some embodiments, an application interface agent (not shown) is used to literally tag or virtually tag application layer traffic so that the policy implementation agent(s) 1690 has the necessary information to implement selected traffic shaping solutions. In some embodiments, an application interface agent (not shown) is in communication with various applications, including a TCP application 1604, an IP application 1605, and a voice application 1602.

[00105] In some embodiments, device assisted services (DAS) techniques for providing an activity map for classifying or categorizing service usage activities to associate various monitored activities (e.g., by URL, by network domain, by website, by network traffic type, by application or application type, and/or any other service usage activity categorization/classification) with associated IP addresses are provided. In some embodiments, a policy control agent (not shown), service monitor agent 1696, or another agent or function (or combinations thereof) of the service processor 115 provides a DAS activity map. In some embodiments, a policy control agent, service monitor agent, or another agent or function (or combinations thereof) of the service processor provides an activity map for classifying or categorizing service usage activities to associate various monitored activities (e.g., by Uniform Resource Locator (URL), by network domain, by website, by network traffic type, by application or application type, and/or any other service usage activity classification/categorization) with associated IP addresses. In some embodiments, a

policy control agent, service monitor agent, or another agent or function (or combinations thereof) of the service processor determines the associated IP addresses for monitored service usage activities using various techniques to snoop the DNS request(s) (e.g., by performing such snooping techniques on the device 100 the associated IP addresses can be determined without the need for a network request for a reverse DNS lookup). In some embodiments, a policy control agent, service monitor agent, or another agent or function (or combinations thereof) of the service processor records and reports IP addresses or includes a DNS lookup function to report IP addresses or IP addresses and associated URLs for monitored service usage activities. For example, a policy control agent, service monitor agent, or another agent or function (or combinations thereof) of the service processor can determine the associated IP addresses for monitored service usage activities using various techniques to perform a DNS lookup function (e.g., using a local DNS cache on the monitored device 100). In some embodiments, one or more of these techniques are used to dynamically build and maintain a DAS activity map that maps, for example, URLs to IP addresses, applications to IP addresses, content types to IP addresses, and/or any other categorization/classification to IP addresses as applicable. In some embodiments, the DAS activity map is used for various DAS traffic control and/or throttling techniques as described herein with respect to various embodiments. In some embodiments, the DAS activity map is used to provide the user various UI related information and notification techniques related to service usage as described herein with respect to various embodiments. In some embodiments, the DAS activity map is used to provide service usage monitoring, prediction/estimation of future service usage, service usage billing (e.g., bill by account and/or any other service usage/billing categorization techniques), DAS techniques for ambient services usage monitoring, DAS techniques for generating micro-CDRs (e.g., also referred to as service usage partition, service usage recording partition, service charging bucket, device generated CDRs, such as in the case where the device and not a network component are generating the usage records, ambient usage records, specialized service usage records, or other terms to indicate a service usage data record generated to provide a more refined or detailed breakdown of service usage for the device), and/or any of the various other DAS related techniques as described herein with respect to various embodiments.

[00106] In some embodiments, all or a portion of the service processor 115 functions disclosed herein are implemented in software. In some embodiments, all or a portion of the service processor 115 functions are implemented in hardware. In some embodiments, all or

substantially all of the service processor 115 functionality (as discussed herein) is implemented and stored in software that can be performed on (e.g., executed by) various components in device 100. In some embodiments, it is advantageous to store or implement certain portions or all of service processor 115 in protected or secure memory so that other undesired programs (and/or unauthorized users) have difficulty accessing the functions or software in service processor 115. In some embodiments, service processor 115, at least in part, is implemented in and/or stored on secure non-volatile memory (e.g., non volatile memory can be secure non-volatile memory) that is not accessible without pass keys and/or other security mechanisms. In some embodiments, the ability to load at least a portion of service processor 115 software into protected non-volatile memory also requires a secure key and/or signature and/or requires that the service processor 115 software components being loaded into non-volatile memory are also securely encrypted and appropriately signed by an authority that is trusted by a secure software downloader function, such as service downloader. In some embodiments, a secure software download embodiment also uses a secure non-volatile memory. Those of ordinary skill in the art will also appreciate that all memory can be on-chip, off-chip, on-board and/or off-board.

[00107] **Figure 10** provides a table summarizing various service processer 115 functional elements in accordance with some embodiments. Many of these agents are similarly described above, and the table shown in Figure 10 is not intended to be an exhaustive summary of these agents, nor an exhaustive description of all functions that the agents perform or are described herein, but rather Figure 10 is provided as a summary aid in understanding the basic functions of each agent in accordance with some embodiments, and how the agents interact with one another, with the service controller server elements, and/or with other network functions in certain embodiments to form a reliable device based service delivery solution and/or platform.

[00108] **Figure 11** provides a table summarizing various service controller 122 functional elements in accordance with some embodiments. Many of these agents/elements are similarly described above, and the table shown in Figure 11 is not intended to be an exhaustive summary of these server elements, nor an exhaustive description of all functions that the elements perform or are described herein, but rather Figure 11 is provided as a summary aid in understanding the basic functions of each element in accordance with some embodiments, and how the elements interact with one another, certain network elements,

and/or the service processor agents in certain embodiments to form a reliable device based service delivery solution and/or platform.

[00109] **Figure 12** illustrates a device stack providing various service usage measurement from various points in the networking stack for a service monitor agent, a billing agent, and an access control integrity agent to assist in verifying the service usage measures and billing reports in accordance with some embodiments. As shown in Figure 12, several service agents take part in data path operations to achieve various data path improvements, and, for example, several other service agents can manage the policy settings for the data path service, implement billing for the data path service, manage one or more modem selection and settings for access network connection, interface with the user and/or provide service policy implementation verification. Additionally, in some embodiments, several agents perform functions to assist in verifying that the service control or monitoring policies intended to be in place are properly implemented, the service control or monitoring policies are being properly adhered to, that the service processor or one or more service agents are operating properly, to prevent unintended errors in policy implementation or control, and/or to prevent tampering with the service policies or control. As shown, the service measurement points labeled I through VI represent various service measurement points for service monitor agent 1696 and/or other agents to perform various service monitoring activities. Each of these measurement points can have a useful purpose in various embodiments described herein. For example, each of the traffic measurement points that is employed in a given design can be used by a monitoring agent to track application layer traffic through the communication stack to assist policy implementation functions, such as the policy implementation agent 1690, or in some embodiments, the modem firewall agent 1655 or the application interface agent, in making a determination regarding the traffic parameters or type once the traffic is farther down in the communication stack where it is sometimes difficult or impossible to make a complete determination of traffic parameters. The particular locations for the measurement points provided in these figures are intended as instructional examples, and other measurement points can be used for different embodiments, as will be apparent to one of ordinary skill in the art in view of the embodiments described herein. Generally, in some embodiments, one or more measurement points within the device can be used to assist in service control verification and/or device or service troubleshooting.

[00110] In some embodiments, the service monitor agent and/or other agents implement virtual traffic tagging by tracking or tracing packet flows through the various communication stack formatting, processing and encryption steps, and providing the virtual tag information to the various agents that monitor, control, shape, throttle or otherwise observe, manipulate or modify the traffic. This tagging approach is referred to herein as virtual tagging, because there is not a literal data flow, traffic flow or packet tag that is attached to flows or packets, and the book-keeping to tag the packet is done through tracking or tracing the flow or packet through the stack instead. In some embodiments, the application interface and/or other agents identify a traffic flow, associate it with a service usage activity and cause a literal tag to be attached to the traffic or packets associated with the activity. This tagging approach is referred to herein as literal tagging. There are various advantages with both the virtual tagging and the literal tagging approaches. For example, it can be preferable in some embodiments, to reduce the inter-agent communication required to track or trace a packet through the stack processing by assigning a literal tag so that each flow or packet has its own activity association embedded in the data. As another example, it can be preferable in some embodiments, to re-use portions of standard communication stack software or components, enhancing the verifiable traffic control or service control capabilities of the standard stack by inserting additional processing steps associated with the various service agents and monitoring points rather than re-writing the entire stack to correctly process literal tagging information, and in such cases, a virtual tagging scheme may be desired. As yet another example, some standard communication stacks provide for unused, unspecified or otherwise available bit fields in a packet frame or flow, and these unused, unspecified or otherwise available bit fields can be used to literally tag traffic without the need to re-write all of the standard communication stack software, with only the portions of the stack that are added to enhance the verifiable traffic control or service control capabilities of the standard stack needing to decode and use the literal tagging information encapsulated in the available bit fields. In the case of literal tagging, in some embodiments, the tags are removed prior to passing the packets or flows to the network or to the applications utilizing the stack. In some embodiments, the manner in which the virtual or literal tagging is implemented can be developed into a communication standard specification so that various device or service product developers can independently develop the communication stack and/or service processor hardware and/or software in a manner that is compatible with the service controller specifications and the products of other device or service product developers.

[00111] It will be appreciated that although the implementation/use of any or all of the measurement points illustrated in Figure 12 is not required to have an effective implementation, such as was similarly shown with respect to various embodiments described herein, various embodiments can benefit from these and/or similar measurement points. It will also be appreciated that the exact measurement points can be moved to different locations in the traffic processing stack, just as the various embodiments described herein can have the agents affecting policy implementation moved to different points in the traffic processing stack while still maintaining effective operation. In some embodiments, one or more measurement points are provided deeper in the modem stack where, for example, it is more difficult to circumvent and can be more difficult to access for tampering purposes if the modem is designed with the proper software and/or hardware security to protect the integrity of the modem stack and measurement point(s).

[00112] Referring to Figure 12, describing the device communications stack from the bottom to the top of the stack as shown, the device communications stack provides a communication layer for each of the modems of the device at the bottom of the device communications stack. Example measurement point VI resides within or just above the modem driver layer. For example, the modem driver performs modem bus communications, data protocol translations, modem control and configuration to interface the networking stack traffic to the modem. As shown, measurement point VI is common to all modem drivers and modems, and it is advantageous for certain embodiments to differentiate the traffic or service activity taking place through one modem from that of one or more of the other modems. In some embodiments, measurement point VI, or another measurement point, is located over, within or below one or more of the individual modem drivers. The respective modem buses for each modem reside between example measurement points V and VI. In the next higher layer, a modem selection & control layer for multimode device based communication is provided. In some embodiments, this layer is controlled by a network decision policy that selects the most desirable network modem for some or all of the data traffic, and when the most desirable network is not available the policy reverts to the next most desirable network until a connection is established provided that one of the networks is available. In some embodiments, certain network traffic, such as verification, control, redundant or secure traffic, is routed to one of the networks even when some or all of the data traffic is routed to another network. This dual routing capability provides for a variety of enhanced security, enhanced reliability or enhanced manageability devices, services or applications. In the next

higher layer, a modem firewall is provided. For example, the modem firewall provides for traditional firewall functions, but unlike traditional firewalls, in order to rely on the firewall for verifiable service usage control, such as access control and security protection from unwanted networking traffic or applications, the various service verification techniques and agents described herein are added to the firewall function to verify compliance with service policy and prevent tampering of the service controls. In some embodiments, the modem firewall is implemented farther up the stack, possibly in combination with other layers as indicated in other Figures. In some embodiments, a dedicated firewall function or layer is provided that is independent of the other processing layers, such as the policy implementation layer, the packet forwarding layer and/or the application layer. In some embodiments, the modem firewall is implemented farther down the stack, such as within the modem drivers, below the modem drivers, or in the modem itself. Example measurement point IV resides between the modem firewall layer and an IP queuing and routing layer. As shown, an IP queuing and routing layer is separate from the policy implementation layer where the policy implementation agent implements a portion of the traffic control and/or service usage control policies. As described herein, in some embodiments, these functions are separated so that a standard network stack function can be used for IP queuing and routing, and the modifications necessary to implement the policy implementation agent functions can be provided in a new layer inserted into the standard stack. In some embodiments, the IP queuing and routing layer is combined with the traffic or service usage control layer. For example, a combined routing and policy implementation layer embodiment can also be used with the other embodiments, such as shown in Figure 12. Measurement point III resides between the IP queuing and routing layer and a policy implementation agent layer. Measurement point II resides between the policy implementation agent layer and the transport layer, including TCP, UDP, and other IP as shown. The session layer resides above the transport layer, which is shown as a socket assignment and session management (e.g., basic TCP setup, TLS/SSL) layer. The network services API (e.g., HTTP, HTTPS, FTP (File Transfer Protocol), SMTP (Simple Mail Transfer Protocol), POP3, DNS) resides above the session layer. Measurement point I resides between the network services API layer and an application layer, shown as application service interface agent in the device communications stack of Figure 12.

[00113] As shown in Figure 12, the application service interface layer is above the standard networking stack API and, in some embodiments, its function is to monitor and in

some cases intercept and process the traffic between the applications and the standard networking stack API. In some embodiments, the application service interface layer identifies application traffic flows before the application traffic flows are more difficult or practically impossible to identify farther down in the stack. In some embodiments, the application service interface layer in this way assists application layer tagging in both the virtual and literal tagging cases. In the case of upstream traffic, the application layer tagging is straight forward, because the traffic originates at the application layer. In some downstream embodiments, where the traffic or service activity classification relies on traffic attributes that are readily obtainable, such as source address or URL, application socket address, IP destination address, time of day or any other readily obtained parameter, the traffic type can be identified and tagged for processing by the firewall agent or another agent as it initially arrives. In other embodiments, as described herein, in the downstream case, the solution is generally more sophisticated when a traffic parameter that is needed to classify the manner in which the traffic flow is to be controlled or throttled is not readily available at the lower levels of the stack, such as association with an aspect of an application, type of content, something contained within TLS, IPSEC or other secure format, or other information associated with the traffic. Accordingly, in some embodiments, the networking stack identifies the traffic flow before it is fully characterized, categorized or associated with a service activity, and then passes the traffic through to the application interface layer where the final classification is completed. In such embodiments, the application interface layer then communicates the traffic flow ID with the proper classification so that after an initial short traffic burst or time period the policy implementation agents can properly control the traffic. In some embodiments, there is also a policy for tagging and setting service control policies for traffic that cannot be fully identified with all sources of tagging including application layer tagging.

[00114] As shown in Figure 12, a service monitor agent, which is also in communication with the agent communication bus 1630, communicates with various layers of the device communications stack. For example, the service monitor agent, performs monitoring at each of measurement points I through VI, receiving information including application information, service usage and other service related information, and assignment information. An access control integrity agent is in communication with the service monitor agent via the agent communications bus 1630, as also shown.

[00115] **Figure 13** illustrates an embodiment similar to Figure 12 in which some of the service processor is implemented on the modem and some of the service processor is implemented on the device application processor in accordance with some embodiments. In some embodiments, a portion of the service processor is implemented on the modem (e.g., on modem module hardware or modem chipset) and a portion of the service processor is implemented on the device application processor subsystem. It will be apparent to one of ordinary skill in the art that variations of the embodiment depicted in Figure 13 are possible where more or less of the service processor functionality is moved onto the modem subsystem or onto the device application processor subsystem. For example, such embodiments similar to that depicted in Figure 13 can be motivated by the advantages of including some or all of the service processor network communication stack processing and/or some or all of the other service agent functions on the modem subsystem (e.g., and such an approach can be applied to one or more modems). For example, the service processor can be distributed as a standard feature set contained in a modem chipset hardware of software package or modem module hardware or software package, and such a configuration can provide for easier adoption or development by device OEMs, a higher level of differentiation for the chipset or modem module manufacturer, higher levels of performance or service usage control implementation integrity or security, specification or interoperability standardization, and/or other benefits.

[00116] Referring to Figure 13, describing the device communications stack from the bottom to the top of the stack as shown, the device communications stack provides a communication layer for modem MAC/PHY layer at the bottom of the device communications stack. Measurement point IV resides above the modem MAC/PHY layer. The modem firewall layer resides between measurement points IV and III. In the next higher layer, the policy implementation agent is provided, in which the policy implementation agent is implemented on the modem (e.g., on modem hardware). Measurement point II resides between the policy implementation agent and the modem driver layer, which is then shown below a modem bus layer. The next higher layer is shown as the IP queuing and routing layer, followed by the transport layer, including TCP, UDP, and other IP as shown. The session layer resides above the transport layer, which is shown as a socket assignment and session management (e.g., basic TCP setup, TLS/SSL) layer. The network services API (e.g., HTTP, HTTPS, FTP (File Transfer Protocol), SMTP (Simple Mail Transfer Protocol), POP3, DNS) resides above the session layer. Measurement point I resides between the network

services API layer and an application layer, shown as application service interface agent in the device communications stack of Figure 13.

[00117] **Figure 14** illustrates various embodiments of intermediate networking devices that include a service processor for the purpose of verifiable service usage measurement, reporting, and billing reports in accordance with some embodiments. For example, Figures 14(A) through 14(E) illustrate various extended modem alternatives for access network connection through an intermediate modem or networking device combination that has a connection (e.g., LAN connection) to one or more devices 100.

[00118] In some embodiments, device 100 includes a 3G and/or 4G network access connection in combination with the Wi-Fi LAN connection to the device 100. For example, the intermediate device or networking device combination can be a device that simply translates the Wi-Fi data to the WWAN access network without implementing any portion of the service processor 115 as shown in Figure 14(A). In some embodiments, an intermediate device or networking device combination includes a more sophisticated implementation including a networking stack and some embodiments, a processor, as is the case for example if the intermediate networking device or networking device combination includes a router function, in which case the service processor 115 can be implemented in part or entirely on the intermediate modem or networking device combination. The intermediate modem or networking device combination can also be a multi-user device in which more than one user is gaining access to the 3G or 4G access network via the Wi-Fi LAN connection. In the case of such a multi-user network, the access network connection can include several managed service links using multiple instantiations of service processor 115, each instantiation, for example, being implemented in whole or in part on device 100 with the intermediate modem or networking device combination only providing the translation services from the Wi-Fi LAN to the WWAN access network.

[00119] Referring now to Figures 14(B)-(D), in some embodiments, the service processors 115 are implemented in part or in whole on the intermediate modem or networking device combination. In the case where the service processor 115 is implemented in part or in whole on the intermediate modem or networking device combination, the service processor 115 can be implemented for each device or each user in the network so that there are multiple managed service provider accounts all gaining access through the same intermediate modem or networking device combination. In some embodiments, the functions

of service processor 115 are implemented on an aggregate account that includes the WWAN access network traffic for all of the users or devices connected to the Wi-Fi LAN serviced by the intermediate modem or networking device combination. In some embodiments, the central provider can also provide an aggregated account service plan, such as a family plan, a corporate user group plan and/or an instant hotspot plan. In the case where there is one account for the intermediate modem or networking device combination, the intermediate modem or networking device combination can implement a local division of services to one or more devices 100 or users in which the services are controlled or managed by the intermediate modem or networking device combination or the device 100, but the management is not subject to service provider control and is auxiliary to the service management or service policy implementation performed by service processors 115. In some embodiments, another service model can also be supported in which there is an aggregate service provider plan associated with one intermediate modem or networking device combination, or a group of intermediate modems or networking device combinations but where each user or device still has its own service plan that is a sub-plan under the aggregate plan so that each user or device has independent service policy implementation with a unique instantiation of service processor 115 rather than aggregate service policy implementation across multiple users in the group with a single instantiation of service processor 115.

[00120] As shown in Figure 14(B), in some embodiments, device 100 includes a Wi-Fi modem, a Wi-Fi modem combined with a 3G and/or 4G WWAN modem on intermediate modem or networking device combination 1510, and the intermediate modem or networking device combination forwards WWAN access network traffic to and from device 100 via the Wi-Fi link. For example, the service processor 115 can be implemented in its entirety on device 100 and the service provider account can be associated exclusively with one device. Similarly, as shown in Figure 14(C), such an implementation can be provided using a different access modem and access network, such as a 2G and/or 3G WWAN, DSL wire line, cable DOCSIS wire line or fiber wire line configuration in place of the 3G and/or 4G access network connection to the intermediate modem or networking device combination 1510. In addition, various other embodiments similarly use DSL as shown in Figures 14(D), USB, Ethernet, Bluetooth, or another LAN or point to point connection from device 100 to the intermediate modem or networking device combination 1510, or a femto cell modem and DSL/cable/T1/other combination as shown in Figure 14(E).

[00121] **Figure 15** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including a proxy server(s) 270 in accordance with some embodiments. As shown, Figure 2 includes a proxy server(s) 270 in communication with a 4G/3G/2G wireless network operated by, for example, a central provider. For example, the proxy server(s) 270 can be used to implement and/or assist in providing various techniques described herein, such as service usage measurement and/or other techniques as described herein.

[00122] **Figure 16** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including a service provider network in accordance with some embodiments, involving one or more of service controllers, service processors and/or proxy server/routers. This diagram illustrates the connections and flows for the provisioning system, new subscriber activation system and order system with the equipment functions having similar or identical embodiments as described in the context of Figure 4 except in this case one or more proxy server/routers 270 are included for embodiments as described herein.

[00123] While the specific illustrations in Figures 16 through 18 and associated descriptions refer to a the wireless 3G/4G network, it will be apparent to one of ordinary skill in the art that these techniques can similarly be applied to other types of access networks including, for example, WiFi, cable, DSL, fiber, satellite, and/or other networks. It will also now be apparent to one of ordinary skill in the art that in the context of the proxy server/router embodiments illustrated in Figures 16 through 18 that many other embodiments are possible for the CDR (or FDR, start/stop records, interim accounting records, IPDRs, micro-CDR or service charging bucket accounting) recording, reporting, aggregating, mediating and/or synchronizing usage records within the various network elements and/or device elements.

[00124] **Figure 17** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including a service provider network in accordance with some embodiments, involving one or more of service controllers, service processors and/or proxy server/routers. This diagram illustrates the connections and flows for the charging system with the equipment functions having similar or identical embodiments as described in the context of Figures 4 through 8 except in this case one or more proxy server/routers 270 are included for embodiments as described herein. The

charging flows are illustrated by three line types: solid lines for device generated CDRs and proxy server/router generated CDRs, dashed lines for network equipment generated CDRs, and double dot-dash line types for CDRs that have been mediated by a service controller 120 and/or mediation system 118.

[00125] **Figure 18** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including a service provider network in accordance with some embodiments, involving one or more of service controllers and/or proxy server/routers. This diagram illustrates the connections and flows for the charging system with the equipment functions having similar or identical embodiments as described in the context of Figure 17 except in this case there is no service processor CDR feed and only CDR feeds from the network equipment and the proxy server/routers. The charging flows are illustrated by three line types: solid lines for proxy server/router generated CDRs, dashed lines for network equipment generated CDRs, and double dot-dash line types for CDRs that have been mediated by a service controller 120 and/or mediation system 118.

[00126] In some embodiments, the proxy server is used for one or more of the functions of: generating, collecting, aggregating, mediating and/or reporting service usage charging information. In some embodiments, the proxy server/router is used for one or more of collecting, aggregating, mediating and/or reporting service usage charging information in which a client device service processor assists in routing traffic to and/or from the proxy server. In some embodiments, the proxy server is used for one or more of the functions of: generating, collecting, aggregating, mediating and/or reporting service usage charging information and the policies controlling the device service processor and the proxy servers are coordinated and distributed by a service controller. In some embodiments, the proxy server/router is used for one or more of: collecting, aggregating, mediating and/or reporting service usage charging information where a client device service processor assists in routing traffic to and/or from the proxy servers and the service processors are coordinated and distributed by a service controller. In some embodiments, in which the proxy server is used in conjunction with a device service processor (e.g., or other client function), the service processor detects one or more types of ambient service activity or other special service activity and routes the traffic to the appropriate proxy server destination for that activity.

[00127] In some embodiments, one or more proxy servers or routers are used for one or more of: generating, collecting, aggregating, mediating and/or reporting service usage charging information in which the proxy server communicates with a client device UI for the purpose of informing the user of service status and/or receiving user feedback on service status.

[00128] In some embodiments, one or more proxy servers or routers are used for controlling service usage in accordance with a set of policies for specialized services that are programmed by a service design UI (VSP Interface 4910). In some embodiments, one or more proxy servers or routers are used for controlling service usage in accordance with a set of policies for specialized services that are programmed by a network element with a service design UI, and the policies controlling the device service processor and the proxy server are coordinated and distributed by a service controller.

[00129] In some embodiments, one or more proxy servers or routers are used for one or more of generating, collecting, aggregating, mediating and/or reporting service usage charging information in which a client device service processor assists in routing traffic to and/or from the proxy server and the policies controlling the device service processor and the proxy server are coordinated and distributed by a service controller.

[00130] In some embodiments, the proxy servers can be distributed and managed across diverse geographical separations so that the device traffic to the proxy server/routers does not need to traverse long distances before being connected through the proxy server/routers to the Internet, data, or phone network 120. For example, this geographic diversity or redundancy can be accomplished in a number of ways including using a redundant server or router architecture with a load balancer to determine the best hop to the nearest equipment location, coupled with a distributed data base to persist the device service state so that if a proxy server/router element goes down the device service may be effectively resumed by a different proxy server/router in the same data center or in a geographically diverse data center. In some embodiments, the device service state is persisted in this way by a distributed or redundant diversity data base. In some embodiments, the device service state is held by the service controller network, which in some embodiments, are also distributed and/or redundant. In some embodiments, the device service state is persisted by other network equipment elements. In some embodiments, the device service state is persisted by the device client software (e.g., service processor).

[00131] In some embodiments, it may not be possible to accurately identify every network service access attempt or service usage (e.g., or traffic access) as belonging to a given service usage partition (e.g., a given ambient service usage, background network chatter usage, user service plan usage, emergency service usage, and/or other type of service usage). As used herein, the terms service usage partition, service usage recording partition, service charging bucket, and micro-CDRs are used interchangeably. Accordingly, it is desirable to provide a service charging bucket for traffic that is allowed and not definitively identified as belonging to a known service charging bucket. This allows for techniques to employ an "allow but verify" approach to traffic that is likely to be legitimately associated with an ambient service or a user service or a network service that is intended to be allowed, but is not definitively identified as being associated with an allowed service.

[00132] As an example, there may be a web site access associated with an ambient service that does not have a reference identifier or other traffic parameter that allows the service processor to associate it with the correct ambient service. In this case, a set of rules can be applied to determine if it is likely that the web site access is a legitimate access given the access control policies that are in place, and if it is the access can be allowed and the traffic usage either recorded in the ambient service charging bucket that it is suspected to be associated with, or the traffic usage can be charged to a network chatter service usage bucket, or the traffic usage can be charged to the user service usage bucket, or the traffic usage may be recorded in a "not classified but allowed" service charging bucket. In some embodiments, in which such traffic is charged to the "not classified but allowed" service usage charging bucket, additional verification measures are employed to ensure that the amount of traffic that is not classified but allowed does not grow too large or become a back-door for service usage errors. For example, the access control policy rules for allowing unclassified traffic can be relatively loose as long as the amount of service usage charges accumulating in the not classified charging bucket remains within certain bounds, and/or the rate of service usage charged to the not classified bucket remains within certain bounds, but if the not classified traffic becomes large or the rate of not classified traffic growth becomes large then the rules governing when to allow not classified traffic can be tightened.

[00133] As another example, a browser application can access a web site that is known to be an ambient service website, and that web site might serve back a series of traffic flows, some of which are associated with the ambient service website through URL identifiers that

are known to be part of the website, and other traffic can be associated with the ambient service website by virtue of a referring website tag or header, and some traffic can be returned to the same application with a relatively close time proximity to the other traffic as being identified as ambient traffic. In this example, as long as the not classified traffic service charging bucket does not exceed a given pre-set policy limit on its size, and/or does not grow faster than a given pre-set policy rate, and/or is received within a certain pre-set policy period of time difference from the time that other ambient service charging bucket traffic is received, then the not classified traffic is continued to be allowed. However, if the not classified traffic amount or rate of growth exceeds the pre-set policy limits, or if the period of time between when verified ambient service traffic is received and the not classified traffic is received exceeds policy limits, then the not classified traffic can be blocked or other action can be taken to further analyze the not classified traffic.

[00134] In some embodiments, it is important to provide a hierarchy of service usage charging rules for the various service usage partitions on a device. As an example, for a given service plan there can be two ambient service charging buckets, a network chatter (e.g., or network overhead) service charging bucket, and a user service plan service charging bucket and it is desirable to make sure that no ambient services or network overhead service or unclassified service is charged to the user service plan, and it is also desirable to ensure that all known ambient service traffic is charged to the appropriate ambient service partner, and it is desirable to ensure that no network overhead service or unclassified service is charged to ambient service partners. In such situations, a service charging bucket hierarchy can be provided as follows: determine if a traffic flow (e.g., or socket) is associated with network overhead, and if so allow it and charge that service bucket, then determine if a traffic flow (or socket) is associated with ambient service #1, and if so allow it and charge that service bucket, then determine if a traffic flow (or socket) is associated with ambient service #2, and if so allow it and charge that service bucket, then determine if a traffic flow (or socket) is associated with not classified traffic, and if so allow it and charge that service bucket, then if the traffic is not associated with any of the above service charging buckets allow it and charge it to the user service plan charging bucket. In another example, if the user has not yet chosen to pay for a user service plan, then the same hierarchical access control and service charging policy can be used except the final step would be: then if the traffic is not associated with any of the above service charging buckets block the traffic. Hierarchical service charging bucket identification such as depicted in these examples can be a crucial

aspect of a robust access control policy and/or service charging policy system. Many other access control policy hierarchies and service charging bucket policy hierarchies will now be apparent to one of ordinary skill in the art.

[00135] In some embodiments, the not classified traffic is charged according to service charging rules that rely on the most likely candidate service charging bucket for the traffic. As another example, if the not classified traffic is being delivered to the same application as other known ambient service traffic and the time difference between delivery of the known ambient service traffic and the not classified traffic is small, then the not classified traffic can be charged to the ambient service in accordance with a pre-set charging policy rule specifying these conditions. Other embodiments that will now be apparent to one of ordinary skill in the art. For example, another charging rule for not classified traffic could be to perform a pro-rata allocation of the not classified traffic to all of the other service charging buckets with the pro-rata allocation being based on the percentage of the total traffic used by the device for each service charging bucket. As another example, the not classified traffic can be charged to a subset of the service charging buckets for the device (e.g., all ambient services plus the network overhead service) in accordance with the pro-rata share for each service included in the pro-rata split.

[00136] In some embodiments, the user service plan agreement is structured so that the user acknowledges that ambient services in which the access connection to the service is sponsored, paid for, and/or partially subsidized by an entity other than the user are a benefit to the user, and/or the user acknowledges that there is no inherent right to free ambient services, and that the service usage accounting system may not always properly characterize usage for a sponsored or subsidized ambient service (e.g., or some other specialized service) in the correct accounting service charging bucket, and, thus, the user service plan account can be charged and/or billed with some of this traffic. By having the user acknowledge a service use agreement of this form then some ambient traffic can be charged to the user service plan account, including, for example, allowed but not classified traffic, excess ambient service usage beyond pre-set policy limits, ambient service usage during busy network periods or on congested network resources, and/or other criteria/measures. In some embodiments, the user might be notified that they are being charged for service activities that are sometimes subsidized or free to the user. As discussed above, it is important to ensure that a not classified service charging bucket does not become a back door for service charging errors or

hacking. It will now be apparent to one of ordinary skill in the art that the not classified service usage charges can be verified in a variety of manners, including, for example, observing the size of the not classified service charging bucket as compared to other service usage charges on the device (e.g., total device service usage, ambient service usage, user bucket service usage, and/or other criteria/measures), capping the not classified bucket, and/or capping the rate of growth of the not classified bucket.

[00137] In some embodiments, it is important to verify not only that the total device service usage amount is correct, but that the service usage is being reported in the proper service charging buckets. For example, if the service processor software can be hacked so that it correctly reports the total service usage, but reports user service plan traffic under one or more ambient service buckets, then simply verifying that the total amount of service usage is correct will not be sufficient to prevent the device from obtaining free user service that can be charged to ambient service partners. There are a variety of direct and indirect embodiments to accomplish this verification of service charging bucket divisions. For example, in direct verification embodiments, one or more alternative measures of service usage are employed to cross-check the accuracy of the service charging bucket divisions. In indirect embodiments one of two classes of verification are employed: the size and rate of growth for service charging buckets is analyzed and compared to a pre-set group of policies to detect and/or modify service charging bucket growth that is out of policy; and/or the proper operation of the service processor elements involved in service charging bucket partitioning is verified.

[00138] Various embodiments involving direct verification of service charging bucket usage and/or accounting include the use of network based service usage measures such as CDRs, IPDRs, flow data records (e.g., FDRs – detailed reports of service usage for each service flow, such as network socket connection, opened and used to transmit data to or from the device), accounting records, interim accounting records or other similar usage records to verify that the device is within service policy and/or the device based service usage reports are accurate. Use of such network generated service usage records to directly verify service charging and/or proper service usage policy adherence are described herein. When network address destination and/or source information is available in these records, as described herein, this can be used in some embodiments, to verify the service charging bucket accounting provided by the device service processor. In some embodiments, some types of

service usage records include real-time data but not necessarily all of the useful information needed to help verify service charging bucket accounting, while other types of service usage records provide more detail (e.g., IP address for destination and source) but do not always arrive in real-time. For example, in some embodiments, FDRs are created each time a new service flow (e.g., network socket connection) is opened and then closed. At the time the service flow is closed, a (e.g., possibly time stamped) data usage record indicating source address, destination address and amount of data transmitted is created and sent to a charging aggregation function in the network. The charging aggregation function can then forward the FDRs to the service controller for verification or direct accounting of service charging bucket accounting. By comparing the FDR addresses with known ambient service traffic address associations, the partitioning of service charging buckets between one or more ambient services and other services such as a user service plan service charging bucket may be verified. However, in some cases it can be a long period of time for an FDR to be generated when a device service flow (e.g., socket) remains open for a long period of time, as in the case for example with a long file download, a peer to peer connection with a socket keep alive, or a proxy server service with a socket keep alive. In such cases, it can be disadvantageous to have large amounts of data to be transferred without an FDR to confirm device service processor based reports, and in some cases this can provide an opportunity for service processor service reporting hacks. This can be remedied in a variety of ways by using other network reported service usage information to augment the FDR information. For example, start and stop accounting records can sometimes be obtained in some embodiments, from a network element such as a service gateway or the AAA servers (e.g., or other network equipment elements depending on the network architecture). Although start and stop records do not possess the detail of service usage information that FDRs, CDRs, IPDRs, interim accounting records or other service usage records posses, they do inform the service controller that a device is either connected to the network or has stopped connecting. If a device is connected to the network and is not transmitting device usage reports or heartbeats, then the service controller is alerted that an error or hacking condition is likely. As another example of how two or more types of network reported service usage information may be used to create a better real time or near real-time check on device service usage, if both FDRs and start/stop accounting records are available, the service controller can send a stop-then-resume service command to the device (e.g., or alternatively send a stop then resume service command to a network equipment element), which will cause the device to terminate all open service flows before re-initiating them, and once the service flows are stopped then the FDR

flow records will be completed and transmitted for any service flows that were in process but unreported when the stop service command was issued. This will cause any long term open socket file transfers to be reported in the FDR flow records thus plugging the potential back door hole in the FDR service usage accounting verification method.

[00139] As another example showing how multiple types of network generated service usage accounting records may be used to complement each other and strengthen the verification of service charging bucket accounting partitions, interim data records can be used with FDRs. Interim data records are available in accordance with some embodiments, n which the interim data records are generated on a regularly scheduled basis by a network element (e.g., gateway, base station, HLR, AAA, and/or other network element/function). Interim data records are typically near real time records that report the aggregate traffic usage for the device as of a point in time, but often do not include traffic address information or other traffic details. In embodiments in which both interim accounting records and FDRs are available, when the interim accounting records are indicating service usage that is not being reported in the FDR stream this is evidence that a device has one or more long term socket connections that are open and are not terminating. In this case, the service controller can verify that the device based usage reports are properly accounting for the total amount of service usage reported by the interim accounting records, and/or the service controller can force an FDR report for the open sockets by issuing a stop-resume service command as similarly discussed above.

[00140] As described herein, other embodiments involving direct verification of service charging bucket accounting can be provided. One example is to route ambient service traffic to a proxy server or router programmed to support only the network access allowed for the ambient service and to account for the ambient service usage. Additional proxy servers or routers can be similarly programmed for each ambient service that is part of the device service plan, and in some embodiments, another proxy server or router is programmed to support traffic control and account for the user service plan service access. By comparing the service usage accounting for each of these proxy servers or routers, the device generated service charging bucket accounting can be directly verified. In some embodiments, the usage accounting provided by the proxy servers or routers is used directly for service usage accounting.

[00141] In some embodiments, ambient service partner feedback is used to verify service charging bucket accounting. For example, web servers used by ambient service partners to provide ambient services can identify a user device based on header information embedded in the HTML traffic, and then account for either the service used by the device during the ambient service sessions or account for the number of transactions the user completes. If service usage is recorded, then it can be reported to the service controller and be used directly to verify ambient service charging bucket accounting. If transactions are all that are recorded, then this can be reported to the service controller and the amount of ambient service used by the device can be compared with the number of transactions completed to determine if the ambient service usage is reasonable or should be throttled or blocked. It will now be apparent to one of ordinary skill in the art that other embodiments can be provided that employ more than one type of network generated service usage records to verify service usage accounting and/or verify service charging bucket accounting.

[00142] Other embodiments involving indirect methods for verifying or controlling service charging bucket accounting include monitoring the size and/or growth rate of ambient service usage. In some embodiments, the access control policy rules call for restricting a given ambient service access when the amount of service usage charges accumulating in the ambient service charging bucket exceed a pre-set policy limit, and/or when the rate of service usage for the ambient service exceeds a pre-set policy limit. For example, once these limits are reached, the ambient service can be throttled back for a period of time, blocked for a period of time, or charged to the user service plan charging bucket. In some embodiments, before these actions are taken the user UI can be used to notify the user of the service policy enforcement action. In some embodiments, indirect verification of service charging bucket accounting includes the various techniques described herein for verifying proper operation of the service processor agent software and/or protecting the service processor agent software from errors, manipulation, or hacking.

[00143] In some embodiments, the device service processor directs traffic destined for a given ambient service to a proxy server or router programmed to support that ambient service, and any traffic control policies and/or access control policies for the ambient service are implemented in the proxy server or router. For example, in such embodiments the proxy server or router can be programmed to only allow access to one or more ambient services that are authorized by the device service plan, with the proxy server or router controlling device

access so that other network destinations cannot be reached. Continuing this example embodiment, the proxy server or router can account for the ambient service usage in an ambient service charging bucket as discussed elsewhere. In such proxy server or router ambient service control embodiments, the same traffic association techniques described elsewhere that allow incoming traffic associated with an ambient service website or other service to be identified, allowed or blocked, potentially throttled, and accounted for in a service charging bucket can be implemented in the proxy server or router programming. Such proxy server or router embodiments can also implement user service plan service charging buckets, user service plan traffic controls, and user service plan access control as discussed herein. In some embodiments, the proxy server or router analyzes the HTML traffic content of the traffic flows as described herein to perform such associations, traffic control and/or service usage accounting. Similarly, in some embodiments, a proxy server or router can provide the "surf-out" capabilities described herein by performing the same surf-out traffic associations (e.g., HTML branch reference associations and/or other branch associations) described herein. It will now be apparent to one of ordinary skill in the art that many of the adaptive ambient service control and service usage charging functions described herein for a service processor can be readily implemented with a proxy server or router that is appropriately programmed.

[00144] In some embodiments, routing of device traffic for one or more ambient services and/or user service plan services to a proxy server or router is accomplished by the device service processor using the device service processor traffic control embodiments described herein. In some embodiments, routing of device traffic for one or more ambient services and/or user service plan services to a proxy server or router is accomplished by dedicated network equipment such as the gateways (e.g., SGSN, GGSN, PDSN, or PDN) , home agents, HLRs or base stations, with the network equipment being provisioned by a service controller (e.g., or other interchangeable network element with similar functions for this purpose) to direct the device traffic to the proxy server or router. In some embodiments, the ambient service traffic or the user service plan traffic is controlled by the proxy server according to a service plan policy set supplied by the service controller (e.g., or equivalent network function for this purpose). The traffic control service policy thus implemented by the proxy server can control traffic based on one or more of the following: period of time, network address, service type, content type, application type, QoS class, time of day, network busy state, bandwidth, and data usage.

[00145] In some embodiments, a proxy server or router is used to verify accounting for a given service, for example, an ambient service. In some embodiments, this is accomplished by the device service processor directing the desired service flows to a proxy server or router programmed to handle the desired service flows, with the proxy server or router being programmed to only allow access to valid network destinations allowed by the access control policies for the desired service, and the proxy server or router also being programmed to account for the traffic usage for the desired services. In some embodiments, the proxy service usage accounting may then be used to verify device based service usage accounting reported by the service processor. In some embodiments, the accounting thus reported by the proxy server or router can be used directly to account for service usage, such as ambient service usage or user service plan service usage.

[00146] In some embodiments, in which a proxy server is used for device service usage accounting, the proxy server maintains a link to the device service notification UI via a secure communication link, such as the heartbeat device link described herein. For example, the proxy server or router can keep track of device service usage versus service plan usage caps/limits and notify the user device UI through the device communication link (e.g., heartbeat link) between the service controller and the device. In some embodiments, the proxy server/router communicates with a device UI in a variety of ways, such as follows: UI connection through a device link (e.g., heartbeat link), through a device link connected to a service controller (e.g., or other network element with similar function for this purpose), presenting a proxy web page to the device, providing a pop-up page to the device, and/or installing a special portal mini-browser on the device that communicates with the proxy server/router. In some embodiments, the UI connection to the proxy server/router is used as a user notification channel to communicate usage notification information, service plan choices, or any of the multiple services UI embodiments described herein.

[00147] In some embodiments, for the proxy server/router techniques for implementing service traffic/access controls and/or service charting bucket accounting, it is desirable to have the same information that is available to the service processor on the device, including, for example, application associated with the traffic, network busy state, QoS level, or other information about the service activity that is available at the device. For example, such information can be used to help determine traffic control rules and/or special services credit is due (e.g., ambient services credit). In some embodiments, information available on

the device can be communicated to the proxy server/router and associated with traffic flows or service usage activities in a variety of ways. For example, side information can be transmitted to the proxy server/router that associates a traffic flow or service activity flow with information available on the device but not readily available in the traffic flow or service activity flow itself. In some embodiments, such side information may be communicated over a dedicated control channel (e.g., the device control link or heartbeat link), or in a standard network connection that in some embodiments, can be secure (e.g., TLS/SSL, or a secure tunnel). In some embodiments, the side information available on the device can be communicated to the proxy server/router via embedded information in data (e.g., header and/or stuffing special fields in the communications packets). In some embodiments, the side information available on the device can be communicated to the proxy server/router by associating a given secure link or tunnel with the side information. In some embodiments, the side information is collected in a device agent or device API agent that monitors traffic flows, collects the side information for those traffic flows, and transmits the information associated with a given flow to a proxy server/router. It will now be apparent to one of ordinary skill in the art that other techniques can be used to communicate side information available on the device to a proxy server/router.

[00148] For example, just as the hierarchy of charging rules can be important for implementations in which the service processor is creating the service charging bucket accounting, it can also important in implementations that use a proxy server or router for service charging bucket accounting. Accordingly, various embodiments described herein for creating a hierarchy of service usage charging rules can be applied to proxy server or proxy router embodiments. It will be apparent to one of ordinary skill in the art that the service charging bucket embodiments and traffic control and access control embodiments described herein for allowed but not classified buckets apply equally to the proxy server/router embodiments. For example, pre-defined service policy rules can be programmed into the proxy server/router to control the traffic flows and/or place usage limits or access limits on an ambient service, or a user service plan service. It will also now be apparent to one of ordinary skill in the art that the embodiments described herein disclosing an initial allowed service access list, temporarily allowing additional service activities until they are determined to be allowed or not allowed, expanding the allowed service activity list, maintaining a not allowed service activity list and expanding the not allowed service activity list also apply equally to proxy server/router embodiments. Similarly, it will now be apparent to one of

ordinary skill in the art that the proxy/server router embodiments can be employed to directly generate the service charging bucket (or micro-CDR) usage reports used to provide further detail and/or billing capabilities for service usage. In some embodiments, in which the device service processor directs traffic to a proxy server/router, there are advantageous design feature embodiments available that can reduce the need to provision network to detect and force specialized device service traffic to the appropriate proxy server/router. For example, this can be done by creating a "usage credit" system for the services supported by the proxy server/outer. Total service usage is counted on the one hand by the device service processor, or by other network equipment, or by both. Credit on the other hand for ambient service or other specialized access service usage that is not charged to the user is then provided for services that the device directs through the proxy server/router destination (e.g., URL or route hop) supporting the particular ambient service or other specialized access service. If the device correctly directs traffic to the proxy server/router, then the counting and/or access rules are correctly implemented by the proxy server/router. The service can be thus controlled and/or accounted for. When the service is accounted for, the proxy server/router reports the service charging bucket accounting back to the service controller (e.g., or other network equipment responsible for service charging bucket/ micro CDR mediation) and the user service plan service charging bucket account can be credited for the services. Traffic that reaches the proxy server/router is controlled by the access rules and/or traffic control rules and/or QoS control rules of the proxy server/router programming, so there is no question regarding the type of service that is supported with the service charging buckets that are reported to mediation functions (e.g., mediation functions can be performed by one or more of service controller, usage mediation, billing, AAA, and/or HLR/home agent). As the proxy server/router is in the network and can be physically secured and protected from hacking, there is high confidence that the service control and/or charging rules intended for ambient services or some other specialized service are properly implemented and that the proxy server/router connection is being used for the intended service and not some other unintended hacked service. If the device is somehow hacked or otherwise in error so that the traffic is not directed through the appropriate proxy server/router, then the proxy server/router does not log the traffic in micro CDRs/buckets and no specialized service usage credit is sent to the mediation functions, so there is no usage credit deducted from the device user service plan service usage totals. Thus, the user pays for the services when the device is hacked to avoid the proxy server/router. The user account service agreement can specify that if the user

tampers with software and traffic is not routed to servers then credit will not be provided and user plan will be charged.

[00149] In some proxy server/router embodiments, the usage credit is sometimes recorded by the proxy server/router detecting which device is performing the access. Device identification can be accomplished in a variety of ways including a header/tag inserted into the traffic by the device, a route in the network specified for that device, a secure link (e.g., TLS/SSL, IP Sec, or other secure tunnel), a unique device IP address or other credential (e.g., where proxy server/router has access to an active IP address look up function), a unique proxy server/router address and/or socket for the device.

[00150] In some embodiments, the coordination of the device service controller traffic control elements with a proxy server/outer can make it simpler to locate, install, provision and operate the proxy servers. The proxy server/routers do not need to be located "in line" with the access network because it is the device's responsibility to make sure the traffic is routed to the servers/routers or else there is not credit and the user account is charged. In some embodiments, this makes it unnecessary or reduces the need to force device traffic routes in carrier network. In some embodiments, the proxy server/routers can be located in carrier network or on the Internet. If the proxy server/routers are on Internet, then traffic can be authenticated in a firewall before being passed to server/routers to enhance security to attack.

[00151] In some embodiments, the service charging bucket recording software in the proxy server/router can be programmed into an ambient service partners network equipment directly thus eliminating the need for special apparatus. The ambient service partner's equipment (e.g., a web server, load balancer or router) can recognize the device using one of the techniques described above, aggregate the device service charging bucket accounting, and periodically send the usage accounting to the service controller or other network service usage mediation function.

[00152] Programming and/or provisioning the types of ambient services, user service plan services and/or specialized services disclosed in various embodiments described herein can be a complex process. In some embodiments, a simplified central network user or MVNO user programming interface, also referred to herein as a Virtual Service Provider Work Station 4910 or interchangeably as a service design interface or VSP Interface, is used

to program the necessary policy settings for such services is desirable. For example, a service design interface (VSP Interface 4910) is provided that organizes and/or categorizes the various policy settings that are required to set up an ambient service (e.g., or other service) including one or more of the following: a policy list of service activities that are allowed under the ambient service (e.g., or other service), access control policies, rules for implementing and/or adapting an allowed list of network destinations, rules for implementing and/or adapting a blocked list of network destinations, service charging bucket policies, user notification policies, service control, and/or service charging bucket verification policies, actions to be taken upon verification errors. In some embodiments, the required information for one or more of these policy sets is formatted into a UI that organizes and simplifies the programming of the policies. In some embodiments, the UI is partly graphical to help the user understand the information and what settings need to be defined in order to define the service. In some embodiments, the UI is created with an XML interface. In some embodiments, the UI is offered via a secure web connection. In some embodiments, a basic service policy for an ambient service (e.g., or another service) is created that includes one or more of the above service policy settings, and then this service policy set becomes a list or an object that can be replicated and used in multiple service plan policy set definitions (e.g., "dragged and dropped" in a graphical UI). In some embodiments, the resulting set of policies created in this service design interface (VSP Interface 4910) are then distributed to the necessary policy control elements in the network and/or on the device that act in coordination to implement the service policy set for a given device group. For example, if a service processor is used in conjunction with a service controller, then the service design (VSP Interface 4910) interface can load the service policy settings subsets that need to be programmed on the service controller and the device service processor into the service controller, and the service controller loads the service controller policy settings subset into the service controller components that control the policies and loads the device policy settings subset to the devices that belong to that device group. In embodiments in which a proxy server/router is used to help control and account for services, in some embodiments, the service design interface (VSP Interface 4910) loads the service policy settings subsets that need to be programmed on the proxy server/router into the proxy server/router. In embodiments where other network equipment (e.g., gateways, base stations, service usage recording/aggregation/feed equipment, AAA, home agent/HLR, mediation system, and/or billing system) need to be provisioned or programmed, in some embodiments, the service design interface (VSP Interface 4910) also loads the appropriate device group policy subsets

to each of the equipment elements. Accordingly, various techniques can be used as described herein to greatly simplify the complex task of translating a service policy set or service plan into all the myriad equipment and/or device settings, programming, and/or provisioning commands required to correctly implement the service. It will now be apparent to one of ordinary skill in the art that several of these techniques can similarly be used for the VSP service design interface (VSP Interface 4910). In some embodiments, a service processor is used in conjunction with one or more proxy servers or routers for one or more of QoS charging, QoS provisioning and/or QoS control. In some embodiments, one or more proxy servers or routers are used in conjunction with a service controller (e.g., or other network function with similar functions for this purpose) for one or more of QoS charging, QoS provisioning, and/or QoS control. In some embodiments, a service processor is used in conjunction with one or more proxy servers or routers and a service controller (e.g., or other network function with similar functions for this purpose) for one or more of QoS charging, QoS provisioning, and/or QoS control. In some embodiments, one or more proxy servers or routers are used in conjunction with a service controller (e.g., or other network function with similar functions for this purpose) for one or more of QoS charging, QoS provisioning, and/or QoS control, in which the proxy server or router policies for this QoS service implementation are programmed by a service design UI (VSP Interface 4910).

[00153] **Figure 19** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including two service provider networks in accordance with some embodiments. The description of the network equipment element functions is generally identical to the embodiments depicted in other figures, except that one or more service controllers 120 and/or proxy servers/routers 270 and/or service design interfaces (VSP Interface 4910) are shared between the two networks as described herein. For example, the network equipment, charging record formats, provisioning systems can be similar in the two networks, or may be completely different since in the various embodiments the service controller 120, service processor 115, and/or proxy sever router 270 are used to provide unified roaming services, or in some embodiments, to provide common network service features across the different networks.

[00154] **Figure 20** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including two service provider networks in accordance with some embodiments, involving one or more of service controllers

and/or service processors. Figure 20 is similar to Figure 19 except that Figure 20 illustrates that various types of access network technology and equipment can be used on any number of the central provider networks (e.g., 2G/3G/4G cellular wireless plus WiFi is the example in Figure 19 while 2G/3G/4G cellular wireless plus DSL and cable is the example in Figure 20). Figures 19 and 20 do not show the access network connections to the central provider #2 core network, but that the second central provider network can have all of or some of the access equipment elements that the first central provider network possesses, or the second central provider network can posses different access network technology and equipment as described herein would be apparent to one of ordinary skill in the art. For example, if any aspect of the 2G/3G/4G technology is different for the two networks, then multi-mode wireless modules can be used in the device modems to allow for access connection using one technology on the first central provider network, and access connection using a second technology on the second central provider network. As many of the techniques and embodiments described herein allow for network service policy implementation at layers above the modem physical layer, modem MAC layer and the access network access control and authorization layers, then any number of multi-mode modem technologies can be employed to bridge connect to either of the two networks while enhancing roaming services or providing unified network services in one or more of the areas of service traffic control, user notification interfaces, charging policies and/or systems, QoS services, instant activation services and/or billing services. It will be apparent to one of ordinary skill in the art that while the discussion herein is for service provider (e.g., central provider, MVNO, VSP, etc) networks, many of the embodiments can similarly be applied to private networks such as, for example, enterprise networks, enterprise WAN solutions and/or remote office solutions, government networks, emergency networks, and/or networks involving intermediate networking devices.

[00155] **Figure 21** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including two service provider networks in accordance with some embodiments. For example, Figure 21 includes elements that can be identical or very similar to those described in the context of Figures 5 through 8, except that in Figure 21 there are two central provider networks in which the CDR reporting and service controls are unified through one or more common service controllers 120 and/or service processors 115. As shown in Figure 21, the charging flows are illustrated by three line types: solid lines for device generated CDRs, dashed lines for network equipment

generated CDRs, and double dot-dash line types for CDRs that have been mediated by a service controller 120 and/or mediation system 118.

[00156] In the context of the multiple service provider network embodiments illustrated in Figures 19 through 23, many of the device assisted service techniques disclosed herein that involve a service processor and/or a service controller, including, for example, service usage charging, QoS enabled service usage charging, service usage notification, service usage control, and service usage user feedback UI that apply to the case of improving roaming services or unifying different service provider networks with a common service may be employed. In addition, in some embodiments, the application of verifiable device assisted services (e.g., verifiable service processor service policy adherence) can be accomplished both on the first service provider network and the second service provider network by virtue of the fact that both networks are supplying network generated service usage information to the one or more service controllers and/or proxy servers or routers.

[00157] Accordingly, this allows a number of embodiments for one or not of the service providers, including, for example: common service usage and/or recording platform that can provide unified service usage reporting and/or billing across multiple networks, common network service controls and/or traffic controls across multiple networks, common user information sharing across multiple networks, and common QoS controls across multiple networks, common service design services across multiple networks. It is also possible to unify networks with different access technologies into a common network service. For example, by creating different network interface "shim" software layers, it is possible to interface a common set of service controller capabilities, service processor capabilities, proxy server and/or router capabilities and/or service design interface capabilities into different networks that have different equipment and even different communication protocols for provisioning equipment, CDR collection and aggregation equipment, traffic control equipment, AAA, home agent/HLR, billing systems, QoS reservation and control equipment, and/or other capabilities/protocols. The equipment software shims translate the different equipment communication protocols for each network into the common protocols supported in the service controller, service processor, proxy server and/or router, and/or service design center apparatus.

[00158] In some embodiments, the techniques described herein to unify network services across multiple networks can be used to provide consistent service control,

notification, billing across networks locally or globally without the need to back-haul the data traffic through wholesale pipes from one network to another as is the case with conventional network technologies. For example, a subscriber can be acquired and/or billed for by network #1 and then be serviced with a uniform service experience and deep service notification, control, charging capabilities on both network #1 and network #2. In some embodiments, a subscriber can be acquired and billed for by network #2 and then be serviced with a uniform service experience and deep service notification, control, charging capabilities on both network #1 and network #2. Service plans, settings, notification, carrier branding, etc. can all be the same or different for subscribers originated on one network versus the other. Additionally, in some embodiments, one or more of the service controller, proxy servers or routers and/or other apparatus that handles traffic including the mediation systems can be distributed and/or redundant with diversity as discussed elsewhere to reduce the need to back haul device service traffic or service control traffic. In some embodiments, it is possible for both carrier networks to posses a common service design network element and UI despite the fact that the different networks can have very different provisioning, AAA, traffic handling, charging, billing, etc equipment.

[00159] **Figure 22** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including two service provider networks in accordance with some embodiments, involving one or more of service controllers, service processors and/or proxy server/routers. Figure 22 includes elements that can be identical or very similar to those described in the context of Figures 5 through 8, 16 through 18, and 21 except that in Figure 21 there are two central provider networks where the CDR reporting and service controls are unified through one or more common service controllers 120, service processors 115 and/or proxy server/routers 270. As shown in Figure 22: the charging flows are illustrated using the following three line types: solid lines for device generated CDRs and/or proxy server/router generated CDRs, dashed lines for network equipment generated CDRs, and double dot-dash line types for CDRs that have been mediated by a service controller 120 and/or mediation system 118.

[00160] **Figure 23** illustrates a wireless network architecture for providing device assisted CDR creation, aggregation, mediation and billing including two service provider networks in accordance with some embodiments, involving one or more of service controllers and/or proxy server/routers. Figure 23 includes elements that may be identical or very

similar to those described in the context of Figures 22, except in this case there is no service processor CDR feed and only CDR feeds from the network equipment and the proxy server/routers. As shown in Figure 23, the charging flows are illustrated using the following three line types: solid lines for device generated CDRs and/or proxy server/router generated CDRs, dashed lines for network equipment generated CDRs, and double dot-dash line types for CDRs that have been mediated by a service controller 120 and/or mediation system 118.

[00161] In some embodiments, one or more proxy servers or routers are used to create a common network service between two or more different networks. In some embodiments, one or more proxy servers or routers are used in conjunction with device client (DAS service processor) used to create a common network service between two or more different networks. In some embodiments, one or more proxy servers or routers are used to create a common network service between two or more different networks in which the proxy server is programmed with a centralized service design interface. In some embodiments, one or more proxy servers or routers are used to create a common service usage recording and/or accounting system across different networks. In some embodiments, one or more proxy servers or routers are used in conjunction with device client (e.g., DAS service processor) used to create a common network service between two or more different networks, in which the proxy server and the device client have coordinated policy settings and/or are both controlled by a service controller element in a network.

[00162] In some embodiments, one or more proxy servers or routers are used in conjunction with a device client (e.g., DAS service processor) to create a common network service between two or more different networks in which the proxy router and the device client have coordinated policy settings and/or are both controlled by a service controller element in a network.

[00163] In some embodiments, one or more proxy servers or routers are used to create a common network service between two or more different networks in which the proxy server is programmed with a centralized service design interface and the is controlled by a service controller element in a network.

[00164] In some embodiments, one or more proxy servers or routers are used to create a common network service between two or more different networks in which the proxy server is programmed with a centralized service design interface and one or more of the service

policies are is controlled by a service controller element in a network. In some embodiments, one or more proxy servers or routers are used to create a coordinated QoS signaling, reservation, provisioning, control, charging, and/or user interface across different service provider networks.

[00165] Those of ordinary skill in the art will appreciate that various other rules can be provided for the rules engine as described herein. Those of ordinary skill in the art will also appreciate that the functions described herein can be implemented using various other network architectures and network implementations (e.g., using various other networking protocols and corresponding network equipment and techniques).

[00166] Although the foregoing embodiments have been described in some detail for purposes of clarity of understanding, the invention is not limited to the details provided. There are many alternative ways of implementing the invention. The disclosed embodiments are illustrative and not restrictive.

[00167] WHAT IS CLAIMED IS:

CLAIMS

1. A system, comprising:

a processor of a proxy network device in communication with a wireless network, wherein the processor is configured to:

collect device generated service usage information for one or more devices in wireless communication on the wireless network; and

provide the device generated service usage information in a syntax and a communication protocol that can be used by other network devices to augment or replace network generated service usage information for the one or more devices in wireless communication on the wireless network; and

a memory coupled to the processor and configured to provide the processor with instructions.

2. The system recited in claim 1, wherein the proxy network device includes a proxy server.

3. The system recited in claim 1, wherein the proxy network device includes a proxy router.

4. The system recited in claim 1, wherein the proxy network device provides a common network service between two or more networks.

5. The system recited in claim 1, wherein the proxy network device is programmed using a centralized service design interface.

6. The system recited in claim 1, wherein the service usage information includes network service usage information.

7. The system recited in claim 1, wherein the syntax is a charging data record (CDR).

8. The system recited in claim 1, wherein the service usage information includes network service usage information.

9. The system recited in claim 1, wherein the proxy network device includes a service usage data store.

10. The system recited in claim 1, wherein the proxy network device includes a service usage data store and a rules engine for aggregating the collected device generated service usage information.

11. The system recited in claim 1, wherein the syntax is a charging data record (CDR), and the proxy network device includes a CDR feed aggregator, and wherein the processor is further configured to:

aggregate device assisted CDRs for the one or more devices in wireless communication on the wireless network; and

apply a set of rules to the aggregated CDRs using a rules engine.

12. The system recited in claim 1, wherein the syntax is a charging data record (CDR), and the proxy network device includes a CDR feed aggregator, and wherein the processor is further configured to:

aggregate device assisted CDRs for the one or more devices in wireless communication on the wireless network;

apply a set of rules to the aggregated device assisted CDRs using a rules engine; and

communicate a new set of CDRs for the one or more devices in wireless communication on the wireless network to a billing interface or a billing system.

13. The system recited in claim 1, wherein the syntax is a charging data record (CDR), and the proxy network device includes a CDR feed aggregator, and wherein the processor is further configured to:

aggregate device assisted CDRs for the one or more devices in wireless communication on the wireless network;

verify the aggregated device assisted CDRs; and

communicate a new set of CDRs for the one or more devices in wireless communication on the wireless network to a billing interface or a billing system.

14. The system recited in claim 1, wherein the syntax is a charging data record (CDR), and the proxy network device includes a CDR feed aggregator, and wherein the processor is further configured to:

aggregate device assisted CDRs for the one or more devices in wireless communication on the wireless network;

verify the aggregated device assisted CDRs by comparing at least a subset of the aggregated device assisted CDRs to a set of network generated CDRs for the one or more devices in wireless communication on the wireless network; and

communicate a new set of CDRs for the one or more devices in wireless communication on the wireless network to a billing interface or a billing system based on the verifying of the aggregated device assisted CDRs.

15. The system recited in claim 1, wherein the syntax is a charging data record (CDR), and the proxy network device includes a CDR feed aggregator, and wherein the processor is further configured to:

aggregate device assisted CDRs for the one or more devices in wireless communication on the wireless network;

apply a set of rules to the aggregated CDRs using a rules engine, wherein at least one rule includes a bill by account rule; and

communicate a new set of CDRs for the one or more devices in wireless communication on the wireless network to a billing interface or a billing system.

16. The system recited in claim 1, wherein the syntax is a charging data record (CDR), and the proxy network device includes a CDR feed aggregator, and wherein the processor is further configured to:

aggregate device assisted CDRs for the one or more devices in wireless communication on the wireless network;

apply a set of rules to the aggregated device assisted CDRs using a rules engine, wherein at least one rule includes a bill by account rule; and

communicate a new set of CDRs for the one or more devices in wireless communication on the wireless network to a billing interface or a billing system, wherein at least one CDR includes a billing offset.

17. The system recited in claim 1, wherein the syntax is a charging data record (CDR), and the network device includes a CDR feed aggregator, and wherein the processor is further configured to:

communicate a new set of CDRs for the one or more devices in wireless communication on the wireless network to a billing interface or a billing system.

18. The system recited in claim 1, wherein the processor is further configured to:

communicate with a service controller to collect the device generated service usage information for the one or more devices in wireless communication on the wireless network.

19. The system recited in claim 1, wherein the processor is further configured to:

communicate with a service controller, wherein the service controller is in communication with a billing interface or a billing system, and wherein the service controller communicates the device generated service usage information to the network device.

20. The system recited in claim 1, wherein the processor is further configured to:

communicate the device generated service usage information to a billing interface or a billing system.

Figure 1

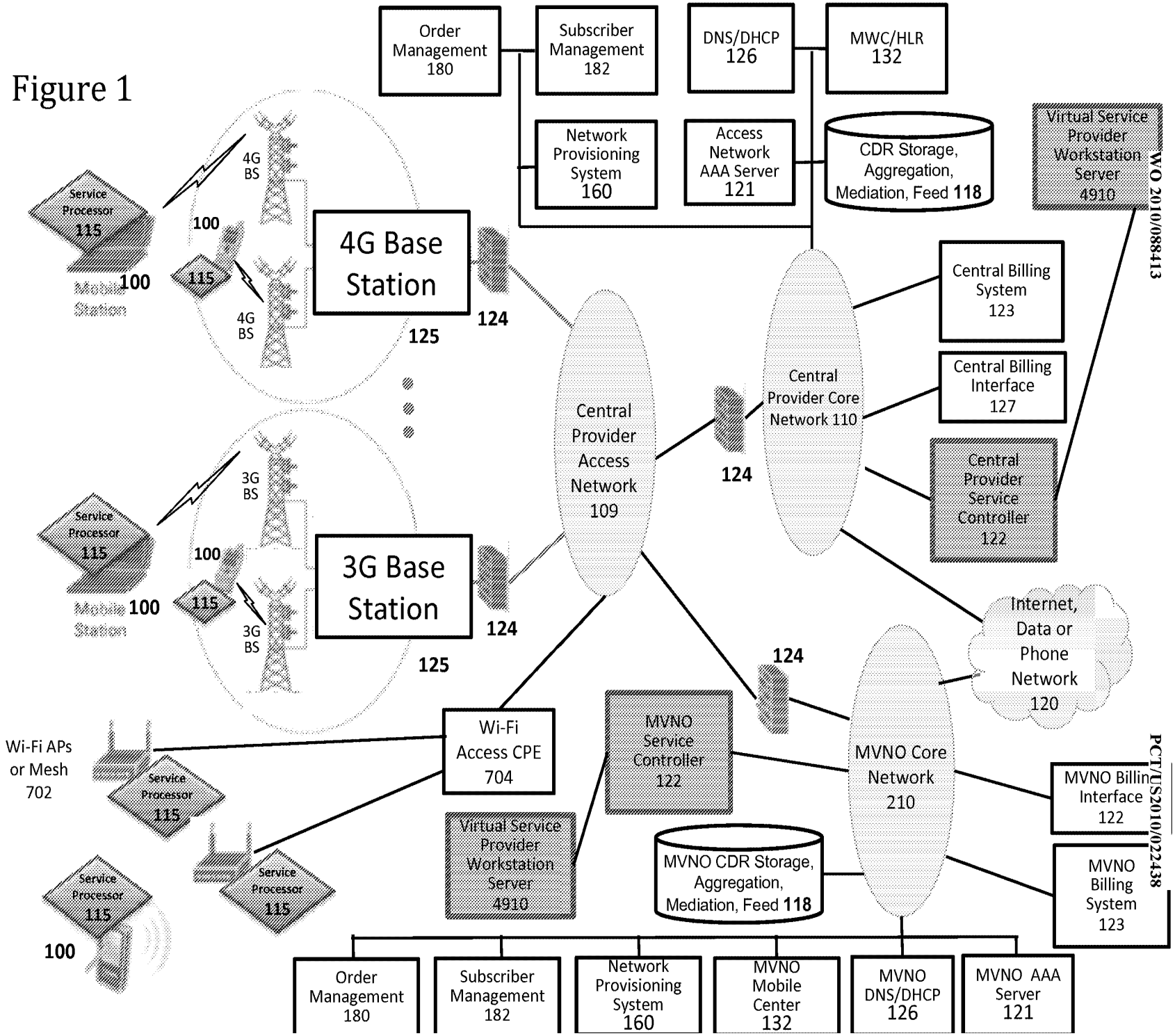
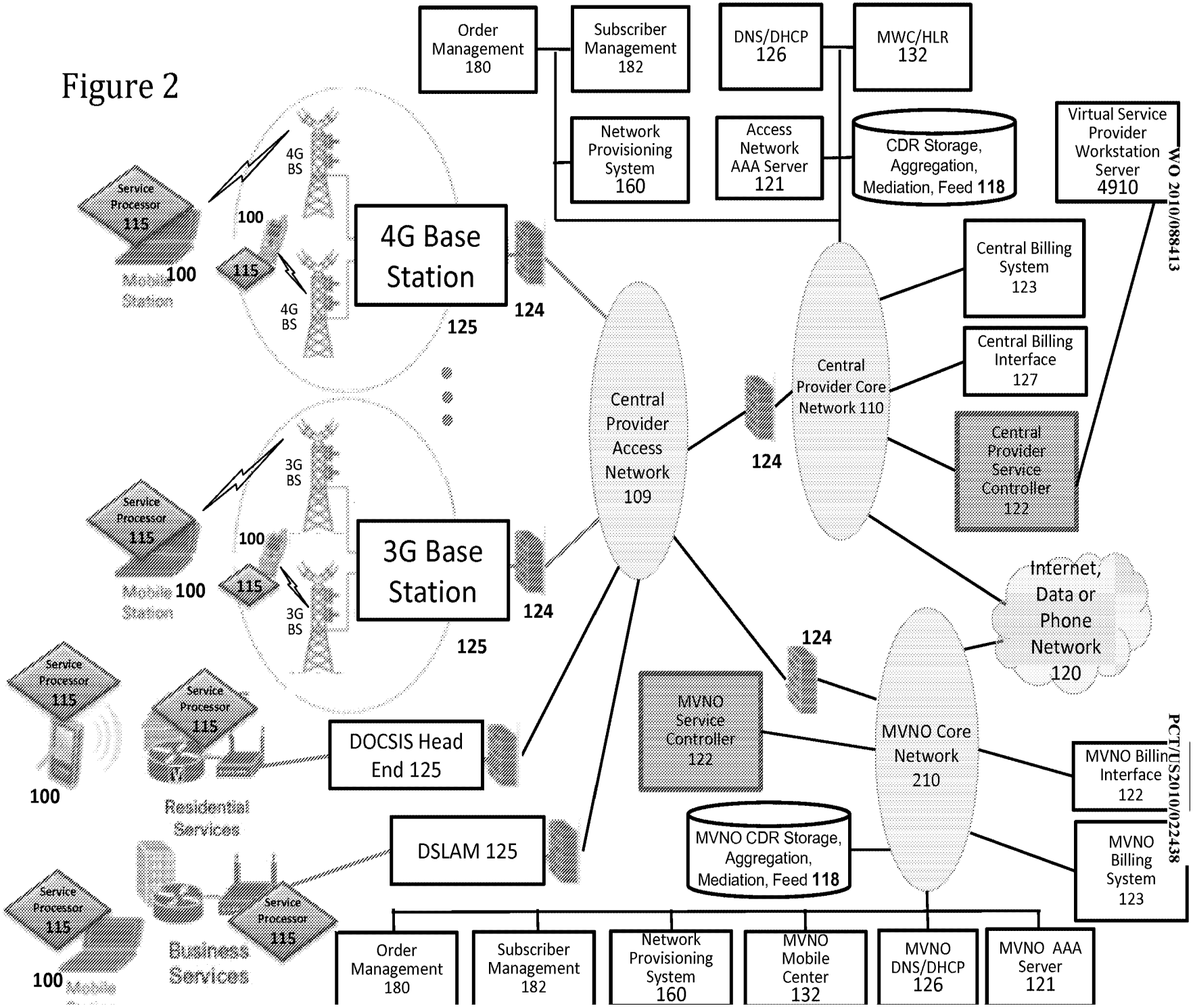

Order Management 180
Subscriber Management 182
DNS/DHCP 126
MWC/HLR 132
Network Provisioning System 160
Access Network AAA Server 121
CDR Storage, Aggregation, Mediation, Feed 118
Virtual Service Provider Workstation Server 4910
Service Processor 115
100
4G BS
4G Base Station
125
124
Central Billing System 123
Central Billing Interface 127
Central Provider Core Network 110
Central Provider Access Network 109
Central Provider Service Controller 122
3G BS
3G Base Station
Internet, Data or Phone Network 120
Wi-Fi APs or Mesh 702
Wi-Fi Access CPE 704
MVNO Service Controller 122
MVNO Core Network 210
MVNO Billing Interface 122
MVNO Billing System 123
MVNO CDR Storage, Aggregation, Mediation, Feed 118
Order Management 180
Subscriber Management 182
Network Provisioning System 160
MVNO Mobile Center 132
MVNO DNS/DHCP 126
MVNO AAA Server 121

Figure 2


Order Management 180
Subscriber Management 182
DNS/DHCP 126
MWC/HLR 132
Network Provisioning System 160
Access Network AAA Server 121
CDR Storage, Aggregation, Mediation, Feed 118
Virtual Service Provider Workstation Server 4910
4G BS
Service Processor 115
100
4G Base Station 125
124
Central Billing System 123
Central Billing Interface 127
Central Provider Core Network 110
Central Provider Access Network 109
Central Provider Service Controller 122
3G BS
3G Base Station 125
Internet, Data or Phone Network 120
MVNO Service Controller 122
MVNO Core Network 210
MVNO Billing Interface 122
MVNO CDR Storage, Aggregation, Mediation, Feed 118
MVNO Billing System 123
DOCSIS Head End 125
DSLAM 125
Residential Services
Business Services
Order Management 180
Subscriber Management 182
Network Provisioning System 160
MVNO Mobile Center 132
MVNO DNS/DHCP 126
MVNO AAA Server 121

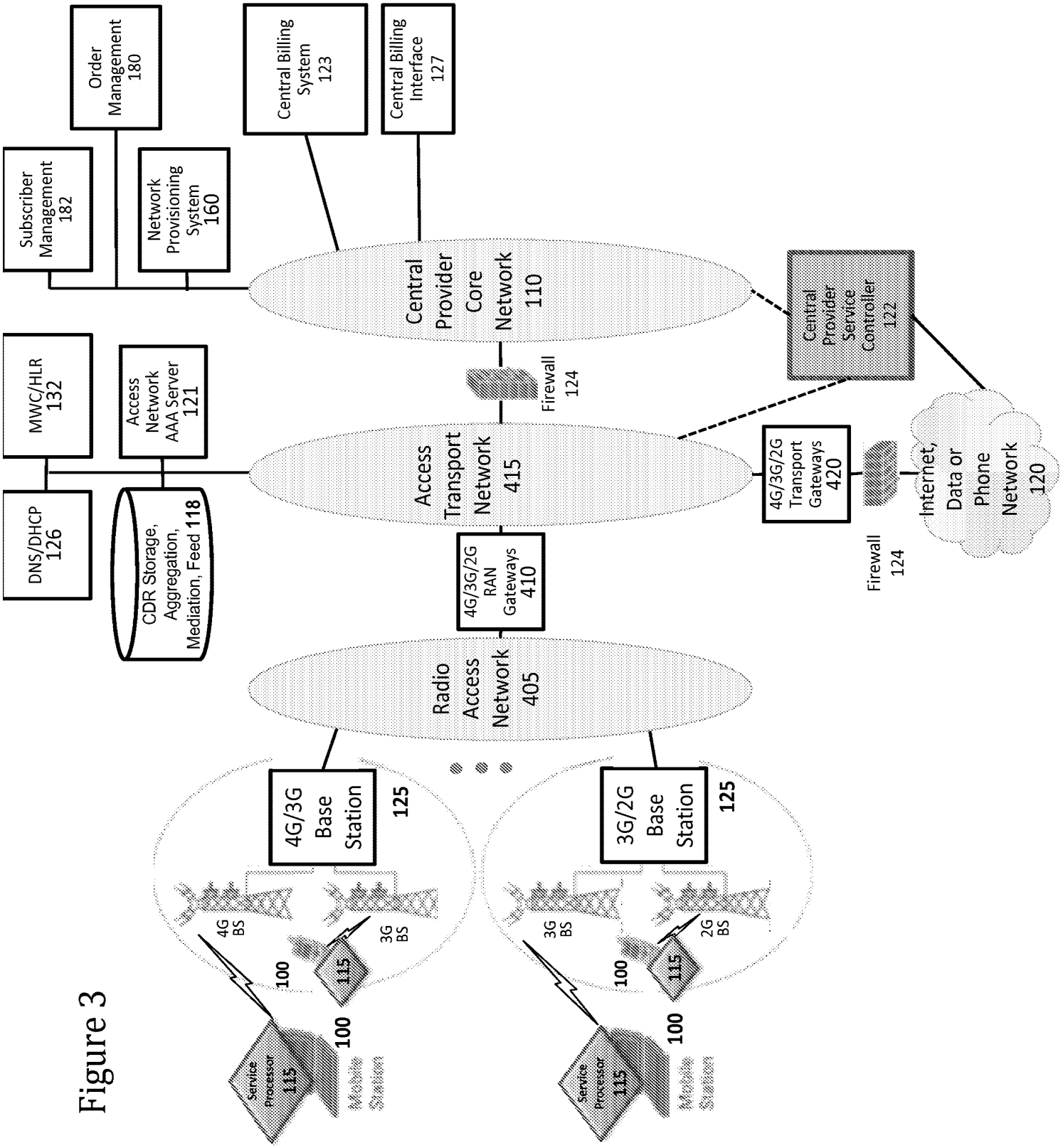
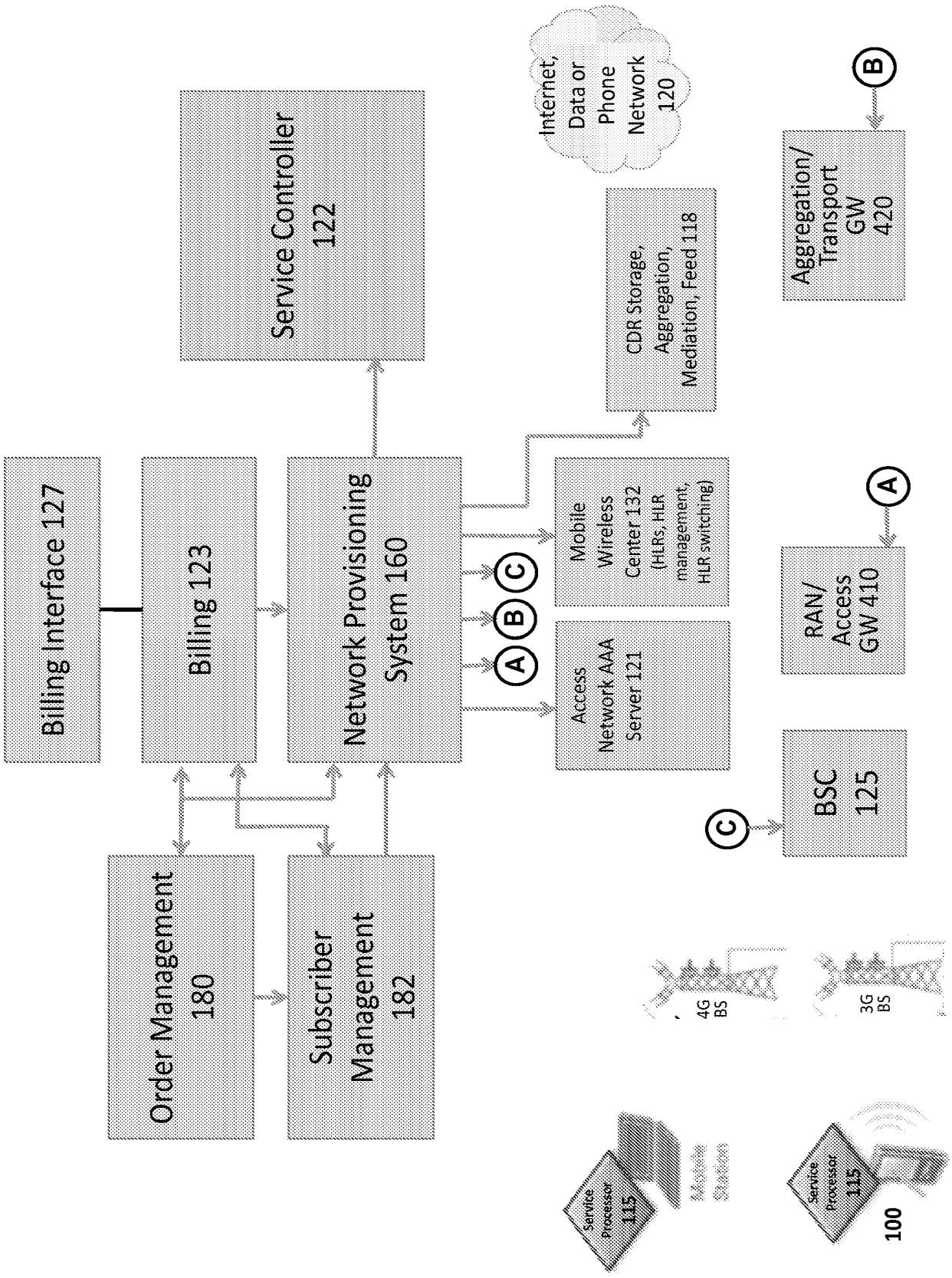

Order Management 180
Central Billing System 123
Central Billing Interface 127
Subscriber Management 182
Network Provisioning System 160
Central Provider Core Network 110
Central Provider Service Controller 122
MWC/HLR 132
Access Network AAA Server 121
Firewall 124
Access Transport Network 415
4G/3G/2G Transport Gateways 420
Internet, Data or Phone Network 120
DNS/DHCP 126
CDR Storage, Aggregation, Mediation, Feed 118
4G/3G/2G RAN Gateways 410
Firewall 124
Radio Access Network 405
4G/3G Base Station 125
3G/2G Base Station 125
4G BS
3G BS
3G BS
2G BS
100
115
Service Processor 115
100
Mobile Station

Figure 3

Figure 4


Billing Interface 127
Billing 123
Service Controller 122
Network Provisioning System 160
Order Management 180
Subscriber Management 182
Internet, Data or Phone Network 120
CDR Storage, Aggregation, Mediation, Feed 118
Aggregation/ Transport GW 420
Mobile Wireless Center 132 (HLRs, HLR management, HLR switching)
Access Network AAA Server 121
RAN/ Access GW 410
BSC 125
A
B
C
4G BS
3G BS
Service Processor 115
Mobile Station
Service Processor 115
100

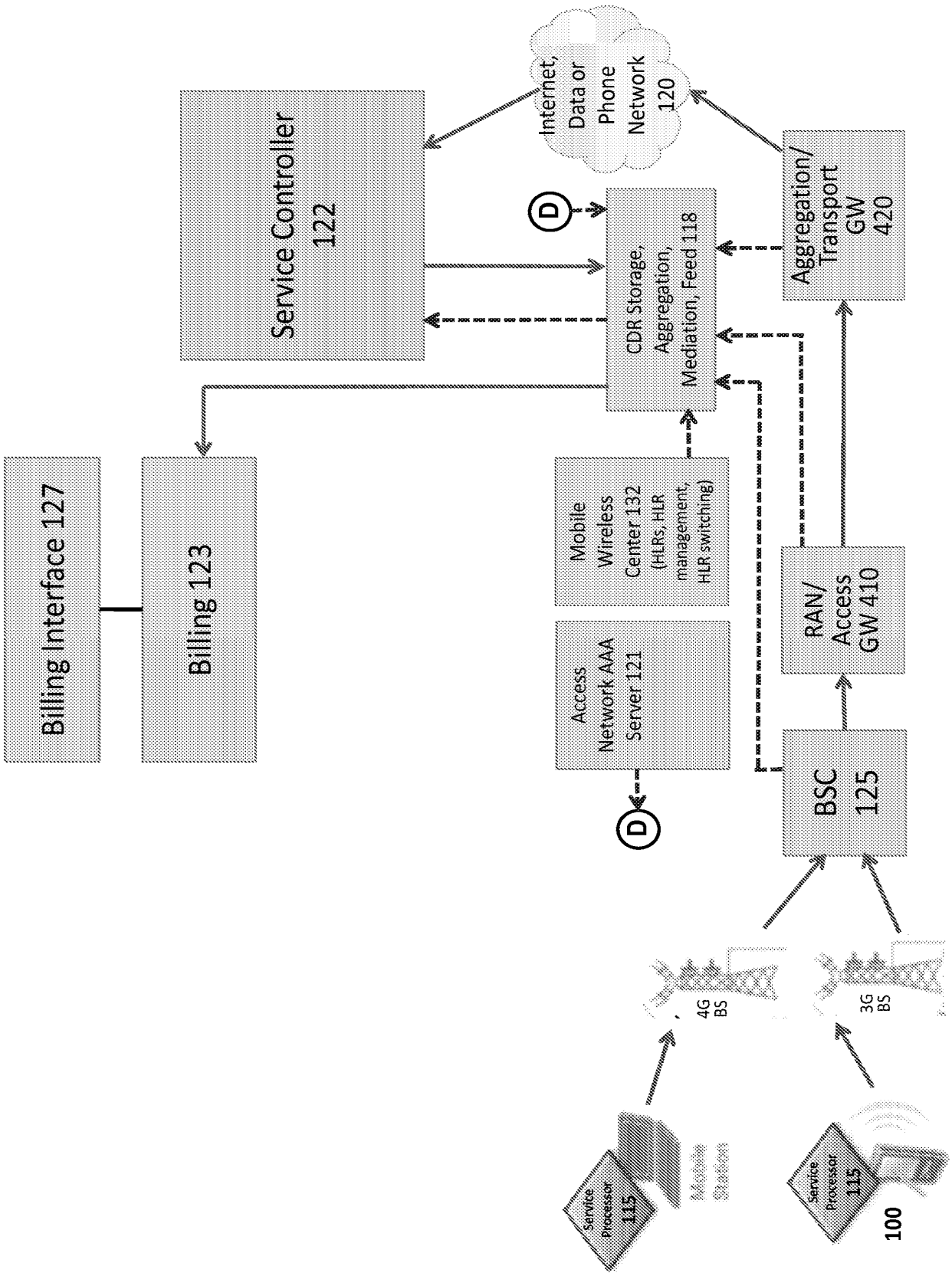

Internet, Data or Phone Network 120
Service Controller 122
Aggregation/ Transport GW 420
CDR Storage, Aggregation, Mediation, Feed 118
Billing Interface 127
Billing 123
Mobile Wireless Center 132 (HLRs, HLR management, HLR switching)
Access Network AAA Server 121
RAN/ Access GW 410
BSC 125
4G BS
3G BS
Service Processor 115
Service Processor 115
100

Figure 5

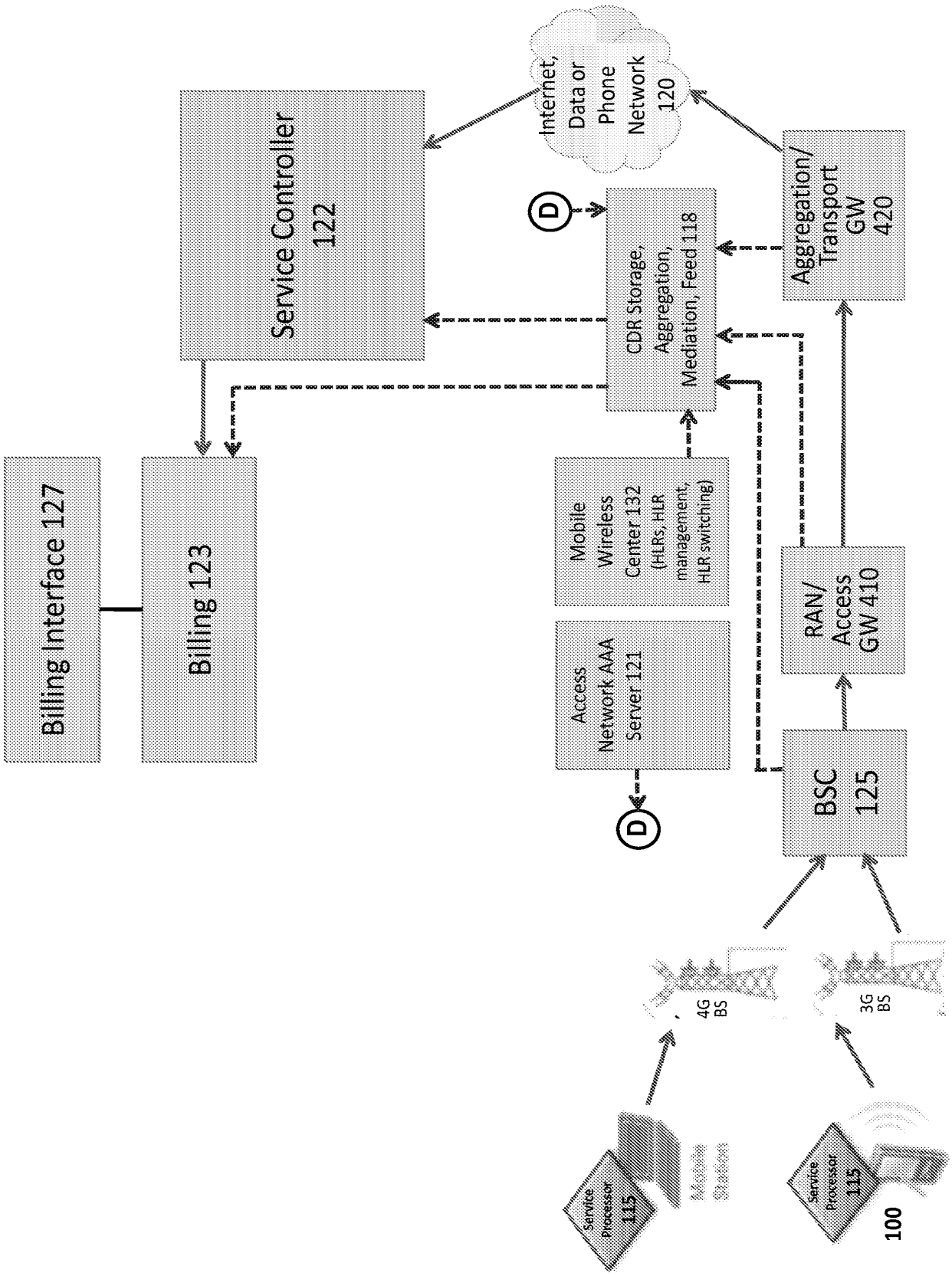

Internet, Data or Phone Network 120
Service Controller 122
Aggregation/ Transport GW 420
CDR Storage, Aggregation, Mediation, Feed 118
Billing Interface 127
Billing 123
Mobile Wireless Center 132 (HLRs, HLR management, HLR switching)
Access Network AAA Server 121
RAN/ Access GW 410
BSC 125
4G BS
3G BS
Service Processor 115
Service Processor 115
100

Figure 6

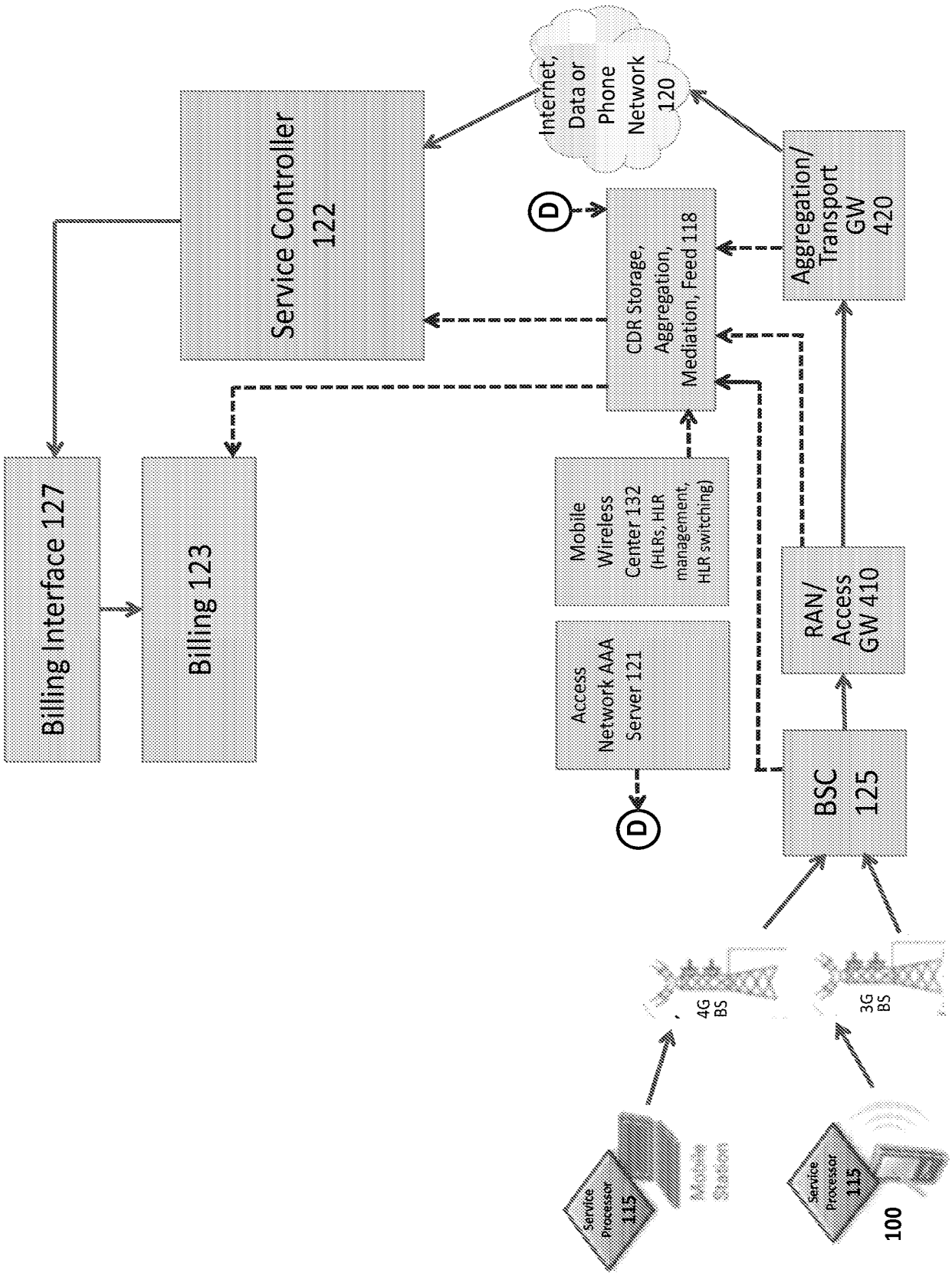

Internet, Data or Phone Network 120
Service Controller 122
Billing Interface 127
Billing 123
CDR Storage, Aggregation, Mediation, Feed 118
Aggregation/ Transport GW 420
Mobile Wireless Center 132 (HLRs, HLR management, HLR switching)
Access Network AAA Server 121
RAN/ Access GW 410
BSC 125
4G BS
3G BS
Service Processor 115
Service Processor 115
100

Figure 7

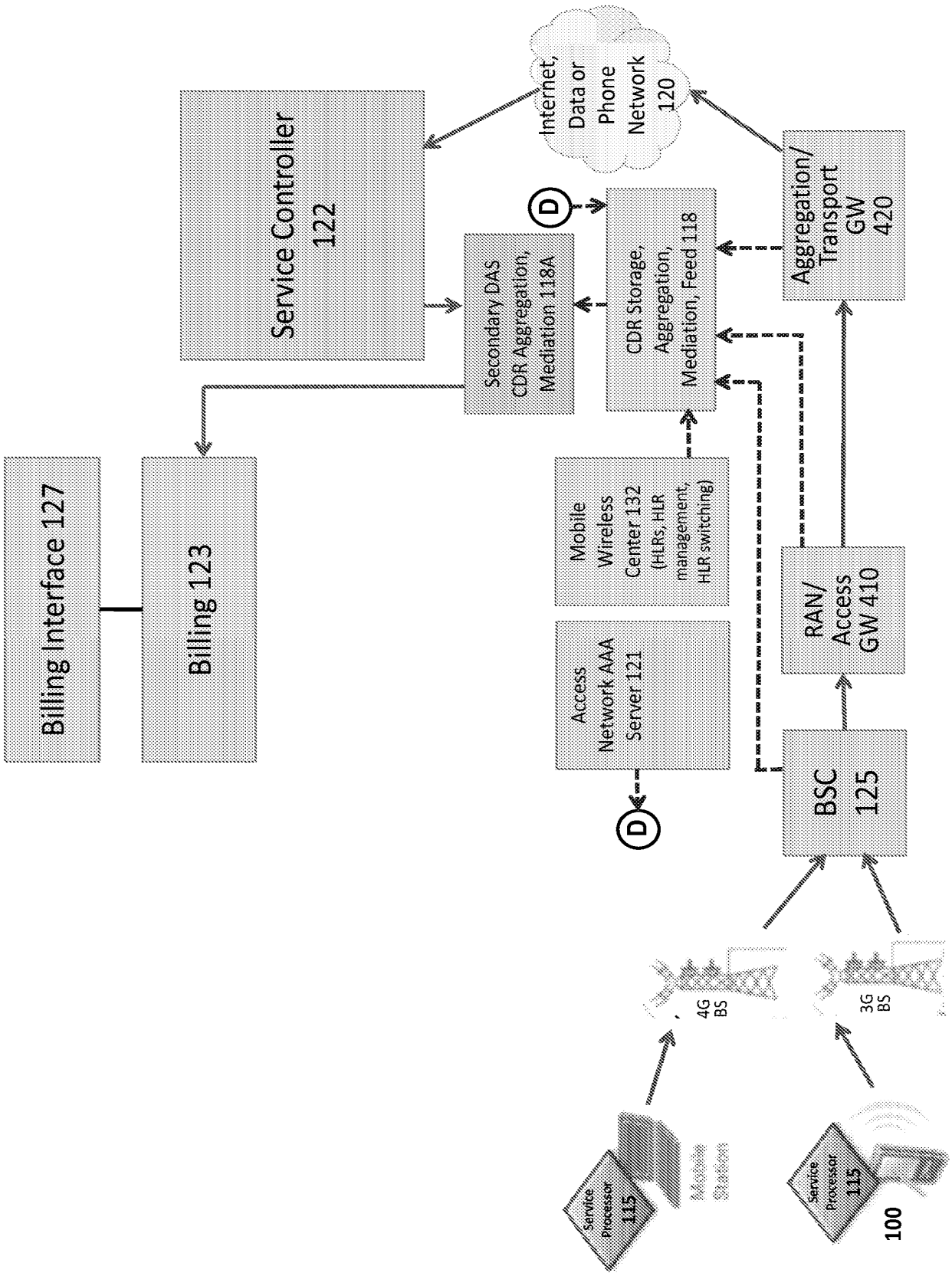

Internet, Data or Phone Network 120
Service Controller 122
Secondary DAS CDR Aggregation, Mediation 118A
CDR Storage, Aggregation, Mediation, Feed 118
Aggregation/ Transport GW 420
Billing Interface 127
Billing 123
Mobile Wireless Center 132 (HLRs, HLR management, HLR switching)
Access Network AAA Server 121
RAN/ Access GW 410
BSC 125
4G BS
3G BS
Service Processor 115
Mobile Station
Service Processor 115
100

Figure 8

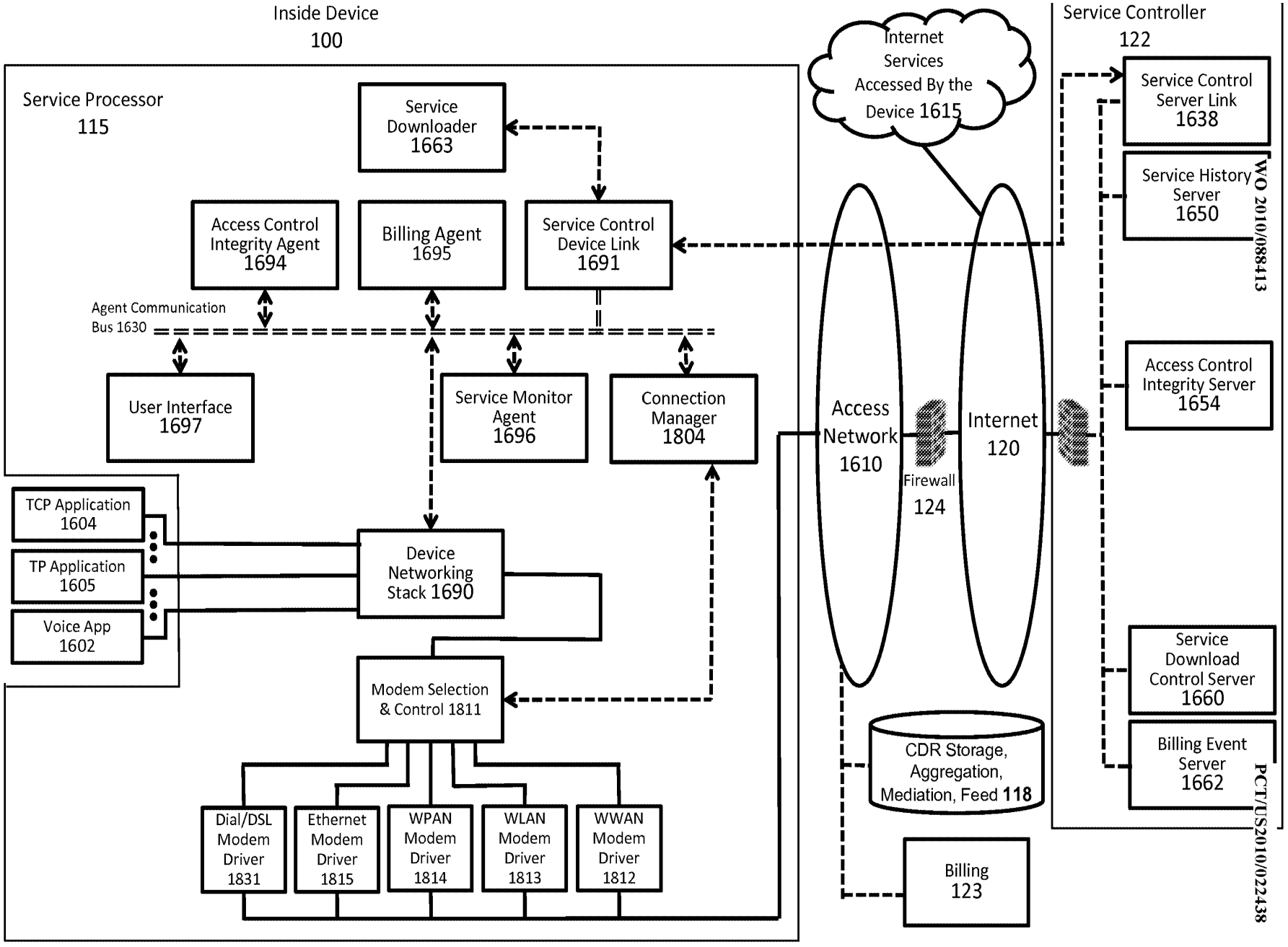


Figure 9

WO 2010/088413
PCT/US2010/022438

Service Processor 115 Embodiment	Partial Summary of Embodiment Functions
Service Control Device Link 1691	Device side control plane link for connecting Service Processor 415 to Service Controller. In some embodiments, also serves as the link for the agent heartbeat function.
Access Control Integrity Agent 1694	Collects device information on service policy, service usage, agent configuration and agent behavior. Cross checks this information to identify integrity breaches in the service policy implementation and control system. Initiates action when a service policy violation or a system integrity breach is suspected. In some embodiments, verifies configuration of other agents or performs challenge-response sequence testing. In some embodiments, monitors software loading activity, protected memory access or communication with Service Processor agents to detect unauthorized changes to Service Processor software or configuration.
Service Monitor Agent 1696	Records and reports device service usage. In some embodiments, assists in communicating application tagging of traffic flows through the networking stack policy implementation. In some embodiments, maintains a history and provides reports or summary reports of which networks in addition to the networks controlled by the Service Controller that the device has connected to. In some embodiments, this network activity summary may include a summary of the networks accessed, activity vs. time per connection, traffic vs. time per connection.
Billing Agent 1695	Detects and reports billing events. In some embodiments interacts with the User Interface Agent 497 to provide the user with service plan options, accept service plan selections, provide notification on service usage levels, provide options on service usage control policy, accept choices on service usage policy, provide transaction options or accept transaction choices. In some embodiments, interacts with Transaction Servers 134 to conduct ecommerce transactions with central billing.
User Interface 1697	Provide service interface to users.
Service Downloader 1663	Provides a download function to install or update service software elements on the device.
Connection Manager 1804	Provides a control and supervision function for one or more modem drivers or modems that connect to an access network.
Modem Selection and Control 1811	Selects the access network connection.
Modem Drivers 1831, 1815, 1814, 1813, 1812	Converts data traffic into modem bus traffic for one or more modems.
Modems 2141, 2125, 2124, 2123, 2122	Connects the device to one or more networks.

Figure 10

Service Controller 122 Element	Partial Summary of Embodiment Functions
Service Control Server Link 1638	Network side control plane link for connecting Service Controller 422 Service Processor 415 device agents. In some embodiments, also serves as the link for the agent heartbeat function.
Access Control Integrity Server 1654	Collects device information on service policy, service usage, agent configuration and agent behavior. Cross checks this information to identify integrity breaches in the service policy implementation and control system. Initiates action when a service policy violation or a system integrity breach is suspected.
Service History Server 118	Collects and records service usage reports from the Access Network AAA Server 421 and the Service Monitor Agent 496. In some embodiments, maintains a history of which networks in addition to the networks controlled by the Service Controller that the device has connected to. In some embodiments, this network activity summary may include a summary of the networks accessed, activity vs. time per connection, traffic vs. time per connection. In some embodiments, this activity summary is further analyzed or reported to estimate the type of service plan associated with the traffic activity for the purpose of bill sharing reconciliation.
Central Provider Billing System 123	Provides mediation function for central provider billing events. Accepts service plan changes. In some embodiments, provides updates on device service usage, service plan limits or service policies.
Billing Event Server 1662	In some embodiments, collects billing events, provides service plan information to the Service Processor 415, provides service usage updates to the Service Processor 415, serves as interface between device and central Provider Billing System 123, or provides trusted third party function for certain ecommerce billing transactions.
Service Download Control Server 1660	Provides a download function to install or update service software elements on the device.

Figure 11

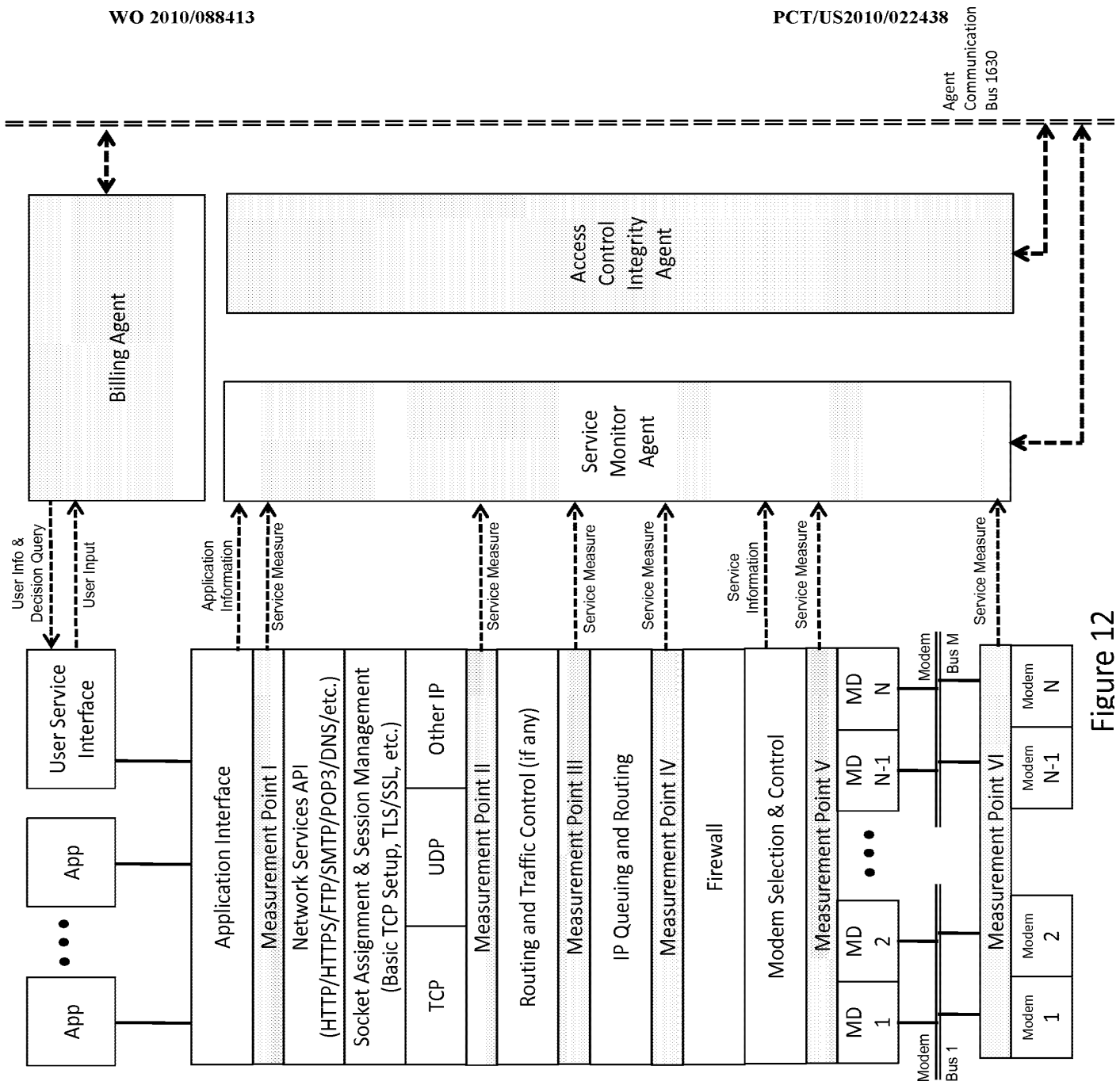

Agent Communication Bus 1630
Billing Agent
Access Control Integrity Agent
Service Monitor Agent
User Info & Decision Query
User Input
Application Information
Service Measure
Service Information
User Service Interface
App
App
Application Interface
Measurement Point I
Network Services API (HTTP/HTTPS/FTP/SMTP/POP3/DNS/etc.)
Socket Assignment & Session Management (Basic TCP Setup, TLS/SSL, etc.)
TCP
UDP
Other IP
Measurement Point II
Routing and Traffic Control (if any)
Measurement Point III
IP Queuing and Routing
Measurement Point IV
Firewall
Modem Selection & Control
Measurement Point V
MD 1
MD 2
MD N-1
MD N
Modem Bus 1
Modem Bus M
Measurement Point VI
Modem 1
Modem 2
Modem N-1
Modem N

Figure 12

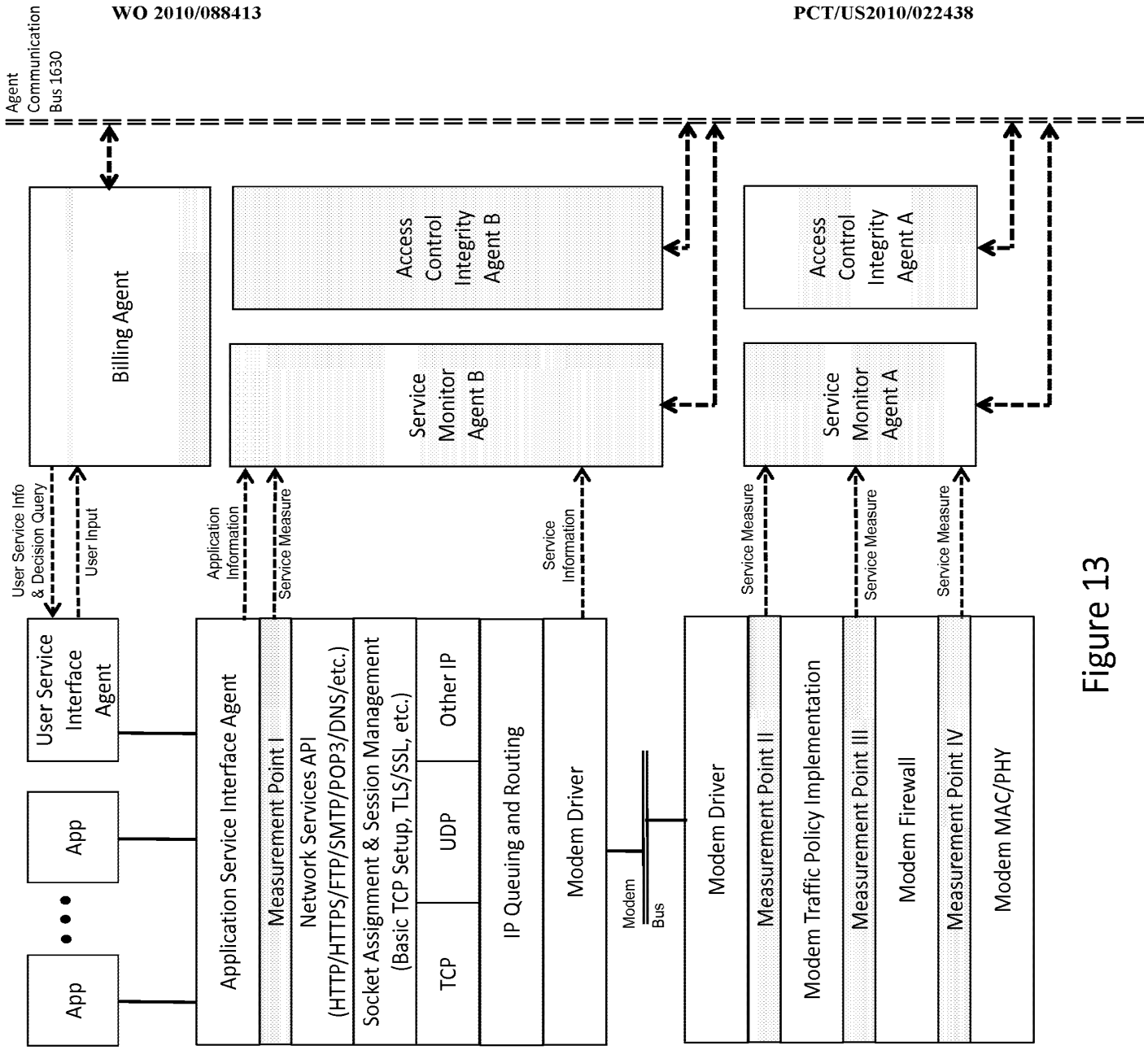

Agent Communication Bus 1630
Billing Agent
Access Control Integrity Agent B
Service Monitor Agent B
Access Control Integrity Agent A
Service Monitor Agent A
User Service Info & Decision Query
User Input
Application Information
Service Measure
Service Information
Service Measure
Service Measure
Service Measure
User Service Interface Agent
App
App
Application Service Interface Agent
Measurement Point I
Network Services API (HTTP/HTTPS/FTP/SMTP/POP3/DNS/etc.)
Socket Assignment & Session Management (Basic TCP Setup, TLS/SSL, etc.)
TCP
UDP
Other IP
IP Queuing and Routing
Modem Driver
Modem Bus
Modem Driver
Measurement Point II
Modem Traffic Policy Implementation
Measurement Point III
Modem Firewall
Measurement Point IV
Modem MAC/PHY

Figure 13

Figure 14(A)

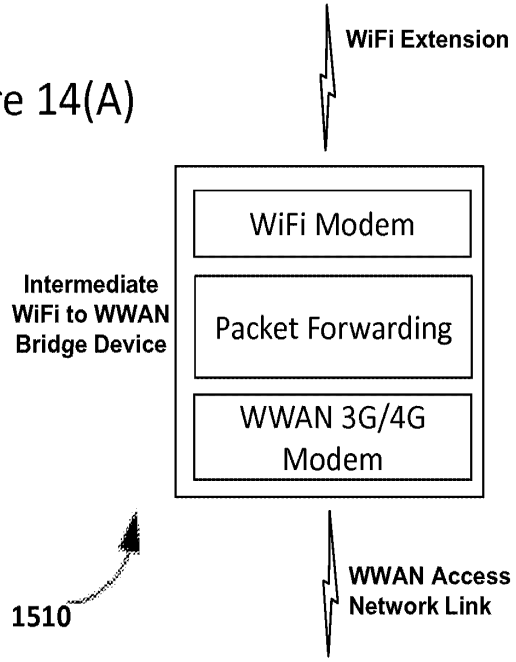
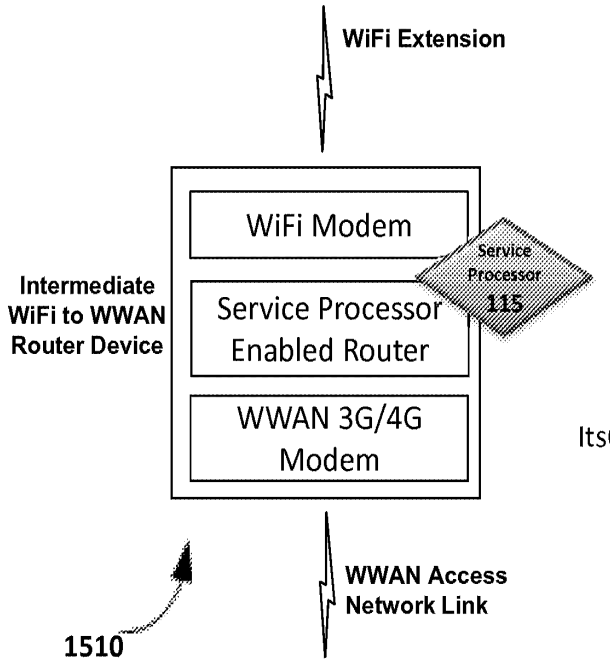


Figure 14(B)



ItsOn - Proprietary and Confidential

Figure 14

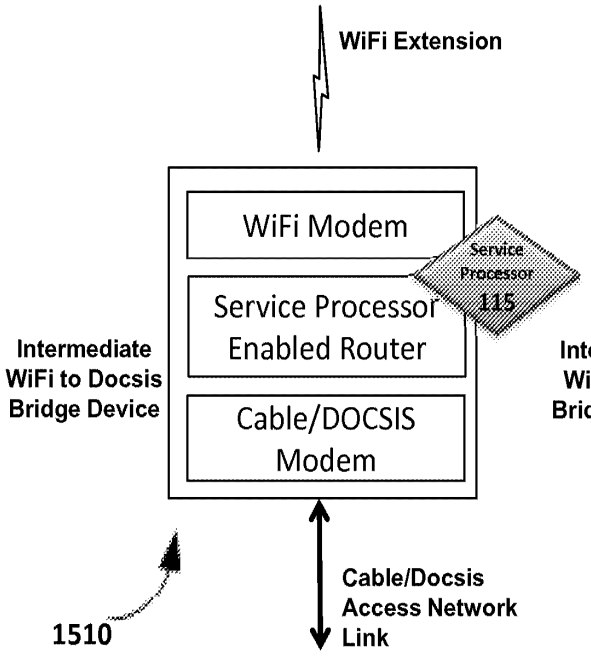


Figure 14(C)

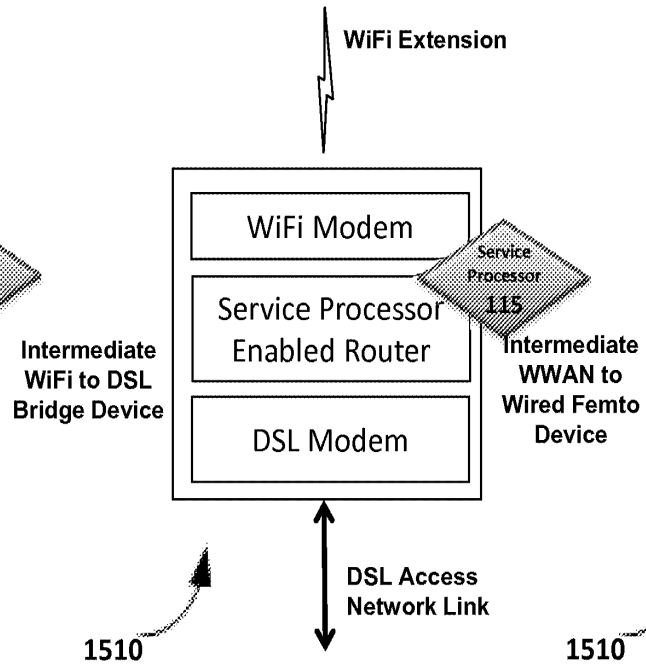


Figure 14 (D)

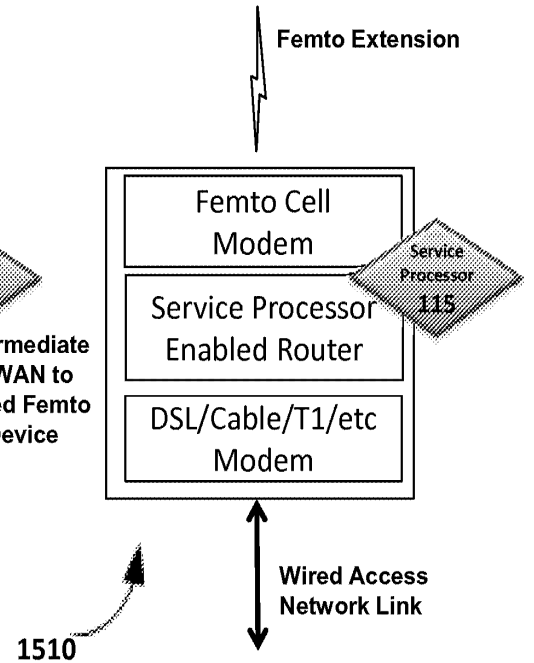


Figure 14 (E)

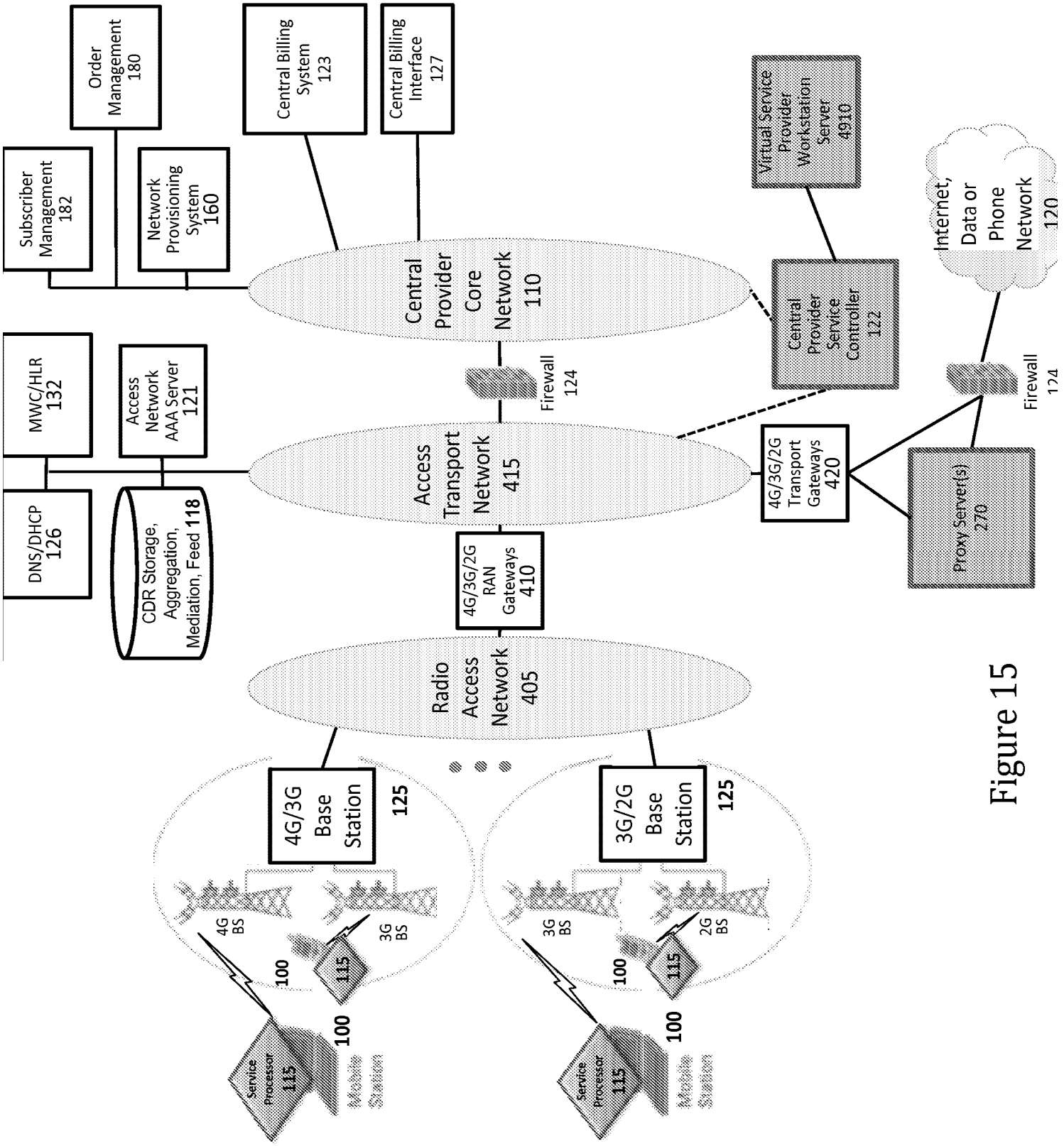

Order Management 180
Central Billing System 123
Central Billing Interface 127
Subscriber Management 182
Network Provisioning System 160
Virtual Service Provider Workstation Server 4910
Internet, Data or Phone Network 120
Central Provider Core Network 110
Central Provider Service Controller 122
MWC/HLR 132
Access Network AAA Server 121
Firewall 124
Firewall 124
DNS/DHCP 126
CDR Storage, Aggregation, Mediation, Feed 118
Access Transport Network 415
4G/3G/2G Transport Gateways 420
Proxy Server(s) 270
4G/3G/2G RAN Gateways 410
Radio Access Network 405
4G/3G Base Station 125
3G/2G Base Station 125
4G BS
3G BS
3G BS
2G BS
100
115
100
Service Processor 115
Mobile Station
100
115
100
Service Processor 115
Mobile Station

Figure 15

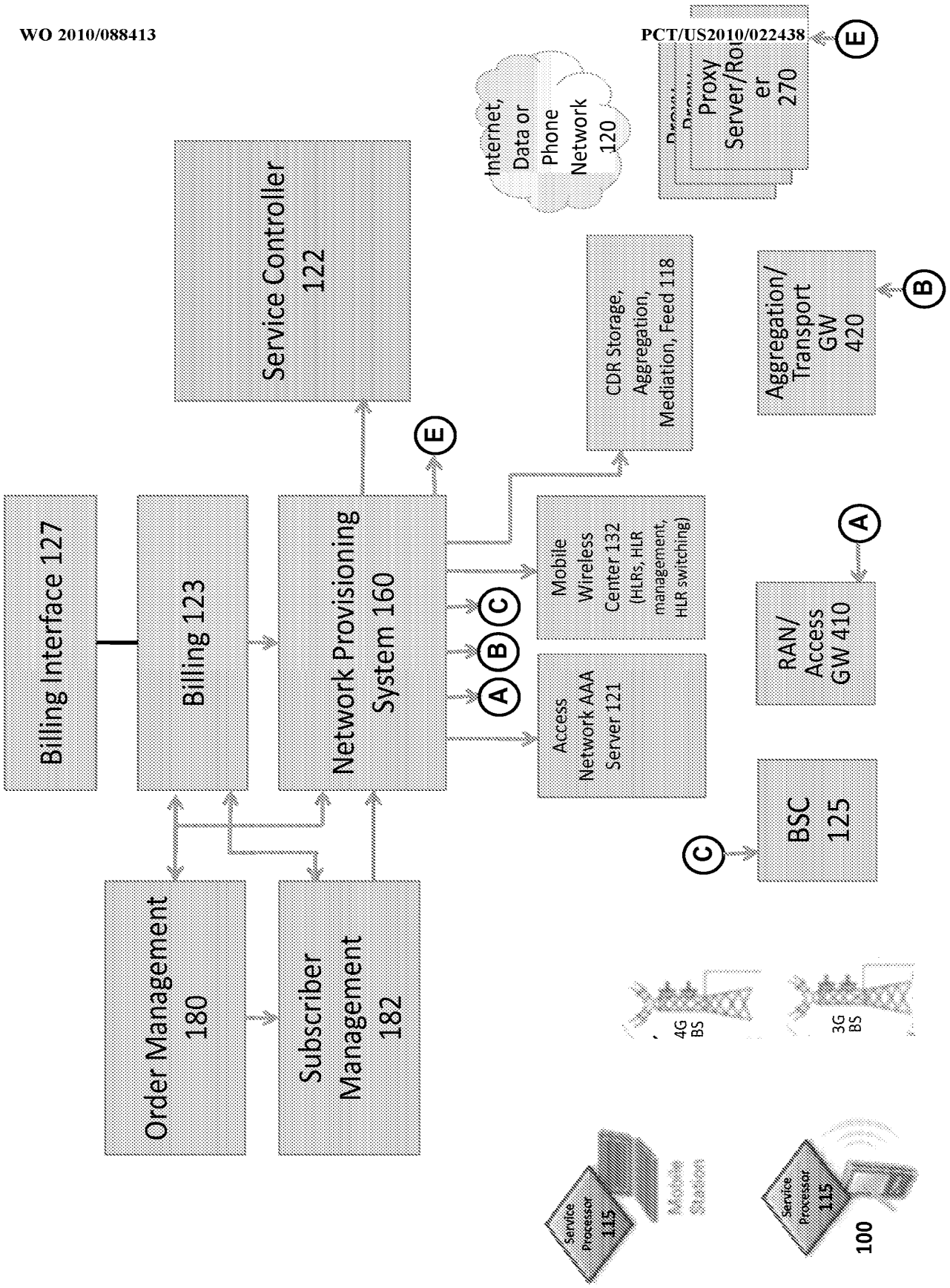

Billing Interface 127
Billing 123
Network Provisioning System 160
Service Controller 122
Order Management 180
Subscriber Management 182
Internet, Data or Phone Network 120
Proxy Server/Roaming 270
CDR Storage, Aggregation, Mediation, Feed 118
Aggregation/ Transport GW 420
Mobile Wireless Center 132 (HLRs, HLR management, HLR switching)
Access Network AAA Server 121
RAN/ Access GW 410
BSC 125
A
B
C
D
E
4G BS
3G BS
Service Processor 115
Mobile Station
Service Processor 115
100

Figure 16

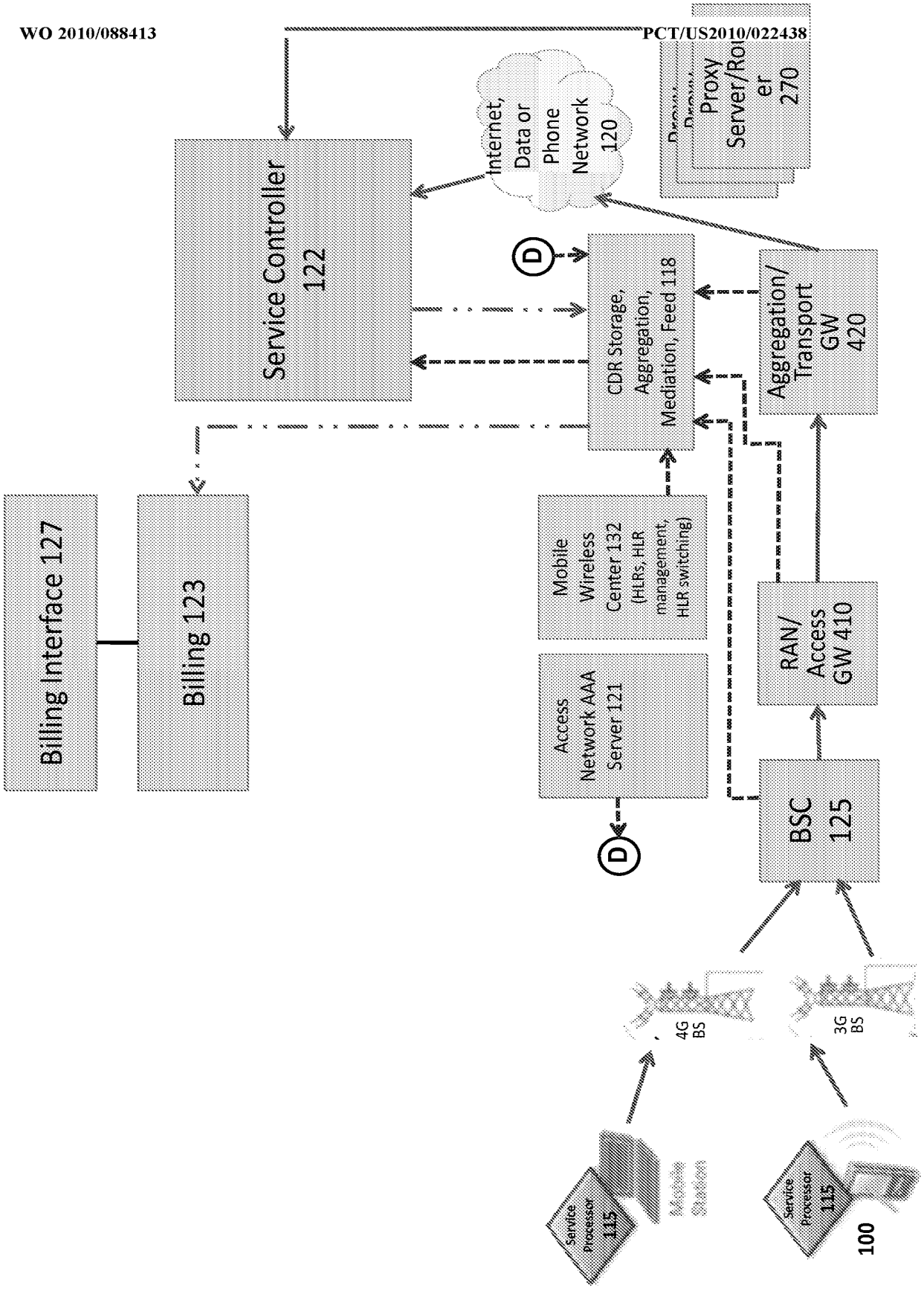

Billing Interface 127
Billing 123
Service Controller 122
Internet, Data or Phone Network 120
Proxy Server/Roaming 270
CDR Storage, Aggregation, Mediation, Feed 118
Aggregation/ Transport GW 420
Mobile Wireless Center 132 (HLRs, HLR management, HLR switching)
Access Network AAA Server 121
RAN/ Access GW 410
BSC 125
4G BS
3G BS
Service Processor 115
Service Processor 115
100

Figure 17

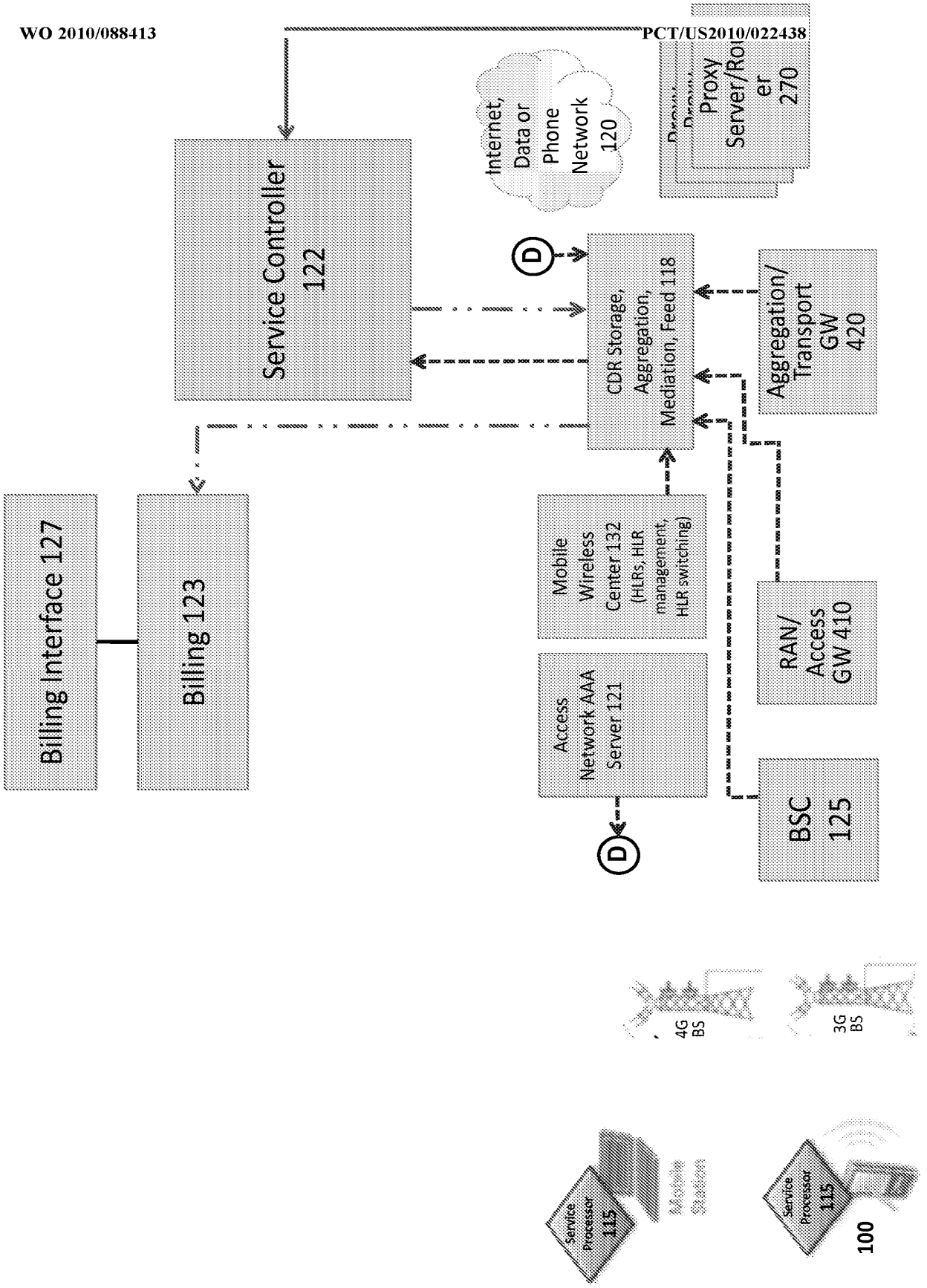

Billing Interface 127
Billing 123
Service Controller 122
Internet, Data or Phone Network 120
Proxy Server/Router 270
CDR Storage, Aggregation, Mediation, Feed 118
Aggregation/ Transport GW 420
Mobile Wireless Center 132 (HLRs, HLR management, HLR switching)
Access Network AAA Server 121
RAN/ Access GW 410
BSC 125
D
D
4G BS
3G BS
Service Processor 115
Mobile Station
Service Processor 115
100

Figure 18

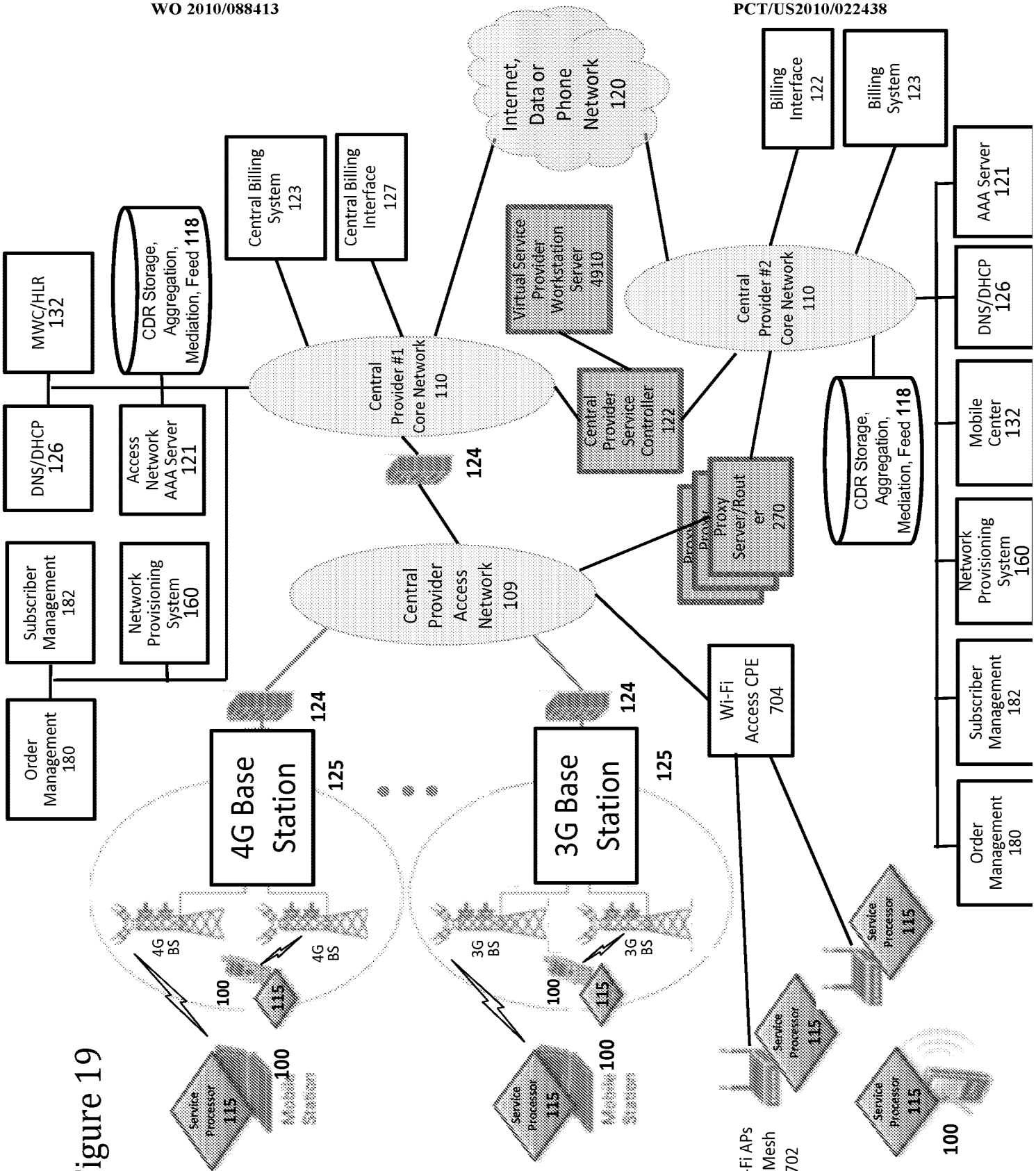

MWC/HLR 132
CDR Storage, Aggregation, Mediation, Feed 118
Central Billing System 123
Central Billing Interface 127
Internet, Data or Phone Network 120
Billing Interface 122
Billing System 123
AAA Server 121
DNS/DHCP 126
Virtual Service Provider Workstation Server 4910
Central Provider #2 Core Network 110
Central Provider #1 Core Network 110
Central Provider Service Controller 122
Access Network AAA Server 121
Subscriber Management 182
Network Provisioning System 160
Central Provider Access Network 109
Proxy Server/Router 270
Mobile Center 132
Order Management 180
4G Base Station
3G Base Station
124
125
Wi-Fi Access CPE 704
4G BS
3G BS
100
115
Service Processor 115
Wi-Fi APs or Mesh 702

Figure 19

Figure 20

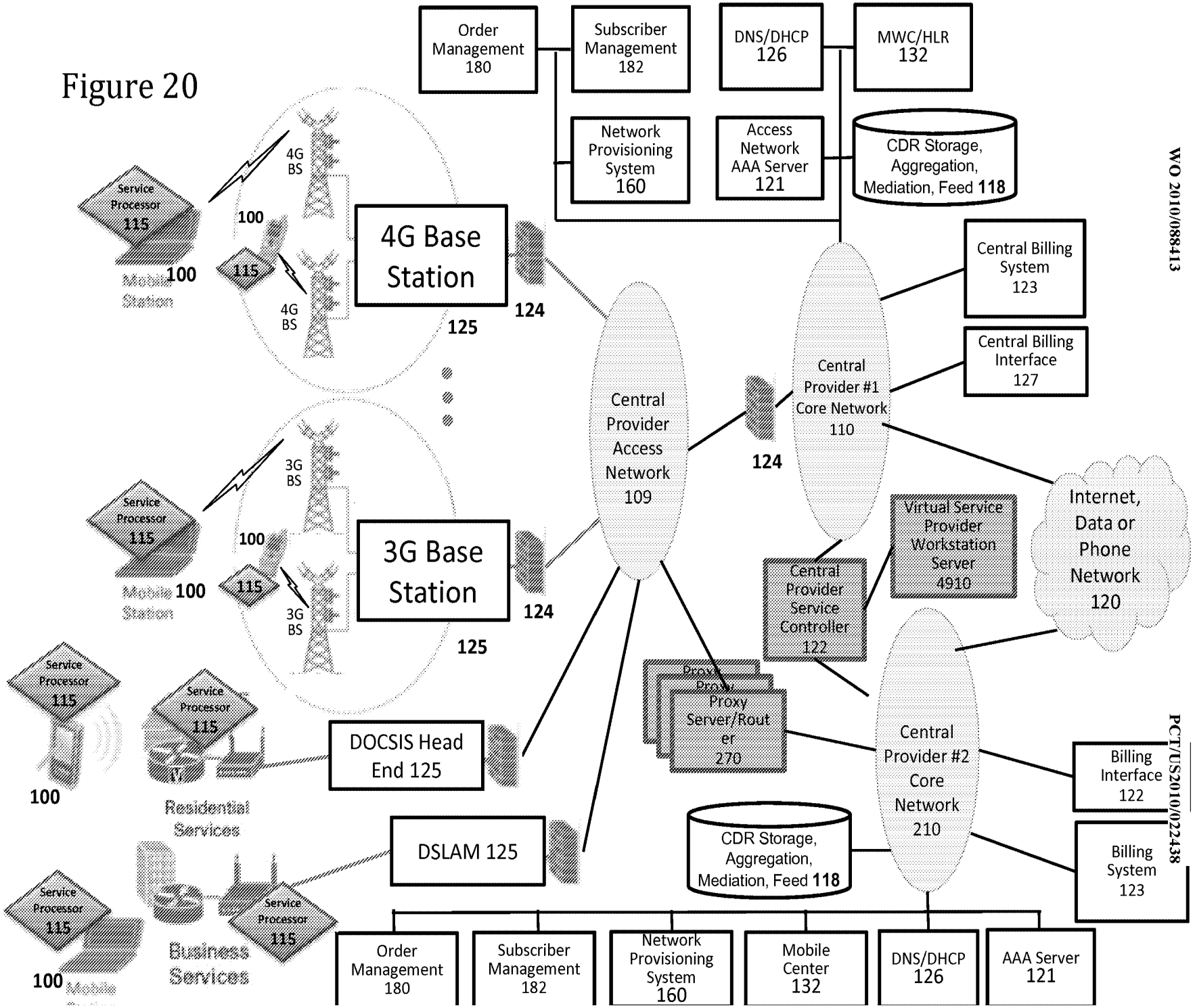

Order Management 180
Subscriber Management 182
DNS/DHCP 126
MWC/HLR 132
Network Provisioning System 160
Access Network AAA Server 121
CDR Storage, Aggregation, Mediation, Feed 118
4G BS
Service Processor 115
100
4G Base Station
125
124
Central Billing System 123
Central Billing Interface 127
Central Provider Access Network 109
Central Provider #1 Core Network 110
3G BS
3G Base Station
Virtual Service Provider Workstation Server 4910
Internet, Data or Phone Network 120
Central Provider Service Controller 122
Proxy Server/Router 270
DOCSIS Head End 125
Residential Services
DSLAM 125
Business Services
Central Provider #2 Core Network 210
Billing Interface 122
Billing System 123
Order Management 180
Subscriber Management 182
Network Provisioning System 160
Mobile Center 132
DNS/DHCP 126
AAA Server 121

Figure 21

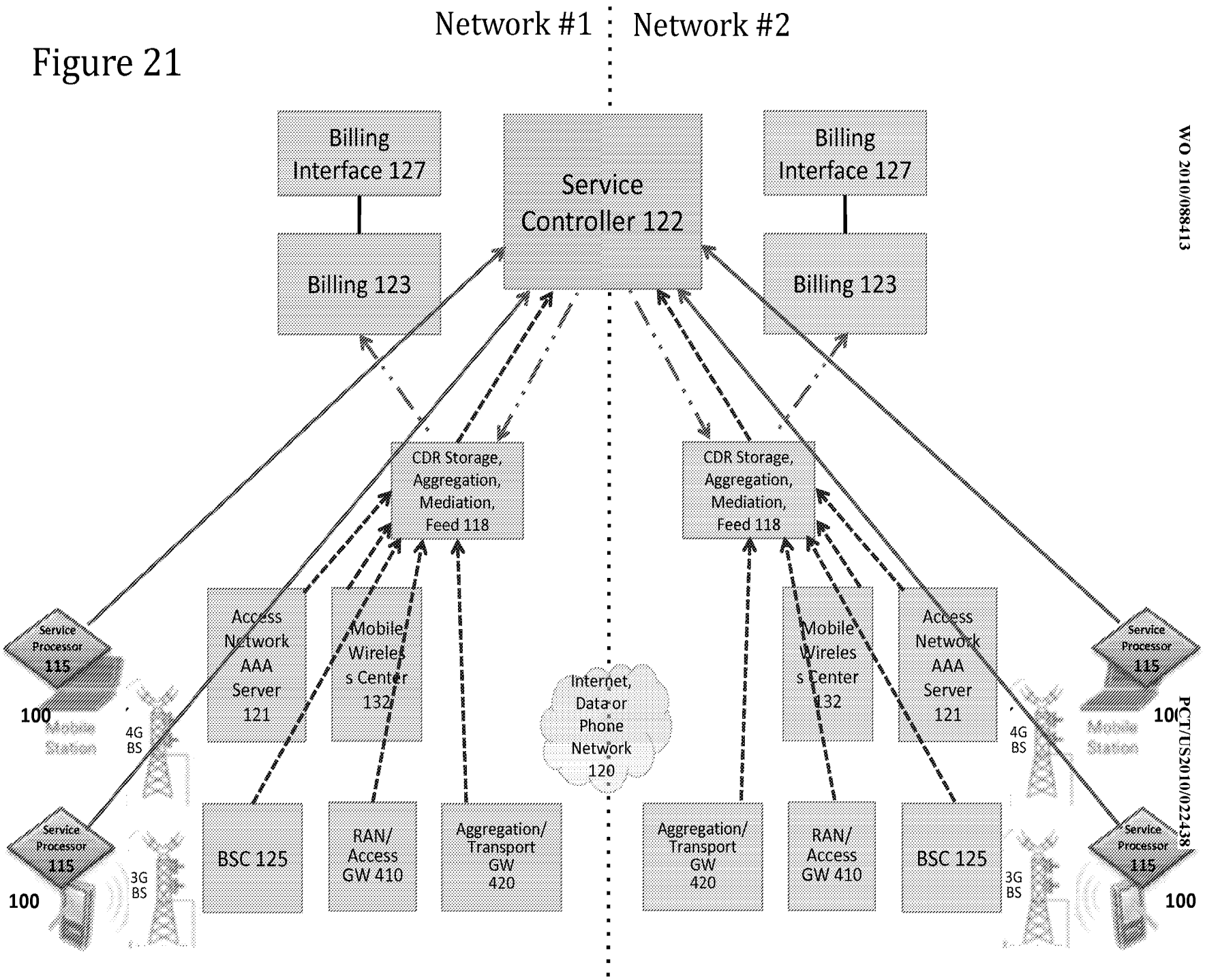

Network #1
Network #2
Billing Interface 127
Billing 123
Service Controller 122
Billing Interface 127
Billing 123
CDR Storage, Aggregation, Mediation, Feed 118
CDR Storage, Aggregation, Mediation, Feed 118
Service Processor 115
100
Mobile Station
4G BS
Access Network AAA Server 121
Mobile Wireless Center 132
Internet, Data or Phone Network 120
Mobile Wireless Center 132
Access Network AAA Server 121
Service Processor 115
100
Mobile Station
4G BS
Service Processor 115
100
3G BS
BSC 125
RAN/ Access GW 410
Aggregation/ Transport GW 420
Aggregation/ Transport GW 420
RAN/ Access GW 410
BSC 125
3G BS
Service Processor 115
100

Figure 22

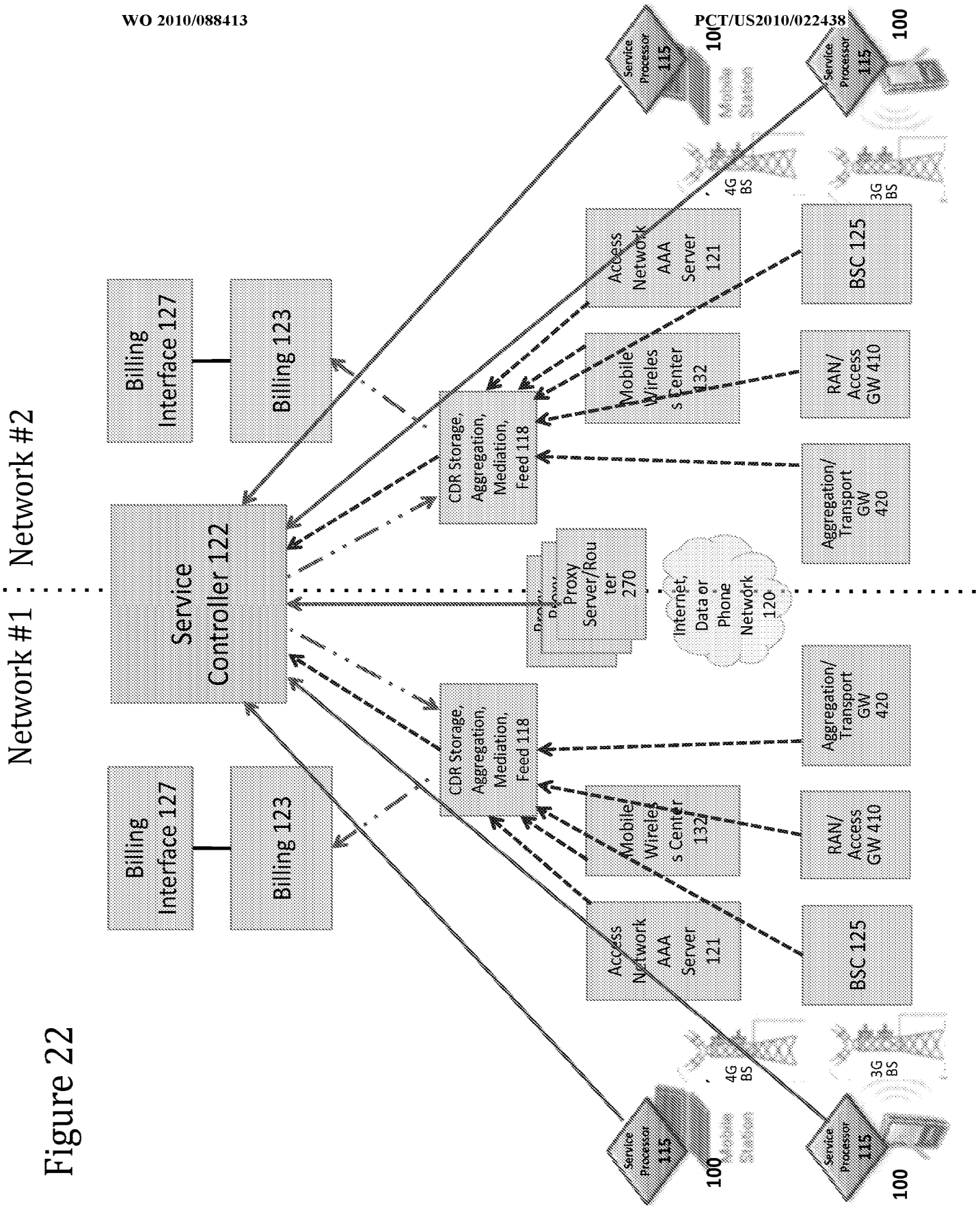
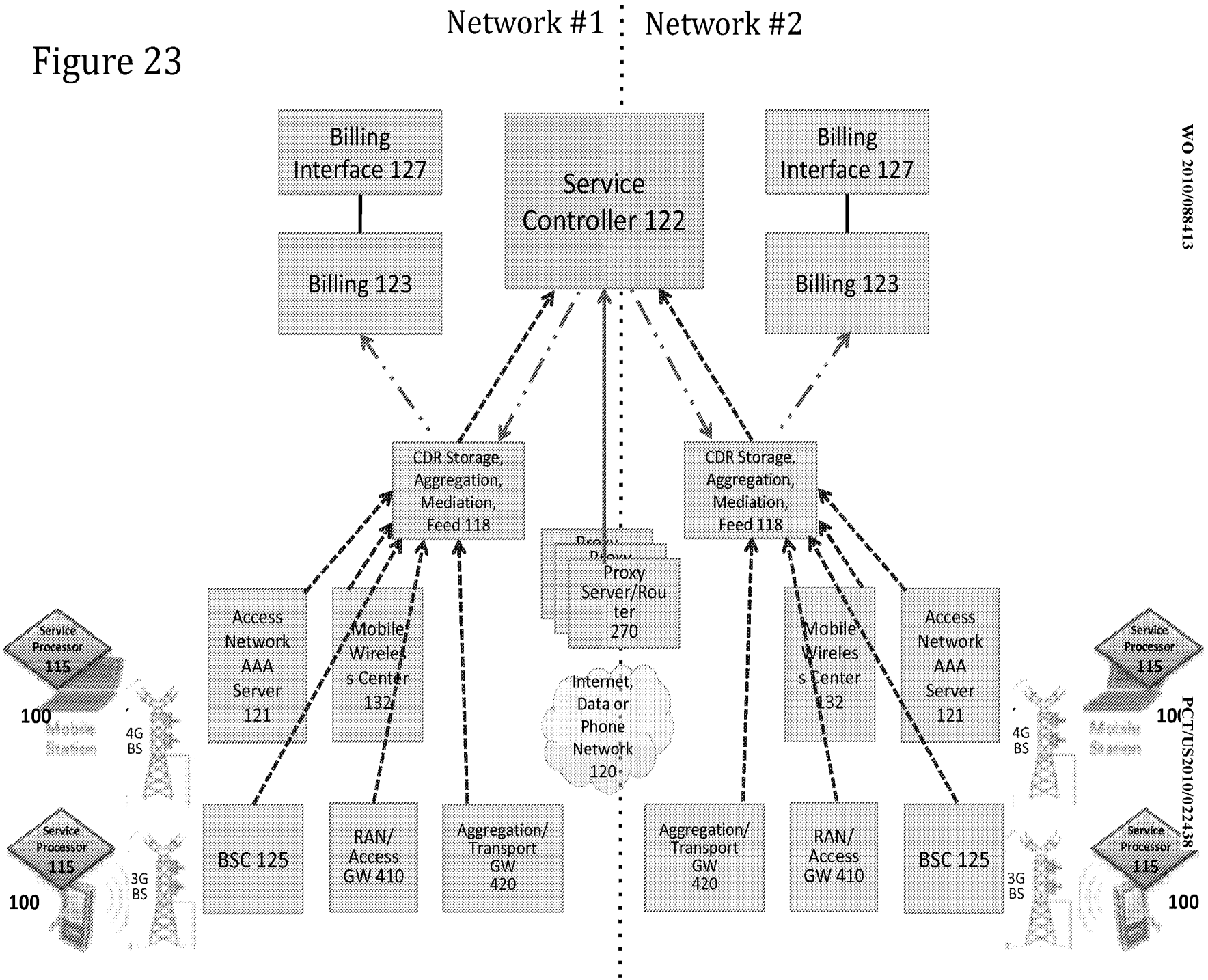

Network #1
Network #2
Billing Interface 127
Billing 123
Service Controller 122
CDR Storage, Aggregation, Mediation, Feed 118
Proxy Server/Router 270
Internet, Data or Phone Network 120
Access Network AAA Server 121
Mobile Wireless Center 132
RAN/ Access GW 410
Aggregation/ Transport GW 420
BSC 125
Service Processor 115
4G BS
3G BS
100

Figure 23


Network #1
Network #2
Billing Interface 127
Billing 123
Service Controller 122
Billing Interface 127
Billing 123
CDR Storage, Aggregation, Mediation, Feed 118
CDR Storage, Aggregation, Mediation, Feed 118
Proxy Server/Router 270
Access Network AAA Server 121
Mobile Wireless Center 132
Internet, Data or Phone Network 120
Mobile Wireless Center 132
Access Network AAA Server 121
Service Processor 115
100
4G BS
3G BS
BSC 125
RAN/ Access GW 410
Aggregation/ Transport GW 420
Aggregation/ Transport GW 420
RAN/ Access GW 410
BSC 125

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/022438

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - H04L 29/08 (2010.01)
USPC - 709/223
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - H04L 29/08 (2010.01)
USPC - 709/223

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/0138601 A1 (PIPONIUS et al) 26 September 2002 (26.09.2002) entire document	1-20
A	US 2002/0176377 A1 (HAMILTON) 28 November 2002 (28.11.2002) entire document	1-20
A	US 2006/0034256 A1 (ADDAGATLA et al) 16 February 2006 (16.02.2006) entire document	1-20
A	US 2005/0228985 A1 (YLIKOSKI et al) 13 October 2005 (13.10.2005) entire document	1-20
A	US 2007/0036312 A1 (CAI et al) 15 February 2007 (15.02.2007) entire document	1-20

☐ Further documents are listed in the continuation of Box C. ☐

* 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	Date of mailing of the international search report
10 March 2010	31 MAR 2010
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
MICHAEL SCHALLOP
VAN PELT, YI & JAMES LLP
SUITE 200
10050 N. FOOTHILL BLVD.
CUPERTINO, CA 95014

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing *(day/month/year)*	23 MAR 2010
Applicant's or agent's file reference RALEP018PCT	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/US2010/021393	International filing date *(day/month/year)* 19 January 2010
Applicant HEADWATER PARTNERS I LLC	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:
   The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

   For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

   ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

   Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

   The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

   Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

   In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

   See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver Telephone No. 571-272-7774

Form PCT/ISA/220 (January 2004) *(See notes on accompanying sheet)*

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference RALEP018PCT	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US2010/021393	International filing date *(day/month/year)* 19 January 2010	(Earliest) Priority Date *(day/month/year)* 28 January 2009
Applicant HEADWATER PARTNERS I LLC		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of:

☒ the international application in the language in which it was filed.

☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).

c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (see Box No. II).

3. ☐ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 1

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/021393

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - H04L12/56 (2010.01)
USPC - 370/401
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - H04L12/56 (2010.01)
USPC - 370/401, 235; 709/225, 227

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
USPTO EAST System (US, USPG-PUB, EPO, DERWENT), Patbase

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2004/0030705 A1 (BOWMAN-AMUAH) 12 February 2004 (12.02.2004) entire document	1-32
Y	US 6,574,321 B1 (COX et al.) 03 June 2003 (03.06.2003) entire document	1-31
Y	US 2006/0291477 A1 (CROAK et al.) 28 December 2006 (28.12.2006) entire document	31
Y	US 2005/0266880 A1 (GUPTA) 01 December 2005 (01.12.2005) entire document	32

☐ Further documents are listed in the continuation of Box C. ☐

* 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
02 March 2010

Date of mailing of the international search report
23 MAR 2010

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Authorized officer:
Blaine R. Copenheaver
PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: MICHAEL SCHALLOP
VAN PELT, YI & JAMES LLP
SUITE 200
10050 N. FOOTHILL BLVD.
CUPERTINO, CA 95014

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	23 MAR 2010

Applicant's or agent's file reference	FOR FURTHER ACTION
RALEP018PCT	See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2010/021393	19 January 2010	28 January 2009

International Patent Classification (IPC) or both national classification and IPC
IPC(8) - H04L12/56 (2010.01)
USPC - 370/401, 235; 709/225, 227

Applicant HEADWATER PARTNERS I LLC

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/US	Date of completion of this opinion	Authorized officer:
Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	02 March 2010	Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/237 (cover sheet) (July 2009)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2010/021393

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:

   a. (means)

      ☐ on paper

      ☐ in electronic form

   b. (time)

      ☐ in the international application as filed

      ☐ together with the international application in electronic form

      ☐ subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2010/021393

Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-32	YES
	Claims	None	NO
Inventive step (IS)	Claims	None	YES
	Claims	1-32	NO
Industrial applicability (IA)	Claims	1-32	YES
	Claims	None	NO

2. Citations and explanations:

Claims 1-30 lack an inventive step under PCT Article 33(3) as being obvious Bowman-Amuah in view of Cox et al. (hereinafter Cox).

As to claim 1, Bowman-Amuah teaches a system (fig. 2), comprising: a processor of an intermediate networking device (fig. 2, 232, gateway) configured to act as a service intermediary or intermediate connection between a first network and one or more communications devices (fig. 2, 212, 214, 216, 218, computers, telephones, mobile phone, PDA);
implement a first service policy set for assisting control of the intermediate networking device use of a first service set on the first network (para 40: shows the enforcing of policies; para 43: shows policies to control individual services)
the first service policy set including one or more first service policies associated with the intermediate networking device or the one or more communications devices connected to the intermediate networking device (para 40: shows the enforcing of policies; para 43: shows policies to control individual services; para 46: shows context enabled services to the mobile devices and users),
the first service set being one or more first network services used by the intermediate networking device or the one or more communications devices (para 47: shows services that are used by the devices); and
a memory of the intermediate networking device coupled to the processor and configured to provide the processor with instructions (para 43: shows the execution of a program to execute policies),
wherein the implementation of the first service policy set is verified (para 43: shows the service control may include authentication).
Bowman-Amuah does not teach monitoring use of the first service set based on the first service policy set.
Cox teaches monitor use of the first service set based on the first service policy set (col 4 lines 10-20: shows with voice, facsimile and modem traffic monitoring and policing to ensure compliance with policies).
It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features as taught by Cox to the invention of Bowman-Amuah in order to manage and enforce of policies related to the use of telecommunications services (Cox: col 1 lines 10-12).

As to claim 2, Bowman-Amuah teaches wherein the one or more communications device include one or more mobile communications devices (fig. 2, 212, 214, 216, 218, computers, telephones, mobile phone, PDA), and the one or more first network services include one or more Internet based services (para 25: shows different services are provided such as application service providers, portals and content providers which are couple to the IP network).

As to claim 3, Bowman-Amuah teaches wherein the one or more communications device include one or more of the following: a mobile phone, a PDA, an eBook reader, a music device, an entertainment/gaming device, a computer, laptop, a netbook, a home networking system, and a modem or communications device supporting machine to machine communications (fig. 2, 212, 214, 216, 218, computers, telephones, mobile phone, PDA).

As to claim 4, Bowman-Amuah teaches wherein the intermediate networking device communicates, forwards, routes, passes or bridges network communications between the first network and one or more of the communications devices (fig. 6, para 53: shows a gateway and network elements such as routers which forwards, routes communications).

As to claim 5, Bowman-Amuah teaches wherein the intermediate networking device includes a first modem to connect with the first network (fig. 6, 232, para 25 shows the access networks are coupled to a gateway).
Bowman-Amuah is silent on a second modem to connect with the one or more communications devices.
Bowman-Amuah shows shows access to an IP network (fig. 6: 212, 224)
Furthermore, access to an IP network would require a DSL modem or a DOCSIS/cable and is a known practice in the art.
It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features in order to provide access to networks (Bowman-Amuah: para 24).

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2010/021393

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

As to claim 6, Bowman-Amuah teaches wherein the intermediate networking device includes a first modem to connect with the first network and a second modem to connect with the one or more communications devices (para 53: shows a gateway and network elements such as routers which forwards, routes communications), and wherein the first modem communicates using one or more of the following communication protocols: WiFi, WWAN, Bluetooth, Ziggby, satellite, DSL, and DOCSIS/cable (fig. 6, para 52 shows wireless technology may be used to control delivery of services) .

As to claim 7, Bowman-Amuah teaches wherein the intermediate networking device includes a first modem to connect with the first network and a second modem to connect with the one or more communications devices (para 53: shows a gateway and network elements such as routers which forwards, routes communications).
Bowman-Amuah is silent the second modem communicates using one or more of the following communication protocols: WiFi, WWAN, Bluetooth, Ziggby, satellite, DSL, and DOCSIS/cable (fig. 6: 212, 224: shows access to an IP network).
Bowman-Amuah shows shows access to an IP network (fig. 6: 212, 224).
Furthermore, access to an IP network would require a DSL modem or a DOCSIS/cable and is a known practice in the art.
It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features in order to provide access to networks (Bowman-Amuah: para 24).

As to claim 8, Bowman-Amuah teaches wherein the intermediate networking device includes one or more of the following: a WWAN to WiFi bridge or router, a femto cell, a wired WAN access router or gateway, a DSL modem, a cable modem router, a gateway, a satellite modem router or gateway, a cell phone, a handheld device, and a computer (fig. 2, 232, gateway, para 53: shows gateway and network elements such as routers).

As to claim 9, Bowman-Amuah teaches wherein a first service processor is located on a first communications device in communication with the intermediate networking device, and wherein the service processor implements the first service policy set for assisting control of the intermediate networking device use of the first service set on the first network (para 43: shows service control providing quality of service and class of service; para 46: shows service control provides context-sensitive services to mobile devices).

As to claim 10, Bowman-Amuah teaches wherein a first portion of a first service processor is located on a first communications device in communication with the intermediate networking device (para 46, 47: shows services provided to mobile devices and users), and
a second portion of the first service processor is located on the intermediate networking device (para 55: shows various sessions are executed over multiple devices and policies are associated with specific devices), and
wherein the service processor implements the first service policy set for assisting control of the intermediate networking device use of the first service set on the first network (para 40: shows the enforcing of policies; para 43: shows policies to control individual services).

As to claim 11, Bowman-Amuah teaches wherein a first portion of a first service processor is located on a first communications device in communication with the intermediate networking device for service usage monitoring or service usage notification assistance or billing assistance (para 50: shows the collection platform tracking service delivery events), and
a second portion of the first service processor is located on the intermediate networking device (para 55: shows various sessions are executed over multiple devices and policies are associated with specific devices), and
wherein the service processor implements the first service policy set for assisting control of the intermediate networking device use of the first service set on the first network (para 40: shows the enforcing of policies; para 43: shows policies to control individual services).

As to claim 12, Bowman-Amuah teaches wherein a first service processor is located on a first communications device in communication with the intermediate networking device (para 46, 47: shows services provided to mobile devices and users), and a
second service processor is located on the intermediate networking device (para 55: shows various sessions are executed over multiple devices and policies are associated with specific devices), and
wherein the first service processor implements the first service policy set for assisting control of the intermediate networking device use of the first service set on the first network (para 46, 47: shows services provided to mobile devices and users), and
the second service processor implements a second service policy set for assisting control of the intermediate networking device use of the first service set on the first network (para 55: shows various sessions are executed over multiple devices and policies are associated with specific devices).

As to claim 13, Bowman-Amuah teaches wherein the processor of the intermediate networking device is further configured to: execute a service processor, wherein the service processor implements a first service policy set for assisting control of the intermediate networking device use of a first service set on a first network, and the service processor is stored on the intermediate networking device (para 40: shows the enforcing of policies; para 43: shows policies to control individual services).

As to claim 14, Bowman-Amuah teaches wherein the processor of the intermediate networking device is further configured to: verify the implementation of the first service policy using a first service processor located on a first communications device (para 43: shows the service control may include authentication).

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2010/021393

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

As to claim 15, Bowman-Amuah teaches wherein the processor of the intermediate networking device is further configured to: verify the implementation of the first service policy using a first service processor located on a first communications device if more than one user or communications device is communicating with the intermediate networking device (para 55: shows various sessions are executed over multiple devices and policies are associated with specific devices).

As to claim 16, Bowman-Amuah teaches wherein the processor of the intermediate networking device is further configured to: verify the implementation of the first service policy using a first service processor located on a first communications device (para 31, 43, 45: shows policies are identified through a profile and the service control may include authentication); and
verify an implementation of a second service policy using a second service processor located on a second communications device (para 55: shows various sessions are executed over multiple devices and policies are associated with specific devices).

As to claim 17, Bowman-Amuah teaches wherein the processor of the intermediate networking device is further configured to: collect first service usage information from a first service processor executed on a first communications device to assist the monitored use of the first service (para 50: shows the collection platform tracking service delivery events).

As to claim 18, Bowman-Amuah teaches wherein the processor of the intermediate networking device is further configured to: collect first service usage information from a first service processor executed on a first communications device to assist the monitored use of the first service if more than one user or communications device is communicating with the intermediate networking device (para 50: shows the collection platform tracking service delivery events; para 55: shows various sessions are executed over multiple devices and policies are associated with specific devices).

As to claim 19, Bowman-Amuah teaches a method, comprising: providing a service intermediary or intermediate connection (fig. 2, 232, gateway) between a first network and one or more communications devices (fig. 2, 212, 214, 216, 218, computers, telephones, mobile phone, PDA);
implementing a first service policy set for assisting control of the intermediate networking device use of a first service set on the first network (para 40: shows the enforcing of policies; para 43: shows policies to control individual services),
the first service policy set including one or more first service policies associated with the intermediate networking device or the one or more communications devices connected to the intermediate networking device (para 40: shows the enforcing of policies; para 43: shows policies to control individual services; para 46: shows context enabled services to the mobile devices and users),
the first service set being one or more first network services used by the intermediate networking device or the one or more communications devices (para 47: shows services that are used by the devices); and
wherein the implementation of the first service policy set is verified (para 43: shows the service control may include authentication).
Bowman-Amuah does not teach monitoring use of the first service set based on the first service policy set
Cox teaches monitoring use of the first service set based on the first service policy set (col 4 lines 10-20: shows with voice, facsimile and modem traffic monitoring and policing to ensure compliance with policies).
It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features as taught by Cox to the invention of Bowman-Amuah in order to manage and enforce of policies related to the use of telecommunications services (Cox: col 1 lines 10-12).

As to claim 20, Bowman-Amuah teaches a computer program product, the computer program product being embodied in a computer readable storage medium and comprising computer instructions (para 43: shows the execution of a program to execute policies) for:
providing a service intermediary or intermediate connection (fig. 2, 232, gateway) between a first network and one or more communications devices (fig. 2, 212, 214, 216, 218, computers, telephones, mobile phone, PDA);
implementing a first service policy set for assisting control of the intermediate networking device use of a first service set on the first network (para 40: shows the enforcing of policies; para 43: shows policies to control individual services),
the first service policy set including one or more first service policies associated with the intermediate networking device or the one or more communications devices connected to the intermediate networking device (para 40: shows the enforcing of policies; para 43: shows policies to control individual services; para 46: shows context enabled services to the mobile devices and users),
the first service set being one or more first network services used by the intermediate networking device or one or more communications devices (para 47: shows services that are used by the devices); and
wherein the implementation of the first service policy set is verified (para 43: shows the service control may include authentication).
Bowman-Amuah does not teach monitoring use of the first service set based on the first service policy set
Cox teaches monitoring use of the first service set based on the first service policy set (col 4 lines 10-20: shows with voice, facsimile and modem traffic monitoring and policing to ensure compliance with policies).
It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features as taught by Cox to the invention of Bowman-Amuah in order to manage and enforce of policies related to the use of telecommunications services (Cox: col 1 lines 10-12).

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2010/021393

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

As to claim 21, Bowman-Amuah teaches a system, comprising: a processor of an intermediate networking device configured to: provide a service intermediary or intermediate connection (fig. 2, 232, gateway) between a first network and one or more communications devices (fig. 2, 212, 214, 216, 218, computers, telephones, mobile phone, PDA);
implement a first service policy set for assisting control of the intermediate networking device use of a first service set on a first network (para 40: shows the enforcing of policies; para 43: shows policies to control individual services),
wherein the first service policy set includes a plurality of service policies associated with the intermediate networking device or the one or more communications devices connected to the intermediate networking device para 40: shows the enforcing of policies; para 43: shows policies to control individual services; para 46: shows context enabled services to the mobile devices and users),, and
the first service set including one or more first network services used by the intermediate networking device or the one or more communications devices (para 47: shows services that are used by the devices); and
collecting a plurality of service usage measurements for the one or more communications devices use of the first service set on the first network (para 45: show collecting operations may be controlled in accordance with device policies and policies identified using profile information are used to configure and tailor operations; para 50: shows collection of service delivery events that may be used for billing and service level agreement management);
comparing the plurality of service usage measurements to the first service policy set (para 45: shows policies identified using profile information are used to configure and tailor operations);
a memory of the communications device coupled to the processor and configured to provide the processor with instructions (para 43: shows the execution of a program to execute policies).
Bowman-Amuah does not teach monitoring use of the first service set based on the first service policy set
Cox teaches monitoring use of the first service set based on the first service policy set (col 4 lines 10-20: shows with voice, facsimile and modem traffic monitoring and policing to ensure compliance with policies);
It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features as taught by Cox to the invention of Bowman-Amuah in order to manage and enforce of policies related to the use of telecommunications services (Cox: col 1 lines 10-12).

As to claim 22, Bowman-Amuah does not teach wherein the plurality of service usage measurements include network based service usage information (para 50: shows collection of service delivery events that may be used for billing and service level agreement management)..

As to claim 23, Bowman-Amuah does not teach wherein the plurality of service usage measurements include CDRs.
Cox teaches wherein the plurality of service usage measurements include CDRs (col 10 lines 55-67: shows CDRs are generated).
It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features as taught by Cox to the invention of Bowman-Amuah in order to manage and enforce of policies related to the use of telecommunications services (Cox: col 1 lines 10-12).

As to claim 24, Bowman-Amuah teaches wherein the plurality of service usage measurements include device network assisted service usage information (para 50: shows collection of service delivery events that may be used for billing and service level agreement management).

As to claim 25, Bowman-Amuah does not teach wherein the processor of the intermediate networking device is further configured to: monitor use of the first service set based on the first service policy set.
Cox teaches monitoring use of the first service set based on the first service policy set (col 4 lines 10-20: shows with voice, facsimile and modem traffic monitoring and policing to ensure compliance with policies).
It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features as taught by Cox to the invention of Bowman-Amuah in order to manage and enforce of policies related to the use of telecommunications services (Cox: col 1 lines 10-12).

As to claim 26, Bowman-Amuah teaches comparing the plurality of service usage measurements to the monitored use (para 45: show collecting operations may be controlled in accordance with device policies and policies identified using profile information are used to configure and tailor operations).
Bowman-Amuah does not teach wherein the processor of the intermediate networking device is further configured to: monitor use of the first service set based on the first service policy set.
Cox teaches monitoring use of the first service set based on the first service policy set (col 4 lines 10-20: shows with voice, facsimile and modem traffic monitoring and policing to ensure compliance with policies).
It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features as taught by Cox to the invention of Bowman-Amuah in order to manage and enforce of policies related to the use of telecommunications services (Cox: col 1 lines 10-12).

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2010/021393

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

As to claim 27, Bowman-Amuah teaches wherein the processor of the intermediate networking device is further configured to: collect network based service usage information from a network device (para 55: shows various sessions are executed over multiple devices and policies are associated with specific devices); and
compare the plurality of service usage measurements to the network based service usage information (para 45: shows policies identified using profile information are used to configure and tailor operations; para 50: shows the collection platform tracking service delivery events).

As to claim 28, Bowman-Amuah teaches wherein the processor of the intermediate networking device is further configured to: collect first service usage information from a first communications device (para 55: shows various sessions are executed over multiple devices and policies are associated with specific devices); and compare the plurality of service usage measurements to the first service usage information (para 45: shows policies identified using profile information are used to configure and tailor operations; para 50: shows the collection platform tracking service delivery events).

As to claim 29, Bowman-Amuah teaches wherein the processor of the intermediate networking device is further configured to report service usage to a network device, wherein the report includes the monitored use and service usage information collected from the one or more communications devices (para 50: shows the collection platform tracking service delivery events).
Bowman-Amuah does not teach wherein the processor of the intermediate networking device is further configured to: monitor use of the first service set based on the first service policy set.
Cox teaches monitoring use of the first service set based on the first service policy set (col 4 lines 10-20: shows with voice, facsimile and modem traffic monitoring and policing to ensure compliance with policies).
It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features as taught by Cox to the invention of Bowman-Amuah in order to manage and enforce of policies related to the use of telecommunications services (Cox: col 1 lines 10-12).

As to claim 30, Bowman-Amuah teaches wherein the processor of the intermediate networking device is further configured to report the monitored use to a network device, wherein the report is encrypted or communicated using a secure protocol (para 48: shows encryption).
Bowman-Amuah does not teach wherein the processor of the intermediate networking device is further configured to: monitor use of the first service set based on the first service policy set.
Cox teaches monitoring use of the first service set based on the first service policy set (col 4 lines 10-20: shows with voice, facsimile and modem traffic monitoring and policing to ensure compliance with policies).
It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features as taught by Cox to the invention of Bowman-Amuah in order to manage and enforce of policies related to the use of telecommunications services (Cox: col 1 lines 10-12).

Claim 31 lack an inventive step under PCT Article 33(3) as being obvious Bowman-Amuah in view of Cox in further view of Croak et al. (hereinafter Croak).

As to claim 31, Bowman-Amuah does not teach wherein the processor of the intermediate networking device is further configured to: monitor use of the first service set based on the first service policy set for each of the one or more communications devices, wherein each of the one or communications device is associated with a unique IP traffic flow, collect CDRs for service usage for each of the one or more communications devices and compare the monitored use to the collected CDRs for each of the one or more communications devices.
Cox teaches monitoring use of the first service set based on the first service policy set for each of the one or more communications devices (col 4 lines 10-20: shows with voice, facsimile and modem traffic monitoring and policing to ensure compliance with policies).
It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features as taught by Cox to the invention of Bowman-Amuah in order to manage and enforce of policies related to the use of telecommunications services (Cox: col 1 lines 10-12).
Bowman-Amuah in view of Cox does not teach wherein each of the one or communications device is associated with a unique IP traffic flow, collect CDRs for service usage for each of the one or more communications device, and compare the monitored use to the collected CDRs for each of the one or more communications devices.
Croak teaches wherein each of the one or communications device is associated with a unique IP traffic flow (para 13: shows VOIP infrastructure over an Internet Protocol based network);
collect CDRs for service usage for each of the one or more communications devices (para 22 shows collecting of call data records); and compare the monitored use to the collected CDRs for each of the one or more communications devices (para 29: shows utilizing call data records in order to calculate capacity).
It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features as taught by Croak to the invention of Bowman-Amuah in view of Cox in order to calculate the capacity of a packet network (Croak: col 1 lines 10-12).

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2010/021393

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Claim 32 lack an inventive step under PCT Article 33(3) as being obvious Bowman-Amuah in view of Cox in further view of Gupta.

As to claim 32, Bowman-Amuah does not teach wherein the processor of the intermediate networking device is further configured to: receive a downloaded new service and install the new service processor.
Gupta teaches wherein the processor of the intermediate networking device is further configured to: receive a downloaded new service processor para 25: shows policies are installed and configured on a component) and install the new service processor (para 25: shows policies are installed and configured on a component).
It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features as taught by Gupta to the invention of Bowman-Amuah in order to configure any service of device (Gupta: para 25).

Claims 1-32 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

Form PCT/ISA/237 (Supplemental Box) (April 2007)

Electronic Acknowledgement Receipt

EFS ID:	12732082
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy implementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	69849
Filer:	Marc A. Sockol/Anne Collette
Filer Authorized By:	Marc A. Sockol
Attorney Docket Number:	26WV-160496 [RALEP018]
Receipt Date:	08-MAY-2012
Filing Date:	02-MAR-2009
Time Stamp:	17:44:52
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	Transmittal Letter	26WV-160496_Transmittal_Form.pdf	109490 22e94e2826af38f79b56d4e3653b8fb1e80cfed7	no	1

Warnings:

Information:

2	Information Disclosure Statement (IDS) Form (SB08)	26WV-160496_IDS.pdf	614534 fd3970e752941a56f54893b18243d6237cf054f9	no	13
Warnings:					
Information:					
3	Foreign Reference	F28-WO2010-088413A1.pdf	8105145 eaf404d7cb2a7b4a94c9dc61b6560fc490913e29	no	97
Warnings:					
Information:					
4	Non Patent Literature	PCT-US10-021393_ISR_WO.pdf	682084 f9472c62d67816a6ca924ccc9ee17be245afa0f0	no	11
Warnings:					
Information:					
		Total Files Size (in bytes):	9511253		

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.

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission	14*

Application Number	12/380,773
Filing Date	2009-03-02
First Named Inventor	Gregory G. Raleigh
Art Unit	2452
Examiner Name	Dohm Chankong
Attorney Docket Number	26WV-160496 [RALEP018]

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☑ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please Identify below):

Remarks

*Total number of pages does not include foreign patents or non-patent literature references

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Sheppard, Mullin, Richter & Hampton LLP		
Signature			
Printed name	Marc A. Sockol		
Date	May 8, 2012	Reg. No.	40823

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature	Anne Collette		
Typed or printed name	Anne Collette	Date	5/8/12

This collection of information is required by 37 CFR 1.5. 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 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Gregory G. Raleigh
Art Unit	2452
Examiner Name	Dohm Chankong
Attorney Docket Number	26WV-160496 [RALEP018]

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20090180391		2009-07-16	PETERSEN et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] ¡	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Marc A. Sockol/	Date (YYYY-MM-DD)	2012-05-08
Name/Print	Marc A. Sockol	Registration Number	40823

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	12733058
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy implementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	69849
Filer:	Marc A. Sockol/Anne Collette
Filer Authorized By:	Marc A. Sockol
Attorney Docket Number:	26WV-160496 [RALEP018]
Receipt Date:	08-MAY-2012
Filing Date:	02-MAR-2009
Time Stamp:	19:37:25
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	Information Disclosure Statement (IDS) Form (SB08)	26WV-160496_IDS_.pdf	612298 e2256d99c8a89e642547a45d804eb605974 37ad0	no	4

Warnings:
Information:

Total Files Size (in bytes):	612298

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.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Gregory G. Raleigh
Art Unit	2452
Examiner Name	Dohm Chankong
Attorney Docket Number	26WV-160496 [RALEP018]

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6574465		2003-06-03	MARSH et al.	
	2	7366497		2008-04-29	NAGATA	
	3	7388950		2008-06-17	ELSEY et al.	
	4	7450927		2008-11-11	CRESWELL et al.	
	5	7499537		2009-03-03	ELSEY et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030046396		2003-03-06	RICHTER et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Marc A. Sockol/	Date (YYYY-MM-DD)	2012-06-04
Name/Print	Marc A. Sockol	Registration Number	40823

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	12931700
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy implementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	69849
Filer:	Marc A. Sockol/Anne Collette
Filer Authorized By:	Marc A. Sockol
Attorney Docket Number:	26WV-160496 [RALEP018]
Receipt Date:	04-JUN-2012
Filing Date:	02-MAR-2009
Time Stamp:	19:47:51
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	Transmittal Letter	26WV-160496_Transmittal.pdf	93740 d9a394b2da3a038b958e0e1bcfa9cf8ef11ffb1f	no	1
Warnings:					
Information:					

2	Information Disclosure Statement (IDS) Form (SB08)	26WV-160496_IDS.pdf	612347 1d4278b1253fbfa53881ed482ea87ff1a383936a	no	4
Warnings:					
Information:					
			Total Files Size (in bytes):	706087	

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.

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission: 5

Application Number	12/380,773
Filing Date	2009-03-02
First Named Inventor	Gregory G. Raleigh
Art Unit	2452
Examiner Name	Dohm Chankong
Attorney Docket Number	26WV-160496 [RALEP018]

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☑ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation
- ☐ Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please Identify below):

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Sheppard, Mullin, Richter & Hampton LLP		
Signature			
Printed name	Marc A. Sockol		
Date	Jan 4, 2012	Reg. No.	40823

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature	Anne Collette		
Typed or printed name	Anne Collette	Date	6/4/12

This collection of information is required by 37 CFR 1.5. 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 and1.14. This collection is estimated to 2 hours 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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Gregory G. Raleigh	Examiner:	Dohm Chankong
Serial No.:	12/380,773	Art Unit:	2452
Filed:	March 2, 2009	Conf. No.:	5719
Title:	Verifiable Service Policy Implementation for Intermediate Networking Devices		

Mail Stop Refund Branch
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR REFUND UNDER 37 CFR §1.26

Dear Sir:

Applicant respectfully requests a refund in the amount of $1,100.00 representing fees charged to Deposit Account No. 50-4561 by the Office on March 12, 2012 for a Request for Continued Examination (RCE) with a Petition for Extension (three months) filed on March 9, 2012 in the above-referenced patent application. Pursuant to 37 CFR §1.26, this request is being submitted within the two-year time period allowed by the Office.

Applicant qualifies for small-entity status pursuant to the Notice of Change of Entity Status from Large to Small filed on June 22, 2011. The above-referenced RCE and petition for extension were mistakenly filed with large-entity fees, and Applicant is requesting a refund for the difference paid between large and small entity fees for both the RCE ($465.00, Fee Code 1801) and the petition for extension ($635.00, Fee Code 1253), for a total of $1,100.00. A copy of the PAIR Fee Payment History Table for the above application is attached, with the above-mentioned fees circled.

Also attached is a copy of the Deposit Account Statement dated March 2012 for Deposit Account No. 50-4561 in the name of Sheppard, Mullin, Richter & Hampton LLP.

The erroneous charges are on page 2 of the Statement, and have been circled.

Applicant respectfully requests that a refund of $1,100.00 be credited back to Deposit Account No. 50-4561 as soon as possible.

If the Office has any questions or needs any additional information, they are invited to contact the undersigned.

Respectfully submitted,

Date: August 8, 2012

By: _____

Marc A. Sockol
Reg. No. 40,823
Customer Number 69849
Sheppard Mullin Richter & Hampton LLP
379 Lytton Avenue
Palo Alto, CA 94301-1432
(650) 815-2602

12/380,773	Verifiable service policy implementation for intermediate networking devices	26WV-160496 [RALEP018]	07-26-2012::00:44:56

Fee Payment History Table

Accounting Date	Fee Code	Fee Amount	Mailroom Date	Payment Method
03-12-2012	1253	$1,270.00	03-09-2012	Deposit Account
03-12-2012	1801	$930.00	03-09-2012	Deposit Account
07-22-2011	1806	$180.00	07-21-2011	Deposit Account
06-23-2011	2202	$832.00	06-22-2011	Deposit Account
06-23-2011	2201	$220.00	06-22-2011	Deposit Account
06-23-2011	2252	$245.00	06-22-2011	Deposit Account
06-10-2009	8021	$40.00	06-09-2009	Deposit Account
06-02-2009	1011	$330.00	06-01-2009	Check
06-02-2009	1111	$540.00	06-01-2009	Check
06-02-2009	1311	$220.00	06-01-2009	Check
06-02-2009	1201	$220.00	06-01-2009	Check
06-02-2009	1202	$624.00	06-01-2009	Check
06-02-2009	1051	$130.00	06-01-2009	Check
06-02-2009	1081	$1,350.00	06-01-2009	Check

Close Window

United States Patent and Trademark Office

Deposit Account Statement

Requested Statement Month:	March 2012
Deposit Account Number:	504561
Name:	SHEPPARD, MULLIN, RICHTER & HAMPTON LLP
Attention:	MARC A. SOCKOL, ESQ.
Street Address 1:	379 LYTTON AVE.
Street Address 2:	
City:	PALO ALTO
State:	CA
Zip:	94301-1432
Country:	UNITED STATES

DATE	SEQ	POSTING REF TXT	ATTORNEY DOCKET NBR	FEE CODE	AMT	BAL
03/01	1588	85331410	27TR-161527	7001	$325.00	$39,880.51
03/01	13817	12871500	22GY-150311	1806	$180.00	$39,700.51
03/01	13912	12402443	18EL-137579	2253	$635.00	$39,065.51
03/01	13917	13409013	18FC-168018	2111	$310.00	$38,755.51
03/01	13916	13409013	18FC-168018	4011	$95.00	$38,660.51
03/01	13918	13409013	18FC-168018	2311	$125.00	$38,535.51
03/01	14218	13409013	18FC-168018	8021	$40.00	$38,495.51
03/02	10067	13154401	18EH-162303	2251	$75.00	$38,420.51
03/02	10068	13154401	18EH-162303	2814	$80.00	$38,340.51
03/02	12208	61605719	29CK-167228	2005	$125.00	$38,215.51
03/05	10597	12432008	28XA-167942	2453	$930.00	$37,285.51
03/05	10598	12432008	28XA-167942	2801	$465.00	$36,820.51
03/05	1	13154401	18EH-162303	2252	$205.00	$36,615.51
03/05	34	12357384	026068-0376867	2202	$30.00	$36,585.51
03/05	33	12357384	026068-0376867	2253	$635.00	$35,950.51
03/06	10193	13331487	26WV-166740 [RALEP051]	2202	$30.00	$35,920.51
03/06	10547	12042938	18EL-137581	2453	$930.00	$34,990.51
03/08	49	13385764	27CZ-160364	2090	$200.00	$34,790.51
03/08	48	13385764	27CZ-160364	2011	$190.00	$34,600.51
03/08	50	13385764	27CZ-160364	2111	$310.00	$34,290.51
03/08	51	13385764	27CZ-160364	2311	$125.00	$34,165.51
03/08	19303	77926100	20DW-143167	7004	$300.00	$33,865.51
03/09	10368	13415715	30SD-167837	4011	$95.00	$33,770.51
03/09	10369	13415715	30SD-167837	2111	$310.00	$33,460.51
03/09	10370	13415715	30SD-167837	2311	$125.00	$33,335.51
03/09	10371	13415715	30SD-167837	2202	$330.00	$33,005.51

03/09	11293	12871500	22GY-150311	1806	$180.00	$32,825.51
03/12	376	77717978	23NS-152456	7004	$450.00	$32,375.51
03/12	8897	12563079	21VG-150047	2202	$30.00	$32,345.51
03/12	8902	12563079	21VG-150047	2253	$635.00	$31,710.51
03/12	8900	12563079	21VG-150047	2201	$250.00	$31,460.51
03/12	11265	12380773	26WV-160496 [RALEP018]	1253	$1,270.00	$30,190.51
03/12	11266	12380773	26WV-160496 [RALEP018]	1801	$930.00	$29,260.51
03/13	3168	13165709	25GZ-162620	2251	$75.00	$29,185.51
03/13	6061	61552224	28XC-165093	8021	$40.00	$29,145.51
03/13	7687	11977187	25JS-157938	1401	$620.00	$28,525.51
03/13	11897	77728260	19PP-148699	7004	$150.00	$28,375.51
03/13	12424	61609879	18LZ-168317	1005	$250.00	$28,125.51
03/13	12648	12754558	18LZ-154100	1501	$1,740.00	$26,385.51
03/13	12649	12754558	18LZ-154100	1504	$300.00	$26,085.51
03/13	12705	12816354	18LZ-155422	1814	$160.00	$25,925.51
03/13	12704	12816354	18LZ-155422	1253	$1,270.00	$24,655.51
03/13	12764	12360801	18LZ-148575 (083617-03778	1253	$1,270.00	$23,385.51
03/13	18780	12420728	20YH-147476	2253	$635.00	$22,750.51
03/14	10131	2605497	19PP-144655	7205	$100.00	$22,650.51
03/14	10132	2605497	19PP-144655	7201	$400.00	$22,250.51
03/14	11670	12380774	26WV-160283 [RALEP016]	2253	$635.00	$21,615.51
03/14	11671	12380774	26WV-160283 [RALEP016]	2801	$465.00	$21,150.51
03/15	2408	61610670	28FX-168346	2005	$125.00	$21,025.51
03/15	8728	61610876	26WV-168343 [RALEP062]	2005	$125.00	$20,900.51
03/15	11669	61610910	26WV-168345 [RALEP063]	2005	$125.00	$20,775.51
03/15	12464	61610944	30XA-168342	2005	$125.00	$20,650.51
03/15	12752	12120338	ARHV000210US	2202	$60.00	$20,590.51
03/16	6168	13356350	30PW-167262	8021	$40.00	$20,550.51
03/16	6858	13356350	30PW-167262	2051	$65.00	$20,485.51
03/16	9927	13309463	26WV-160518 [RALEP041]	2051	$65.00	$20,420.51
03/16	10145	13309463	26WV-160518 [RALEP041]	8021	$40.00	$20,380.51
03/16	11137	12715048	18EH-153391	2253	$635.00	$19,745.51
03/16	11138	12715048	18EH-153391	2801	$465.00	$19,280.51
03/16	11366	12380756	26WV-160490 [RALEP009]	2253	$635.00	$18,645.51
03/16	11367	12380756	26WV-160490 [RALEP009]	1806	$180.00	$18,465.51
03/16	16426	85571456	25TY-157481	7001	$650.00	$17,815.51
03/19	7549	85571959	25SY-157104	7001	$650.00	$17,165.51
03/19	9236	12380772	26WV-160491 [RALEP011]	2253	$635.00	$16,530.51
03/19	9237	12380772	26WV-160491 [RALEP011]	1806	$180.00	$16,350.51
03/19	9889	E-REPLENISHMENT		9203	-$20,000.00	$36,350.51
03/19	10383	12509210	25SY-158945	1801	$930.00	$35,420.51
03/20	1330	13423574	26EF-160760	2311	$125.00	$35,295.51
03/20	1329	13423574	26EF-160760	2111	$310.00	$34,985.51
03/20	1328	13423574	26EF-160760	4011	$95.00	$34,890.51
03/20	3226	13423574	26EF-160760	8021	$40.00	$34,850.51
03/20	9905	E-REPLENISHMENT		9203	-$9,409.49	$44,260.00
03/20	9913	85264488	22SG-153574	7004	$300.00	$43,960.00
03/20	10026	85264492	22SG-153574	7004	$300.00	$43,660.00

03/20	11711	12380778	26WV-160485 [RALEP004]	2253	$635.00	$43,025.00
03/20	11712	12380778	26WV-160485 [RALEP004]	1806	$180.00	$42,845.00
03/20	12341	13200548	29HF-164442	2252	$280.00	$42,565.00
03/22	8172	13312883	26FY-158761	2051	$65.00	$42,500.00
03/22	8173	13312883	26FY-158761	2251	$75.00	$42,425.00
03/22	8171	13312883	26FY-158761	2201	$875.00	$41,550.00
03/22	8170	13312883	26FY-158761	2202	$1,140.00	$40,410.00
03/22	8169	13312883	26FY-158761	2311	$125.00	$40,285.00
03/22	8168	13312883	26FY-158761	2111	$310.00	$39,975.00
03/22	8167	13312883	26FY-158761	4011	$95.00	$39,880.00
03/22	8508	6133785	18LZ-137930	1553	$4,730.00	$35,150.00
03/22	8524	13312883	26FY-158761	8021	$40.00	$35,110.00
03/23	766	85576910	27WF-165089	7001	$650.00	$34,460.00
03/23	9192	A0028952	28XX-164503/CLOUDON	7901	$300.00	$34,160.00
03/23	9193	A0028952	28XX-164503/CLOUDON	7951	$3,555.36	$30,604.64
03/23	9779	85132643	037W-140062	7004	$300.00	$30,304.64
03/23	10004	85132631	037W-140062	7004	$300.00	$30,004.64
03/23	10338	85132656	037W-140062	7004	$300.00	$29,704.64
03/23	10448	85132652	037W-140062	7004	$300.00	$29,404.64
03/26	22	12432008	28XA-167942	2801	-$465.00	$29,869.64
03/27	534	85430407	28XX-164503/CLOUDON - IN	8507	$15.00	$29,854.64
03/27	8201	85174853	19NM-147162/THE VEINS	7002	$100.00	$29,754.64
03/27	15568	7443266	18LZ-137973	1551	$1,130.00	$28,624.64
03/27	15645	7444164	18LZ-137868	1551	$1,130.00	$27,494.64
03/28	12062	12380780	26WV-160488 [RALEP007]	2253	$635.00	$26,859.64
03/28	12063	12380780	26WV-160488 [RALEP007]	1806	$180.00	$26,679.64
03/29	3419	85293403	19PD-143424/ A LOGO	7004	$300.00	$26,379.64
03/29	3438	85293403	19PD-143424/ A LOGO	7003	$200.00	$26,179.64
03/29	4533	85293401	19PD-143424/ DISCOVERING	7004	$300.00	$25,879.64
03/29	11457	12380781	26WV-160495 [RALEP015]	2253	$635.00	$25,244.64
03/29	11458	12380781	26WV-160495 [RALEP015]	1806	$180.00	$25,064.64
03/30	6504	77977925	20HD-147518/OCLARO	7004	$300.00	$24,764.64
03/30	3	12281962	29TP-165154	2202	$120.00	$24,644.64
03/30	12436	61617604	27WF-168701	2005	$125.00	$24,519.64
03/30	18813	E-REPLENISHMENT		9203	-$20,000.00	$44,519.64
03/30	18832	E-REPLENISHMENT		9203	-$3,320.36	$47,840.00

START BALANCE	SUM OF CHARGES	SUM OF REPLENISH	END BALANCE
$40,205.51	$45,560.36	$53,194.85	$47,840.00

Need Help? | USPTO Home Page | Finance Online Shopping Page | Alerts Page

Electronic Acknowledgement Receipt	
EFS ID:	13448266
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy implementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	69849
Filer:	Marc A. Sockol/Linda Brost
Filer Authorized By:	Marc A. Sockol
Attorney Docket Number:	26WV-160496 [RALEP018]
Receipt Date:	08-AUG-2012
Filing Date:	02-MAR-2009
Time Stamp:	17:24:08
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		160496-RALEP018-RequestforRefund-080812.pdf	163909 cd7a9304f1efcca4dac3e928987db3fc7fa875d9	yes	7

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	1
	Refund Request	2	7
Warnings:			
Information:			
	Total Files Size (in bytes):	163909	

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.

PTO/SB/21 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission	7

Application Number	12/380,773
Filing Date	March 2, 2009
First Named Inventor	Gregory G. Raleigh
Art Unit	2452 Conf. No. 5719
Examiner Name	Dohm Chankong
Attorney Docket Number	26WV-160496 [RALEP018]

ENCLOSURES *(Check all that apply)*

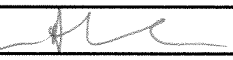
- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement with PTO/SB/08a/b
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
- ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation, Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s)
- ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC (Appeal Notice, Brief, Reply Brief)
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Other Enclosure(s) (please Identify below):

  Request for Refund Under CFR 1.26 (2 pgs.); copies of Fee Payment History Table and Deposit Acct. Stmt. (4 pgs.)

Remarks

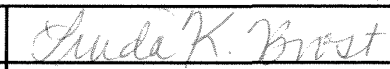
You are hereby authorized to charge any additional fee required or credit any overpayment to Deposit Account No. 50-4561.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Sheppard, Mullin, Richter & Hampton LLP		Customer No. 69849
Signature			
Printed name	Marc A. Sockol		
Date	August 8, 2012	Reg. No.	40,823

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this correspondence is being filed electronically via EFS-Web addressed to the Commissioner for Patents on the date shown below:

Signature			
Typed or printed name	Linda K. Brost	Date	August 8, 2012

This collection of information is required by 37 CFR 1.5. 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 2 hours 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.

RECEIVED
CENTRAL FAX CENTER
AUG 0 8 2012

PTO/SB/80 (11-08)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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: 107265

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: 107265

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:

Headwater Partners I LLC
350 Marine Parkway, Suite 300
Redwood City, CA 94065 U.S.A.

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	July 5, 2012
Name	Gregory G. Raleigh	Telephone	650-517-2781
Title	Manager		

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.

RECEIVED
CENTRAL FAX CENTER
AUG 0 8 2012

PTO/SB/96 (08-08)
Approved for use through 09/30/2008, OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Gregory G. Raleigh

Application No./Patent No.: 12/380,773 Filed/Issue Date: March 2, 2009

Entitled: Verifiable Service Policy Implementation for Intermediate Networking Devices

Headwater Partners I LLC (Name of Assignee), a limited liability company (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 022799, Frame 0823, or for which a copy therefore is attached.

OR

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

1. From: _____ To: _____
   The document was recorded in the United States Patent and Trademark Office at
   Reel _____, Frame _____, or for which a copy thereof is attached.
2. From: _____ To: _____
   The document was recorded in the United States Patent and Trademark Office at
   Reel _____, Frame _____, or for which a copy thereof is attached.
3. From: _____ To: _____
   The document was recorded in the United States Patent and Trademark Office at
   Reel _____, Frame _____, or for which a copy thereof is attached.

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

[✓] 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.

Signature — August 8, 2012 (Date)

Krista S. Jacobsen, Reg. No. 59,374 (Printed or Typed Name) — 650-517-2798 (Telephone Number)

Attorney of Record (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.

RECEIVED
CENTRAL FAX CENTER
AUG 0 8 2012

Date:	August 8, 2012
Send To:	Commissioner for Patents
Fax No.:	571-273-8300
From:	Krista S. Jacobsen, Head Counsel, Headwater Partners I LLC
Phone Number:	650-517-2798

Total Pages Including Cover: 3

Fax

Sir:

Following this cover sheet, please find form SB/80, granting power of attorney to prosecute applications before the USPTO to practitioners associated with the Customer Number 107265, and form SB/96, a statement under 37 C.F.R. § 3.73(b) establishing the right of assignee Headwater Partners I LLC to take action in application number 12/380,773.

Please let me know if you need any additional information to complete the Customer Number change in the application.

Sincerely,

Krista S. Jacobsen
Head Counsel, Headwater Partners I LLC
Reg. No. 59,374

PAGE 1/3 * RCVD AT 8/8/2012 11:33:32 PM [Eastern Daylight Time] * SVR:IW-PTOFAX-001/40 * DNIS:2738300 * CSID:16506108051 * DURATION (mm-ss):00-45

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission: 9

Application Number	12/380,773
Filing Date	2011-03-02
First Named Inventor	Gregory G. Raleigh
Art Unit	2452 Conf.: 5719
Examiner Name	Dohm Chankong
Attorney Docket Number	RALEP016

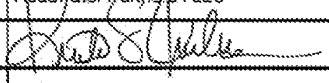
ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☑ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please identify below):

Remarks

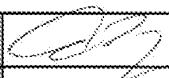
You are hereby authorized to charge any additional fee required or credit any overpayment to Deposit Account No. 50-5876.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Headwater Partners I LLC		
Signature			
Printed name	Krista S. Jacobsen		
Date	August 14, 2012	Reg. No.	59,374

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name	Ann Taylor	Date	August 14, 2012

This collection of information is required by 37 CFR 1.5. 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 and1.14. This collection is estimated to 2 hours 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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Examiner:
Gregory G. Raleigh	Dohm Chankong
Serial No. 12/380,773	Art Unit: 2452
Filed: March 2, 2009	Conf. No.: 5719

Title: Verifiable Service Policy Implementation for Intermediate Networking Devices

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

INFORMATION DISCLOSURE STATEMENT PURSUANT TO 37 C.F.R. §§ 1.97-1.98

Sir:

In accordance with the duty of disclosure under 37 CFR §1.56 and pursuant to 37 CFR §§ 1.97-1.98, Applicant hereby notifies the U.S. Patent and Trademark Office of the references listed on the enclosed Form PTO-SB/08A. Pursuant to the USPTO's waiver of the requirements under 37 CFR 1.98(a)(2)(i) for submitting a copy of each cited U.S. patent, we are not submitting copies of U.S. patents and/or patent publications cited.

The present Information Disclosure Statement is being filed before receiving an office action after the filing of an RCE. Accordingly, no certification or fee is required.

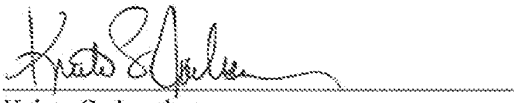
The submission of the listed documents is not intended as an admission that any such document constitutes prior art against the claims of the present application. Applicant reserves the right to dispute any of the listed documents as prior art during examination. Furthermore, Applicant does not waive any right to take any action that would be appropriate to antedate or otherwise remove any listed document as a competent reference against the claims of the present application. The submission of this Information Disclosure Statement is not to be

construed as a representation that a search has been made or that no other material information may exist.

The Examiner is requested to initial the enclosed Form PTO/SB/08A and return a copy thereof to the undersigned.

No fee is believed to be due relative to this submission, but if for any reason an insufficient fee has been paid, please charge the insufficiency to Deposit Account No. **50-5876**.

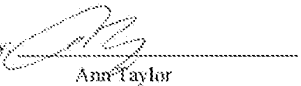
Respectfully submitted,

Date: August 14, 2012 By: 

Krista S. Jacobsen
Reg. No. 59,374
Head Counsel
Headwater Partners I LLC
350 Marine Parkway, Suite 300
Redwood Shores, CA 94065
(650) 517-2798

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being filed electronically via EFS-Web addressed to the Commissioner for Patents on:

Date: August 14, 2012 By: 
Ann Taylor

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Chankong, Dohm
	Attorney Docket Number	RALEP018

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6418147		2002-07-09	Wiedeman, Robert A	
	2	6765864		2004-07-20	Natarajan, Shankar et al.	
	3	7610328		2009-10-27	Haase, Oliver et al.	
	4	7650137		2010-01-19	Jobs, Steven P. et al.	
	5	7693720		2010-04-06	Kennewick, Robert A. et al.	
	6	7734784		2010-06-08	Araujo, Wladimir et al.	
	7	7747699		2010-06-29	Prueitt, James K. et al.	
	8	7792708		2010-09-07	Alva, Jessi	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Chankong, Dohm
	Attorney Docket Number	RALEP018

	9	7797401		2010-09-14	Stewart, Hugh Donal et al.	
	10	7822837		2010-10-26	Urban, Mark et al.	
	11	7949529		2011-05-24	Weider, Chris et al.	
	12	8095666		2012-01-10	Schmidt, Jonathan E. et al.	
	13	8099077		2012-01-17	Chowdhury, Amor et al.	
	14	8099517		2012-01-17	Jia, Lujun R. et al.	
	15	8170553		2012-05-01	Bennett, James D.	
	16	7984130		2011-07-19	Bogineni, Kalyani et al.	
	17	8019687		2011-09-13	Wang, Feng Chi et al.	
	18	8144591		2012-03-27	Ghai, Rajat et al.	
	19	7336960		2008-02-26	Zavalkovsky, Arthur et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Chankong, Dohm
	Attorney Docket Number	RALEP018

	20	8194549		2012-06-05	Huber, Kurt Donald et al.	
	21	6606744		2003-08-12	Mikurak, Michael G.	
	22	8190675		2012-05-29	Tribbett, David	
	23	8200775		2012-06-12	Moore, James F.	
	24	7069248		2006-06-27	Huber, Adriano	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030018524		2003-01-23	Fishman, Dan et al.	
	2	20030220984		2003-11-27	Jones, Paul David et al.	
	3	20040021697		2004-02-05	Beaton, Brian Finlay et al.	
	4	20040107360		2004-06-03	Herrmann, Conrad K. et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Chankong, Dohm
	Attorney Docket Number	RALEP018

	5	20070061243		2007-03-15	Ramer, Jorey et al.	
	6	20070282896		2007-12-06	Wydroug, Zoe M. et al.	
	7	20080184127		2008-07-31	Rafey, Richter A. et al.	
	8	20090013157		2009-01-08	Beaule, Stephane	
	9	20090079699		2009-03-26	Sun, Jian	
	10	20110126141		2011-05-26	King, Bennett M. et al.	
	11	20100103820		2010-04-29	Fuller, Randy et al.	
	12	20070254675		2007-11-01	Zorlu Ozer, Sebnem et al.	
	13	20080005285		2008-01-03	Robinson, James David et al.	
	14	20090113514		2009-04-30	Hu, Q. James	
If you wish to add additional U.S. Published Application citation information please click the Add button.						
FOREIGN PATENT DOCUMENTS						

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Chankong, Dohm
	Attorney Docket Number	RALEP018

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Chankong, Dohm
	Attorney Docket Number	RALEP018

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

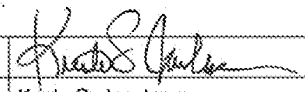
☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2012-08-14
Name/Print	Krista S. Jacobsen	Registration Number	59,374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	13497171
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy implementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	69849
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	26WV-160496 [RALEP018]
Receipt Date:	14-AUG-2012
Filing Date:	02-MAR-2009
Time Stamp:	18:46:21
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	Transmittal Letter	Trans.pdf	363636 d613ea7e15072bb758f28785d67d5b1b909093e9	no	1

Warnings:	
Information:	

2	Transmittal Letter	Ltr.pdf	301968 710e73e858c723a833d72afa7ff96531345007df	no	2
Warnings:					
Information:					
3	Transmittal Letter	IDS.pdf	1254593 193e9da7b2634e98a33c02233a980a008ca9afaf	no	7
Warnings:					
Information:					
			Total Files Size (in bytes):	1920197	

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.
12/380,773	03/02/2009	Gregory G. Raleigh	26WV-160496 [RALEP018]	5719

69849 7590 08/14/2012

SHEPPARD, MULLIN, RICHTER & HAMPTON LLP
379 Lytton Avenue
Palo Alto, CA 94301

EXAMINER	
CHANKONG, DOHM	
ART UNIT	**PAPER NUMBER**
2452	
MAIL DATE	**DELIVERY MODE**
08/14/2012	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.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND
DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

August 13, 2012

SHEPPARD, MULLIN, RICHTER & HAMPTON LLP
379 LYTTON AVENUE
PALO ALTO, CA 94301-1432
US

Dear Sir/Madam,

Your refund request for 12380773 in the amount of $1,100.00 has been issued.

Upon review of the refund request, we have determined that a refund is due. However, the amount requested exceeds the amount of the eligible refund. Therefore, a partial refund was issued.

Sincerely,
Tonya Tubbs
Technical Center 2400
571-272-1633

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
12/380,773	03/02/2009	Gregory G. Raleigh	RALEP018

CONFIRMATION NO. 5719

107265
Headwater Partners I LLC - Outside Firm 1
350 Marine Parkway, Suite 300
Redwood Shores, CA 94065

POA ACCEPTANCE LETTER

OC000000056046615

Date Mailed: 08/23/2012

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/08/2012.

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.

/hchristian/

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
12/380,773	03/02/2009	Gregory G. Raleigh	26WV-160496 [RALEP018]

CONFIRMATION NO. 5719

69849
SHEPPARD, MULLIN, RICHTER & HAMPTON LLP
379 Lytton Avenue
Palo Alto, CA 94301

POWER OF ATTORNEY NOTICE

OC000000056046557

Date Mailed: 08/23/2012

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/08/2012.

- 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).

/hchristian/

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Raleigh, Gregory G.
Art Unit	2452
Examiner Name	Nguyen, Thu V.
Attorney Docket Number	RALEP018

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7953808		2011-05-31	Sharp, Christopher Brooke et al.	
	2	8135392		2012-03-13	Marcellino, Chris et al.	
	3	6502131		2002-12-31	Vaid, Aseem et al.	
	4	6505114		2003-01-07	Luciani, Sergio	
	5	6763000		2004-07-13	Walsh, Peter J.	
	6	6967958		2005-11-22	Ono, Yoshiyuki et al.	
	7	7644267		2010-01-05	Ylikoski, Martti et al.	
	8	7710932		2010-05-04	Muthuswamy, Sivakumar et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

	9	7881199		2011-02-01	Krstulich, Zlatko	
	10	7886047		2011-02-08	Potluri, Dora	
	11	7911975		2011-03-22	Droz, Patrick et al.	
	12	8050275		2011-11-01	Iyer, Jayaraman R.	
	13	8194553		2012-06-05	Liang, Zhi Yong et al.	
	14	8239520		2012-08-07	Grah, Adrian et al.	
	15	7890084		2011-02-15	Dudziak, Thaddeus Jude et al.	
	16	7890111		2011-02-15	Bugenhagen, Michael K.|	
	17	6226277		2001-05-01	Chuah, Mooi Choo	
	18	6839340		2005-01-04	Voit, Eric A. et al.	
	19	6922562		2005-07-26	Ward, Stephen L. et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

	20	7620041		2009-11-17	Dunn, Jeffrey H. et al.	
	21	7627314		2009-12-01	Carlson, Steven I. et al.	
	22	7792538		2010-09-07	Kozisek, Steven E.	
	23	7801523		2010-09-21	Kenderov, Stoyan	
	24	7877090		2011-01-25	Maes, Stephane H.	
	25	7912025		2011-03-22	Pattenden, Christopher E. S. et al.	
	26	7948968		2011-05-24	Voit, Eric A. et al.	
	27	7970426		2011-06-28	Poe, Brian R. et al.	
	28	8185158		2012-05-22	Tamura, Motoshi et al.	
	29	8254915		2012-08-28	Kozisek, Steven E.	
	30	7418257		2008-08-26	Kim, Myong-Ju	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

	31	8126123		2012-02-28	Cai, Yigang et al.	
	32	7903553		2011-03-08	Liu, Enhui	
	33	8155620		2012-04-10	Wang, Jun et al.	
	34	8238287		2012-08-07	Gopi, Paramesh et al.	
	35	7113997		2006-09-26	Jayapalan, Jay et al.	
	36	5594777		1997-01-14	Makkonen, Matti et al.	
	37	8244241		2012-08-14	Montemurro, Michael	
	38	7756534		2010-07-13	Anupam, Vinod et al.	
	39	7636574		2009-12-22	Poosala, Viswanath	
	40	6678516		2004-01-13	Nordman, Ian et al.	
	41	6477670		2002-11-05	Ahmadvand, Nima	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

	42	6038452		2000-03-14	Strawczynski, Leo et al.	
	43	8108520		2012-01-31	Ruutu, Jussi et al.	
	44	7778643		2010-08-17	Laroia, Rajiv et al.	
	45	7668176		2010-02-23	Chuah, Mooi Choo	
	46	7515608		2009-04-07	Yuan, Yuan et al.	
	47	7251218		2007-07-31	Jorgensen, Jacob W.	
	48	7002920		2006-02-21	Ayyagari, Deepak et al.	
	49	7685131		2010-03-23	Batra, Vishal Singh et al.	
	50	7283561		2007-10-16	Picher-Dempsey, Heidi	
	51	7212491		2007-05-01	Koga, Takahiro	
	52	6683853		2004-01-27	KANNAS, Chris et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20080081606		2008-04-03	Cole, Terry L.	
	2	20090248883		2009-10-01	Suryanarayana, Lalitha et al.	
	3	20100144310		2010-06-10	BEDINGFIELD, James Carlton	
	4	20080132201		2008-06-05	KARLBERG, Johan	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

If you wish to add additional non-patent literature document citation information please click the Add button			
EXAMINER SIGNATURE			
Examiner Signature		Date Considered	
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

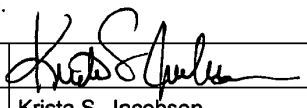
☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2012-10-12
Name/Print	Krista S. Jacobsen	Registration Number	59374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Electronic Acknowledgement Receipt	
EFS ID:	13978883
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy implementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	107265
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	RALEP018 [26WV-160496]
Receipt Date:	12-OCT-2012
Filing Date:	02-MAR-2009
Time Stamp:	21:50:16
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	Transmittal Letter	P018Trans.pdf	319699 c6c9c84047dc041398016db9bcb8d36c951fdbb4	no	1
Warnings:					
Information:					

2	Information Disclosure Statement (IDS) Form (SB08)	P018IDS.pdf	1584745 d27529c77f11f360527f35fcb891d91f865d31ea	no	8
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
			Total Files Size (in bytes):	1904444	

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.

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	12/380,773
Filing Date	March 2, 2009
First Named Inventor	Gregory G. Raleigh
Art Unit	2452 Conf. 5719
Examiner Name	Nguyen, Thu V.
Attorney Docket Number	RALEP018

Total Number of Pages in This Submission: 8

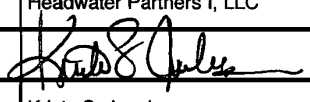
ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☑ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please Identify below):

Remarks

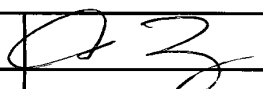
You are hereby authorized to charge any additional fee required or credit any overpayment to Deposit Account No. 50-5876.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Headwater Partners I, LLC		
Signature			
Printed name	Krista S. Jacobsen		
Date	October 12, 2012	Reg. No.	59374

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name	Ann Taylor	Date	October 12, 2012

This collection of information is required by 37 CFR 1.5. 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 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Raleigh, Gregory G.
Art Unit	2452
Examiner Name	Nguyen, Thu V.
Attorney Docket Number	RALEP018

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7609700		2009-10-27	Ying, Wen-Ping et al.	
	2	8255515		2012-08-28	Melman, David et al.	
	3	7945240		2011-05-17	Klock, Jacqueline et al.	
	4	7912056		2011-03-22	Brassem, Wayne	
	5	7920529		2011-04-05	Mahler, Roger et al.	
	6	8184530		2012-05-22	Swan, Tim L. et al.	
	7	8213363		2012-07-03	Ying, Wen-Ping et al.	
	8	8214536		2012-07-03	Zhao, Wen	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

	9	8255689		2012-08-28	Kim, Eun Ah et al.	
	10	7746854		2010-06-29	Ambe, Shekhar et al.	
	11	7068600		2006-06-27	Cain, Joseph Bibb	
	12	6876653		2005-04-05	Ambe, Shekhar et al.	
	13	6631122		2003-10-07	Arunachalam, Vaidhyanathan et al.	
	14	7599288		2009-10-06	Cole, Raymond E. et al.	
	15	7546629		2009-06-09	Albert, Anthony et al.	
	16	7747730		2010-06-29	Harlow, James D.	
	17	7609650		2009-10-27	Roskowski, Steve et al.	
	18	6581092		2003-06-17	Motoyama, Tetsuro et al.	
	19	7283963		2007-10-16	Fitzpatrick, John E. et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

	20	8271049		2012-09-18	Silver, Andrew et al.	
	21	7644151		2010-01-05	Jerrim, John et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20080085707		2008-04-10	Fadell, Tony	
	2	20090046723		2009-02-19	Rahman, Reshad A. et al.	
	3	20080219268		2008-09-11	Dennison, Larry R.	
	4	20080005285		2008-01-03	Robinson, James David et al.	
	5	20090315735		2009-12-24	Bhavani, Neeraj S. et al.	
	6	20090219170		2009-09-03	Clark, Ryan C. et al.	
	7	20090067372		2009-03-12	Shah, Keyur C. et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

	8	20080262798		2008-10-23	KIM, Eun Ah et al.	
	9	20100103820		2010-04-29	FULLER, Randy et al.	
	10	20100153781		2010-06-17	HANNA, Stephen R.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2012-12-04
Name/Print	Krista S. Jacobsen	Registration Number	59374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Electronic Acknowledgement Receipt	
EFS ID:	14384283
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy implementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	107265
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	RALEP018 [26WV-160496]
Receipt Date:	04-DEC-2012
Filing Date:	02-MAR-2009
Time Stamp:	20:52:52
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	Information Disclosure Statement (IDS) Form (SB08)	P018IDS.pdf	1132672 a5193658e7fb9c15bbd51323c43f91862fff3f94	no	6

Warnings:
Information:

This is not an USPTO supplied IDS fillable form	
Total Files Size (in bytes):	1132672

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.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Raleigh, Gregory G.
Art Unit	2452
Examiner Name	Nguyen, Thu V.
Attorney Docket Number	RALEP018

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	8291238		2012-10-16	Ginter, Karl L. et al.	
	2	8068824		2011-11-29	Shan, Xueshan et al.	
	3	7228354		2007-06-05	Chambliss, David Darden et al.	
	4	5283904		1994-02-01	Carson, David G. et al.	
	5	8208919		2012-06-26	Kotecha, Lalit Ratilal	
	6	8185152		2012-05-22	Goldner, Alla	
	7	7844728		2010-11-30	Anderson, Thomas W. et al.	
	8	7873344		2011-01-18	Bowser, Robert et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

	9	7856226		2010-12-21	Wong, Ellis L. et al.	
	10	7948952		2011-05-24	Hurtta, Tuija et al.	
	11	7957020		2011-06-07	Mine, Ryuta et al.	
	12	7346410		2008-03-18	Uchiyama, Kenji	
	13	7167078		2007-01-23	Pourchot, Shawn C.	
	14	8102814		2012-01-24	Rahman, Shahriar I. et al.	
	15	7970350		2011-06-28	Sheynman, Arnold et al.	
	16	8094551		2012-01-10	Huber, Kurt Donald et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20090307746		2009-12-10	DI, Jinwen et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

	2	20050009499		2005-01-13	Koster, Karl	
	3	20100041364		2010-02-18	Lott, Robert Wayne et al.	
	4	20100027469		2010-02-04	Gurajala, Ravindra Babu et al.	
	5	20010053694		2001-12-20	Igarashi, Yoichiro et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]¡	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

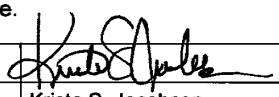
☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2013-01-22
Name/Print	Krista S. Jacobsen	Registration Number	59374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Electronic Acknowledgement Receipt

EFS ID:	14764035
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy implementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	107265
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	RALEP018 [26WV-160496]
Receipt Date:	22-JAN-2013
Filing Date:	02-MAR-2009
Time Stamp:	21:12:19
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	Information Disclosure Statement (IDS) Form (SB08)	P018IDS.pdf	966334 a723251409b597bb47a5826d1110cfeeb7176cd7	no	5

Warnings:	
Information:	

This is not an USPTO supplied IDS fillable form	
Total Files Size (in bytes):	966334

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.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Raleigh, Gregory G.
Art Unit	2452
Examiner Name	Nguyen, Thu V.
Attorney Docket Number	RALEP018

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	8135388		2012-03-13	Gailloux, Michael A. et al.	
	2	6947723		2005-09-20	Gurnani, Roger et al.	
	3	8350700		2013-01-08	Fast, Raymond D. et al.	
	4	8204190		2012-06-19	Bang, Jung-Hee et al.	
	5	7962622		2011-06-14	Friend, John et al.	
	6	7583964		2009-09-01	Wong, Gregory A.	
	7	7565141		2009-07-21	Macaluso, Anthony G.	
	8	7373179		2008-05-13	Stine, Ted et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

	9	7236780		2007-06-26	Benco, David S. et al.	
	10	7039403		2006-05-02	Wong, Gregory A.	
	11	7865182		2011-01-04	Macaluso, Anthony G.	
	12	8370477		2013-02-05	Short, Joel E. et al.	
	13	8364806		2013-01-29	Short, Joel E. et al.	
	14	8279067		2012-10-02	Berger, Thomas R. et al.	
	15	8213296		2012-07-03	Shannon, Frank M. et al.	
	16	8019868		2011-09-13	Rao, Goutham et al.	
	17	8005988		2011-08-23	Maes, Stephane H.	
	18	7978627		2011-07-12	Taylor, William Scott et al.	
	19	7711848		2010-05-04	Maes, Stephane H.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

	20	6782412		2004-08-24	Brophy, Kevin et al.	
	21	6081591		2000-06-27	Skoog, Frederick H.	
	22	6064878		2000-05-16	Denker, John Stewart et al.	
	23	7730123		2010-06-01	Erickson, Richard R. et al.	
	24	8024397		2011-09-20	Erickson, Richard R. et al.	
	25	8156206		2012-04-10	Kiley, Kevin J. et al.	
	26	8126722		2012-02-28	Robb, Terence Alan et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20090299857		2009-12-03	Brubaker, Curtis M.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2013-03-21
Name/Print	Krista S. Jacobsen	Registration Number	59374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Electronic Acknowledgement Receipt	
EFS ID:	15331840
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy implementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	107265
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	RALEP018 [26WV-160496]
Receipt Date:	22-MAR-2013
Filing Date:	02-MAR-2009
Time Stamp:	14:12:08
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	Information Disclosure Statement (IDS) Form (SB08)	P018IDS.pdf	1018043 a6e967078be7be3a355c5a6c3ce5810244cd924a	no	5

Warnings:
Information:

This is not an USPTO supplied IDS fillable form	
Total Files Size (in bytes):	1018043

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.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6754470		2004-06-22	Hendrickson, Keith et al.	
	2	8122128		2012-02-21	Burke, II, Robert M. et al.	
	3	8149823		2012-04-03	Turcan, Diane Brown et al.	
	4	8131256		2012-03-06	Martti, Jyrki et al.	
	5	6381316		2002-04-30	Joyce, Simon James et al.	
	6	7965983		2011-06-21	Swan, Tim et al.	
	7	8284740		2012-10-09	O'Connor, Dennis M.	
	8	8116223		2012-02-14	Tian, Dan et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

	9	6154738		2000-11-28	Call, Charles Gainor	
	10	8423016		2013-04-16	Buckley, Adrian et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20110173678		2011-07-14	Kaippallimalil, John et al.	
	2	20080235511		2008-09-25	O'Brien, William G. et al.	
	3	20080240373		2008-10-02	Wilhelm, Robert D.	
	4	20100027559		2010-02-04	LIN, Hung-Ming et al.	
	5	20020116338		2002-08-22	Gonthier, Jean-Charles et al.	
	6	20070061878		2007-03-15	Hagiu, Costin et al.	
	7	20100020822		2010-01-28	Zerillo, Anthony J. et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

	8	20040203755		2004-10-14	Brunet, Jeffrey et al.	
	9	20090172077		2009-07-02	Roxburgh, David et al.	
	10	20080051076		2008-02-28	O'Shaughnessy, John et al.	
	11	20080313730		2008-12-18	Iftimie, Sorin et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2006120558A1	WO		2006-11-16	Nokia Corp.		☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	2010-09-01 Non-Final Rejection in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices," Examiner Obaidul Huq	☐
	2	2011-02-28 Amendment After Non-Final Rejection in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices"	☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

	3	2011-05-09 Notice to the applicant regarding a non-compliant or non-responsive amendment in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices," Examiner Obaidul Huq	☐
	4	2011-07-05 Amendment After Non-Final Rejection in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices"	☐
	5	2011-09-06 Supplemental Response or Supplemental Amendment in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices"	☐
	6	2011-09-14 Final Rejection in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices," Examiner Obaidul Huq	☐
	7	2012-03-13 Amendment Submitted with Filing of CPA-RCE in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices"	☐
	8	2012-07-19 Supplemental Amendment in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices"	☐
	9	2013-03-26 Non-Final Rejection in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices," Examiner Obaidul Huq	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

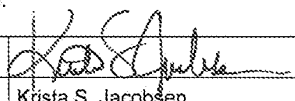
☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2013-05-21
Name/Print	Krista S. Jacobsen	Registration Number	59374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
16 November 2006 (16.11.2006)

PCT

(10) International Publication Number
WO 2006/120558 A1

(51) International Patent Classification:
G06Q 20/00 (2006.01) *H04M 15/00* (2006.01)

(21) International Application Number:
PCT/IB2006/001254

(22) International Filing Date: 4 May 2006 (04.05.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0509440.4 9 May 2005 (09.05.2005) GB
11/300,297 15 December 2005 (15.12.2005) US

(71) Applicant *(for all designated States except US)*: **NOKIA CORPORATION** [FI/FI]; Keilalahdentie 4, FIN-02150 Espoo (FI).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: **MARTTI, Jyrki** [FI/FI]; Pohjantie 8-10 A 22, FIN-02100 Espoo (FI).

(74) Agents: **RUUSKANEN, Juha-Pekka** et al.; Page White & Farrer, Bedford House, John Street, London WC1N 2BF (GB).

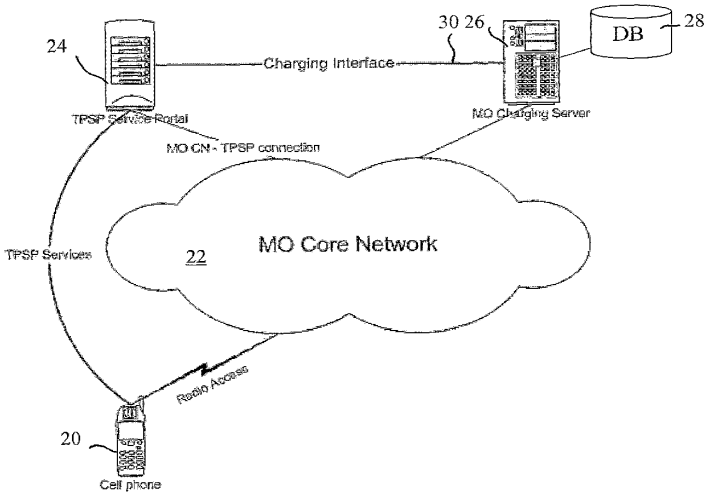
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (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: SERVICES IN A COMMUNICATION SYSTEM



(57) Abstract: A user device (20) is provided with information relating to a service wherein content is communicated to the user device via an access system provided by a communications network (22). In the method information regarding access charges from a charging entity (26) associated with the access system is provided to a service provider entity (24), where after an indication of total cost of the service covering content charges and the access charges is sent from the service provider entity to the user device. Alternatively, indication of the total costs can be sent directly to the user device from the charging entity.

WO 2006/120558 A1

SERVICES IN A COMMUNICATION SYSTEM

Field of the Invention

The present invention relates to services offered to end-users of a communication system, and more particularly, to services wherein content is delivered to user devices of the end-users.

Background of the Invention

A communication system is a facility which enables communication between two or more entities such as user terminal equipment (mobile or fixed) or other communication devices and/or network entities and other nodes associated with a communication system. The communication may comprise, for example, communication of voice, electronic mail (email), text messages, data, multimedia and so on. A communications system may also be used for providing users with services, typically for communication between users and service providers and for delivery of content data to the user devices. The content data delivery typically includes downloading of data from a remote node, such as a service provide server, via an access system of the communications system.

A communication system typically operates in accordance with a given standard or with a given set of specifications which set out what the various elements of a system are permitted to do and how that should be achieved. For example, the standard or specification may define if the user, or more precisely user equipment, is provided with access via a circuit switched bearer or a packet switched bearer, or both. Communication protocols and/or parameters which should be used for the access to the communication system are also typically defined. For example, the manner in which communication should be implemented between the user equipment and the

elements of the communication networks is typically based on a predefined communication protocol. In other words, a specific set of "rules" on which the communication can be based needs to be defined to enable the user equipment to communicate via the communication system.

Access for a user device to the communication system may be provided by a fixed line and/or wireless communication interface. An example of communication systems providing wireless access are public land mobile networks (PLMN). In a more detailed example the end-user may access the service via a GPRS (General Packet Radio Service) or another cellular wireless access system operated by a telephone operator. Other examples pf possible wireless access systems include various wireless local area networks (WLANs) and satellite based systems. Examples of communication systems providing fixed line access include public switched telephone networks (PSTN), cable networks, digital subscriber line (DSL) networks, and so on.

Content services can be provided by third party service providers (TPSP). The end-users can be subscribers of an operator, for example a fixed line operator or a mobile operator (MO), and commonly use an access network of a telecommunications system operator to contact the third party service provider's service portal. When a third party service provider (TPSP) provides a service to an end-user, it may need to indicate the price of the service to the end-user. The total cost of the service may need to be presented, for example, for customer service reasons. In some countries the cost may need to be indicated for legal reasons.

The third party service provider typically knows the price of the content which it delivers. However, if for example a downloadable game or other considerable data volume is delivered, the end-user may also need to pay for the access costs. The problem is that the third party service provider does not necessarily know what will the access charges be. For example, the third party service provider may not be aware of the access charges for a particular content download.

Arrangements wherein a charging interface is provided between a third party service provider (TPSP) and a mobile operator (MO) have been proposed. In a scenario a TPSP may use a charging interface to request charging information from the mobile operator whose subscriber the end-user is. However, the charging interface has not been designed for provision of information to the end-user relating to the total cost of a particular content download and it's delivery, for example via a GPRS access system. Instead, the cost that has typically been indicated to the end-user is the price of the content itself with a vague reference to additional access charges that may apply. This may not enable the end-user to get any realistic indication of the likely total costs, unless he or she is able to convert the volume of the content to be downloaded to the access charge costs applicable at that specific time. This may not satisfy legislative requirement of some countries where it might be required that the end-user must be given a substantially accurate indication of the total cost of the service.

Summary of the Invention

In accordance with an embodiment there is provided a method for providing a user device with information relating to a service wherein content associated with a service provided by a service provider is communicated to the user device via an access system provided by a communications network. In the method information regarding access charges of the access system is generated. Said information regarding access charges of the access system is then communicated together with content charges of the service provider to the user device.

Another embodiment provides a charging server comprising means for generating information regarding access charges of an access system of a communication network when content that is associated with a service provided by a service provider is communicated to a user device via the access system, and an interface for sending said information regarding

access charges of the access system for communication together with content charges of the service provider to the user device.

Another embodiment provides a service provider entity, comprising an interface for receiving information from a charging entity associated with an access system of a communication network relating to costs of the access system for communication of content that is associated with a service provided by the service provider entity to a user device via the access system, and means for sending information regarding access charges of the access system for communication together with content charges of the service provider to the user device.

The embodiments of the invention may provide an advantage in that making it easier for the end-users to make decisions on whether to buy a service or not. The embodiments may enable providing the user with an indication of the total service costs. Such an indication may make the available services more attractive for end-users. Charging services offered by the operators may also become more attractive for third party service providers.

Brief Description of the Drawings

For a better understanding of the present invention and how the same may be carried into effect, reference will now be made by way of example only to the accompanying drawings in which:

Figure 1 shows a schematic view of a communications system wherein the invention may be embodied;

Figure 2 shows a flowchart for operation in accordance with an embodiment of the present invention;

Figure 3 is a sequence diagram in accordance with an embodiment the invention.

Figure 4 shows signalling flows in accordance with an embodiment;

Figure 5 shows a flowchart for operation in accordance with an embodiment;

Figure 6 shows a flowchart for operation in accordance with a further embodiment.

Detailed Description of Embodiments of the Present Invention

To assist in understanding the invention, an explanation of a possible underlying communication system is given first with reference to elements of a cellular mobile communication network as defined by the third generation partnership project (3GPP). It is noted that although certain embodiments will now be described by way of example, with reference to the exemplifying architectures of a communication system comprising 3GPP mobile access networks and/or wireless local area networks, embodiments may be applied to any other suitable forms of communication systems than those illustrated and described herein.

A user device of an end-user may communicate data in association with various services based on an appropriate data communication protocol. In Figure 1 the services available for mobile user devices 20 (only one shown for clarity) are provided by a service provider portal 24. The portal may be provided by a server or any other appropriate data processing device capable of communicating with user devices. The services may be provided, for example, by means of the Internet Protocol (IP), and thus the portal 24 can be understood as, for example, denoting an Internet Protocol (IP) based device.

A mobile communication system 22 is typically arranged to serve a plurality of mobile user devices which have accessed wirelessly the access system. A core network part of the communication system is typically connected to a number of access networks, typically to base station systems. The base stations are arranged to transmit signals to and receive signals from a mobile user equipment, via respective wireless interfaces. Correspondingly, each mobile device is able to transmit signals to and receive signals from the base stations via the wireless interface. In a typical operation a mobile

communication network provides packet switched data transmission in the packet switched domain between a support node and mobile user equipment via the access system.

A non-limiting example of a possible mobile network is the 3rd generation cellular network wherein a mobile user device may connect to an access network by setting up a PDP (Packet Data Protocol) context through a GPRS (General Packet Radio Service) network. The GPRS service allows transmission of packet data between mobile communication devices and external data networks. In this case the mobile network 22 would be connected to external data networks, for example the Internet, via a gateway GPRS support node (GGSN). Each PDP context provides a communication pathway between a particular user and a gateway node of the network. Once the PDP context is established, it can typically carry multiple flows. Each flow normally represents, for example, a particular service and/or media component of a particular service. The PDP context therefore often represents a logical communication pathway for one or more flows across the network. To implement the PDP context between user equipment and a node, radio access bearers need to be established which commonly allow for data transfer for the user equipment. Another option to wirelessly access services is to set up an IPsec tunnel through a WLAN network that is then connected to a core communication network.

A mobile communication device within an access network may communicate with a radio network controller via radio network channels which are typically referred to as radio bearers. Each mobile device such as a mobile user equipment may have one or more radio channels open at any one time with the radio network controller. Any appropriate mobile device adapted for Internet protocol (IP) communication maybe used to connect to the network. For example, a user may access the cellular network by means of communication devices such as a personal computer, personal data assistant (PDA), mobile station (MS), portable computer, combinations thereof or the like.

The mobile communication device can be used for various tasks such as making and receiving phone calls, for receiving and sending data from and to a network and for experiencing, for example, multimedia or other content. The communication device is typically provided with a processor and memory for accomplishing these tasks. The operation of the user equipment may be controlled by means of a suitable user interface such as key pad, voice commands, touch sensitive screen or pad, combinations thereof or the like.

The following describes an exemplifying embodiment for charging of services provided by third party service providers utilizing bearer services offered by a mobile operator. The example is described with reference to Figure 1 wherein an end-user using a mobile terminal (MT) 20 is a subscriber to a mobile operator (MO) operating network 22. The end-user may request for services provided by a third party service provider (TPSP) portal 24.

Use of the services can be charged by the third party service provider by sending of charging requests to a charging server 26 hosting the end-user charging account. The mobile operator (MO) may be responsible for the operation of the communications network 22 and the charging server 26. The charging server 26 may be based on an existing charging server of an operator. In such case the server and/or system functionality thereof may need to be updated to support the new functionalities required by the embodiment.

An online charging web service interface 30 is provided between the third party service provider portal 24 and charging server 26. The charging interface may be provided by an external data network, for an Internet Protocol based network and/or via the communications network 22. The online charging interface 30 supports communication of indications associated with the costs of services. The third party service provider portal 24 may use the charging interface 30 to charge via operator based billing the end-users for the services the end-users are using. The online charging interface 30 can be used to indicate the charges that are applicable to a service provided to user devices in an access system associted with the charging server. This is

an important improvement on the prior art charging interfaces which have not been used for consideration how access charges, in addition to the content price, that relate to delivery of the content can be reported to the TPSP in order to provided the end-user with an indication of the total cost of the content download.

A database 28 is also provided for storing information needed to resolve the access changes for a specific service. The database may be hosted by the mobile operator, or any other appropriate party. The database 28 may be integrated with the server 26, or the server may be provided with an access thereto.

Figure 2 shows a flowchart for operation in accordance with an embodiment. In the embodiment a user of a user device is provided with information relating to the cost of using a service before he/she makes a definitive decision whether to order the service. In Figure 2 embodiment the service provider first sends a request for information about access charges to a charging entity associated with an access network of a communication system at step 100. This is not always necessary, and information about the access charges may also be provided to the service provider entity without a specific request, for example periodically. Information regarding access charges is communicated in step 102 from the charging entity to the service provider entity. Communication between the entities may occur via the interface 30 of Figure 1.

When generating the information, the charging entity may fetch relevant information from a database. The service provider entity may then generate an appropriate indication of total cost of the service covering content charges and the access charges, and send the indication to the user device at step 104. This communication may occur via the communication network 22.

The cost may then be displayed to the user, step 106. This preferably occurs before the service is taken into use at the user device, i.e. before the user has decided if he/she wants to use the service. The cost can be presented for the

end-user only for information, and the service provision is continued automatically, step 108. Alternatively, the end user may be asked to accept the cost, see step 110. In the latter case, if the cost are acceptable at step 112, the user may order the service by sending his acceptance, step 116. If the costs are not acceptable, the user does not respond at all, or sends a denial, and may not be charged, step 114.

There are various ways to support the providing of indications regarding the access charges from the content that is to be downloaded, if the service is ordered. According to a possibility the service provider 24 may request information regarding the access charges via the on-line charging interface 30. The charging web service provided by server 26 supports the relevant service interface and charging server functionality. The service interface is on the operator side of the connection, i.e. the charging interface is controlled by the operator. The TPSP can be seen as the client of the charging service. The charging interface can be used for all exchange of charging information between the service provider and the charging entity of the operator.

The signalling flow of Figure 3 shows operation in accordance with this embodiment in more detail. In the flow chart the solid lines present functionalities that are required by this embodiment and dashed lines describe functionalities that may be needed to support the particular communication environment, but are not necessary. Dotted lines are for information purposes only.

The end-user requests for a service, for example a game or other content, from a service provider by message 1. Optional messages 2 and 3 may be signalled for discovery of a charging web service interface (WSI) service, for example by using a functionality provided by the Project Liberty Alliance. A request 4 containing information about the service and the end-user is then sent from the service provider to the operator. Request 4 may contain information regarding the end-user, the requested service, volume of the content, the access bearer and so on. This message may also include various other parameters, such as information regarding rates, credit reservations,

credit deductions, credit checks, charging method and so on. The charging system can be made aware of what access bearer the terminal is using based on a service identifier or a correlation-identifier in the request that is received by the charging system. This can be, for example, a user identity or a dynamically defined service identity that is defined when the access is initiated.

The operator owned charging entity may then resolve at step 5 the costs of the access charges based on the received information and information stored in a database. At step 6 the charging entity may debit funds both for content and access charges from an end-user account, make a respective reservation or reservation on a user account. or take any other required action required for the actual charging.

A response message 7 may contain information regarding granted charging units and a specific field or parameter for indicating either the total const or at least the access charges for the service. The online charging interface mechanism can include to the response message the access charges that the service provider server can then add to the price of the content. According to an alternative the response can contain the total charges of the service, for example if the service is also rated by the operator.

The total charges or the access charge only caused by the download are then indicated to the service provider by message 7. The service provider may then indicate the price to the end-user by message 8.

In accordance with a possibility, in case the operator is also rating charge of the content, the mobile operator can indicate the costs of the service directly to the end-user through appropriate channels.

The end-user may then confirm that he/she is willing to use the service by message 9. The service is delivered by signalling 10. After completion of the service delivery the success thereof may be indicated to the TPSP by signalling 11.

In case of the first request towards the operators charging infrastructure only made a reservation of charging units, the reserved units can be committed in response to message 12.

According to another possibility the service provide is provided with a database that contains access charge rates for all its customers. This may be a more complicated to provide, because the service providers do not commonly define themselves what the access charges are. Thus even in this alternative the service provider needs to request information from the operator of the end-user. The end-user may also have different tariffs for the access charges depending the time of the day, so the service provider may need frequently update the information.

Further exemplifying embodiments will now be described with reference to Figures 4 to 6. In these embodiments a user device 20 is involved, at least to a degree, in generation of the total charge information. The involvement of the user device 20 may be provided in various ways. For example, the user device may be made aware of the access charges incurred for data traffic. This information may come from the access network 22. The access charge information available at the user device 20 may then be utilised either at the user device or at an appropriate entity at the network side when calculating the total charge.

A possible way to provide the communication interfaces of Figure 4 is to use an HTTP/XML (Hypertext Transport Protocol/ eXtensible Markup Language)-based Web Services interface towards the operator network and a similar interface towards the content provider. It is also possible to simply use HTTP-headers for the communication.

In the embodiment of Figure 5 the user device 20 is provided with information regarding the access charges at step 200 and information regarding the content charges at 202, where after the user device itself may calculate at 204 the total charge. This scenario enables operation wherein no action is required from the content provider, or another entity at the network side.

In accordance wit ha specific example, the user device may use appropriate data, for example metadata such as information contained in JAD-files of Java 2 Platform Micro Edition (JME2) to calculate the price of the transmission. JME2 is a Java application environment providing a framework for the deployment and use of Java technology. A JAD file is a Java Application Descriptor file that contains information about a Java Archive Repository (JAR) file. A JAD file contains the name, file size, and version of the actual JAR content file. This information may then be displayed or otherwise reported to the user at 206, preferably before the user accepts the download. The user device may be configured to wait until it receives an indication of acceptance of the total cost of the service, for example an activation of a predefined key or menu option. The request for the service may then be transmitted in response to said indication.

In an another embodiment shown in Figure 6 a user device is provided with access charge information at step 300. The user device may then report the access charge information at 302 to the content provider or another appropriate entity at the network. The information from the user device may then be used at the network side at 304 in calculating the total charge. The full, complete purchase price may then be reported at 306 to the user device based on at least partially information originating from the user device at step 302. The total cost may then be presented to the user at 308.

In a further embodiment the content provider may be able to dynamically adjust the price of the content based on the subscriber's traffic charges. For example, to be able to offer uniform pricing for all users, those with flat-rate data subscriptions may be charged relatively more compared to those with high data traffic costs. The perceived end-user price would stay the same. Communications to the operator may be enabled for example for the purposes of traffic compensation negotiations or other arrangements.

On the operator-side, an interface may be provided for queries from user devices regarding the prices for packet data traffic. The interface may be positioned at a charging server or similar charging element of the network. On the content provider side, the server 24 may be adapted to interpret pricing information provided in various formats. The information can be provided, for example, in the form of an XML-request or can be supplied in the content request HTTP-headers and so on.

The overall high-level message flow of Figure 4 may be as follows. The user device 20 may send at 15 a request to the operator querying the current data charging rate. The charging rate can be given, for example, per Megabyte. An appropriate network node 22, for example a charging server, then responds at 16 with the current data-charging rate. The user device may then request at 17 for a service or content from a content provider 24. The user device includes information regarding the current data charging rate in the request. The content provider may then calculate the total content price, and reply at 18 with the total charge for the content.

Steps 15 and 16 may be performed periodically, for example as once a day or a week. The results can be cached in the memory of the user device. The operator core network may also push the charging rate information to the user device periodically, and/or advice the user device to update the rate information when the rates change.

According to a further embodiment the content provider and the access network operator may interact and automatically agree on various features, for example on possible discounts to the packet data traffic rates. The content provider may, for example, sponsor the traffic charges for some user segments.

Embodiments may be made independent of the actual payment mechanism that is used to pay for the content. Some of the embodiments may allow a non-affiliated content provider to offer a service with a known total price without relationships with the network operator.

The required data processing functions may be provided by means of one or more data processors. Appropriately adapted computer program code product may be used for implementing the embodiments, when loaded to a computer, for example a processor of the communication device and/or any of the other nodes associated with the operation. The program code means may, for example, perform the generation of messages and/or information elements, interpretation and so forth. The program code product for providing the operation may be stored on and provided by means of a carrier medium such as a carrier disc, card or tape. A possibility is to download the program code product via a data network. The required data processing functionalities of the user device 20 may be embedded in, for example, a browser or an appropriate content discovery client 21 of the user device. A mechanism for providing an advice of the charges for the end user may be provided at the user device and/or at the content provider.

The herein described embodiments enable an end user to have a single price for a service inclusing access charges and content charges. This information can be provided for a user before he/she decides to use the service. The total costs or the rate of a service can be also presented during service provision session, for example after a rate of a video streaming service changes, or a certain predefined cost has been exceeded.

It is noted that whilst embodiments of the present invention have been described in relation to communication devices such as mobile stations, embodiments of the present invention are applicable to any other suitable type of devices suitable for communication via a communications network.

It is also noted that although the above example relates a request-response model, the services may be pushed to user devices. For example, a service provider server may detect based on a database or its settings that a communication device is present in an access network, and that it may wish to use a service. In this model a specific request by the end-user may not be necessary.

It is noted that even though the exemplifying embodiments shown and described in this disclosure use the terminology of the 3rd generation (3G) WCDMA (Wideband Code Division Multiple Access) networks, such as UMTS (Universal Mobile Telecommunications System), CDMA2000 systems and wireless local area networks, embodiments of the proposed solution can be used in any communication system wherein advantage may be obtained by means of the embodiments of the invention, fort example for providing an access system for an IPsec tunnel.

It is also noted herein that while the above describes exemplifying embodiments of the invention, there are several variations and modifications which may be made to the disclosed solution without departing from the scope of the present invention as defined in the appended claims.

Claims

1. A method for providing a user device with information relating to a service, wherein content associated with a service provided by a service provider is communicated to the user device via an access system provided by a communications network, said method comprising:

generating information regarding access charges of the access system; and

communicating said information regarding access charges of the access system together with content charges of the service provider to the user device.

2. A method as claimed in claim 1, wherein the step of communicating comprises sending an indication of total cost of the service including content charges and the access charges to the user device.

3. A method as claimed in claim 1, comprising the step of sending said information regarding access charges from a charging entity associated with the access system to a service provider entity, wherein the step of communicating comprises sending an indication of total cost of the service including content charges and the access charges from the service provider entity to the user device.

4. A method as claimed in claim 1, wherein the step of communicating comprises sending an indication of total cost of the service including content charges and the access charges from a charging entity associated with the access system to the user device.

5. A method as claimed in any preceding claim, wherein the step of communicating occurs before the service is taken into use at the user device.

6. A method as claimed in any of claims 1 to 4, wherein the step of communicating occurs during use of the service.

7. A method as claimed in any preceding claim, further comprising sending from the service provider entity to the charging entity information identifying the service and the user device.

8. A method as claimed in any preceding claim, further comprising sending from the service provider entity to the charging entity a message containing information regarding at least any one of the user device, the service, volume of content to be communicated, and a data bearer between the user device and the access network.

9. A method as claimed in any preceding claim, further comprising the steps of

sending a request for the service from the user device to a service provider entity;

discovering an appropriate charging entity in response to receiving the request for the service at the service provider entity; and

sending from the service provider entity to the discovered charging entity information identifying the service and the user device.

10. A method as claimed in any preceding claim, further comprising resolving access charges associated with use of resources of the access system at a charging entity based on information associated with the service and the user device as received from a service provider entity and information from a database.

11. A method as claimed in any preceding claim, wherein the step of sending information regarding access charges from the charging entity comprises sending further information regarding other charges.

12. A method as claimed in claim 11, wherein said step of sending further information comprises sending information regarding total charges for the service.

13. A method as claimed in any preceding claim, further comprising sending an acceptance of the total cost from the user device.

14. A method as claimed in any preceding claim, comprising sending information regarding the access charges from the user device.

15. A method as claimed in claim 14, comprising receiving information regarding access charges at the user device prior the step of sending the information regarding the access charges from the user device.

16. A method as claimed in claim 15, comprising pushing rate information from the communications network to the user device.

17. A method as claimed in claim 15, comprising sending periodically rate information from the communications network to the user device.

18. A method as claimed in claim 15, comprising sending rate information from the communications network to the user device after a rate change.

19. A method as claimed in claim 15, comprising sending a request for rate information from the user device to the communications network.

20. A method as claimed in claim 1, wherein the step of generating comprises generating said information regarding the access charges at the user device.

21. A method as claimed in claim 1, wherein the step of generating comprises generating said information regarding the access charges at the user device based on metadata.

22. A method as claimed in claim 1, comprising processing information received from the user device to obtain a total cost for of the service.

23. A method as claimed in claim 22, wherein the step of processing information comprises processing, at an entity connected to the communications network, information regarding the access charges received from the user device and information regarding content charges to obtain the total cost for of the service.

24. A method as claimed in claim 22, wherein the step of processing information comprises dynamically adjusting the content charges based on information received from the user device.

25. A method as claimed in any preceding claim, comprising including by the user device the information regarding access charges into a request for the service.

26. A method as claimed in any preceding claim, wherein the user device comprises a mobile device, and the access system comprises an access network of a mobile communication network.

27. A method as claimed in any preceding claim, comprising communication of data between the charging entity and the service provider via a separate data network.

28. A method as claimed in claim 27, wherein the separate data network comprises an Internet Protocol network.

29. A computer program comprising program code means configured to perform the steps of any of claims 1 to 27 when the program is run on a computer.

30. A charging server for a communications network, said charging comprising:

means for generating information regarding access charges of an access system of the communications network when content that is associated with a service provided by a service provider is communicated to a user device via the access system; and

an interface for sending said information regarding access charges of the access system for communication together with content charges of the service provider to the user device.

31. A charging server as claimed in claim 30, wherein the interface is configured for communication of said information regarding access charges of the access system to a service provider entity.

32. A charging server as claimed in claim 30 or 31, wherein the means for generating information is configured to process information identifying the service and the user device.

33. A charging server as claimed in any of claims 30 to 32, wherein the means for generating information are configured to resolve access charges associated with use of resources of the access system at a charging entity based on information associated with the service and the user device and information from a database.

34. A charging server as claimed in any of claims 30 to 33, wherein the means for generating information are configured to generate information regarding other charges.

35. A charging server as claimed in claim 34, wherein the means for generating information are configured to generate said information regarding total charges for the service.

36. A charging server as claimed in claim 35, wherein the interface is for communication of said information regarding the total charges for the service to the user device.

37. A charging server as claimed in any of claims 30 to 36, wherein the interface is configured for communication of data via a data network.

38. A charging server as claimed in claim 37, wherein the data network comprises an Internet Protocol network.

39. A charging server as claimed in claim 30, wherein the means for generating are configured to generate the information regarding the access chares based on information received from the user device.

40. A service provider entity, comprising:
an interface for receiving information regarding access charges of the access system for communication of content that is associated with a service provided by the service provider entity to a user device via an access system of a communications network; and
means for sending information regarding access charges of the access system for communication together with content charges of the service provider to the user device.

41. A service provider entity as claimed in claim 40 being configured to receive said information regarding access charges from a charging entity associated with the access system of the communications network.

42. A service provider entity as claimed in claim 41, configured to discover an appropriate charging entity in response to receiving a request for the service.

43. A service provider entity as claimed in claim 42, configured to provide the discovered charging entity with information identifying the service and the user device.

44. A service provider entity as claimed in claim 40 being configured to receive said information regarding access charges from the user device.

45. A communication system comprising at least one of a charging server in accordance with any of claims 30 to 39 and a service provider entity in accordance with any of claims 40 to 44,

46. A method for providing charging information relating to a service provided by a service provider, wherein content associated with the service is communicated to the user device via an access system provided by a communications network, said method comprising:

providing the user device with information regarding access charges of the access system;

providing the user device with information regarding content charges; and

processing said information regarding the access charges of the access system and said information regarding the content charges in the user device to provide a total charge.

47. A method as claimed in claim 46, further comprising receiving by the user device an indication of acceptance of the total cost of the service; and sending a request for the service in response to said indication.

48. A method as claimed in claim 46, comprising receiving information regarding access charges at the user device.

49. A method as claimed in claim 46, comprising pushing rate information from the communications network to the user device.

50. A method as claimed in claim 46, comprising sending periodically rate information from the communications network to the user device.

51. A method as claimed in claim 46, comprising sending rate information from the communications network to the user device after a rate change.

52. A method as claimed in claim 46, comprising sending a request for rate information from the user device to the communications network.

53. A method as claimed in claim 46, wherein the step of generating comprises generating said information regarding the access charges at the user device.

54. A method as claimed in claim 46, wherein the step of generating comprises generating said information regarding the access charges at the user device based on metadata.

55. A user device comprising:
a receiver for receiving content associated with a service via an access system of a communications network;
a controller configured to process information regarding access charges of the access system and information regarding content charges to provide a total charge; and
a user interface for presenting the total charge.

56. A user device as claimed in claim 55 being configured to receive an indication of acceptance of the total cost of the service, and to send a request for the service in response to said indication.

57. A user device as claimed in claim 55, wherein the controller is configured to process information regarding access charges received from the communications network.

58. A user device as claimed in claim 55, wherein the controller is configured to generate said information regarding the access charges.

59. A user device as claimed in claim 55, wherein the controller is configured to generate said information regarding the access charges based on metadata.

60. A user device as claimed in claim 55, comprising a memory for storing access charge information.

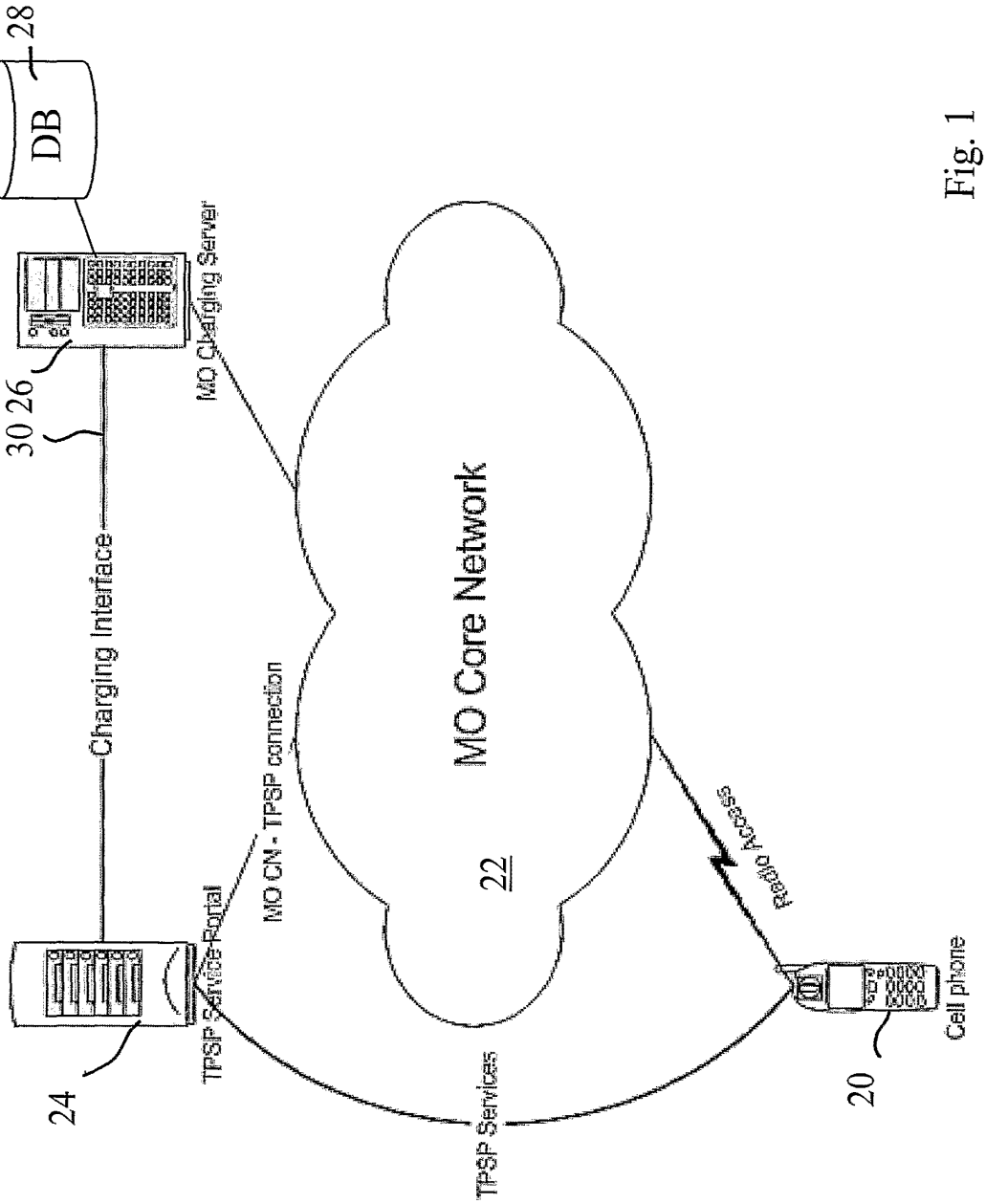

28
DB
MO Charging Server
30 26
Charging Interface
MO Core Network
22
MO CN - TPSP connection
Radio Access
TPSP Service Portal
24
TPSP Services
20
Cell phone

Fig. 1

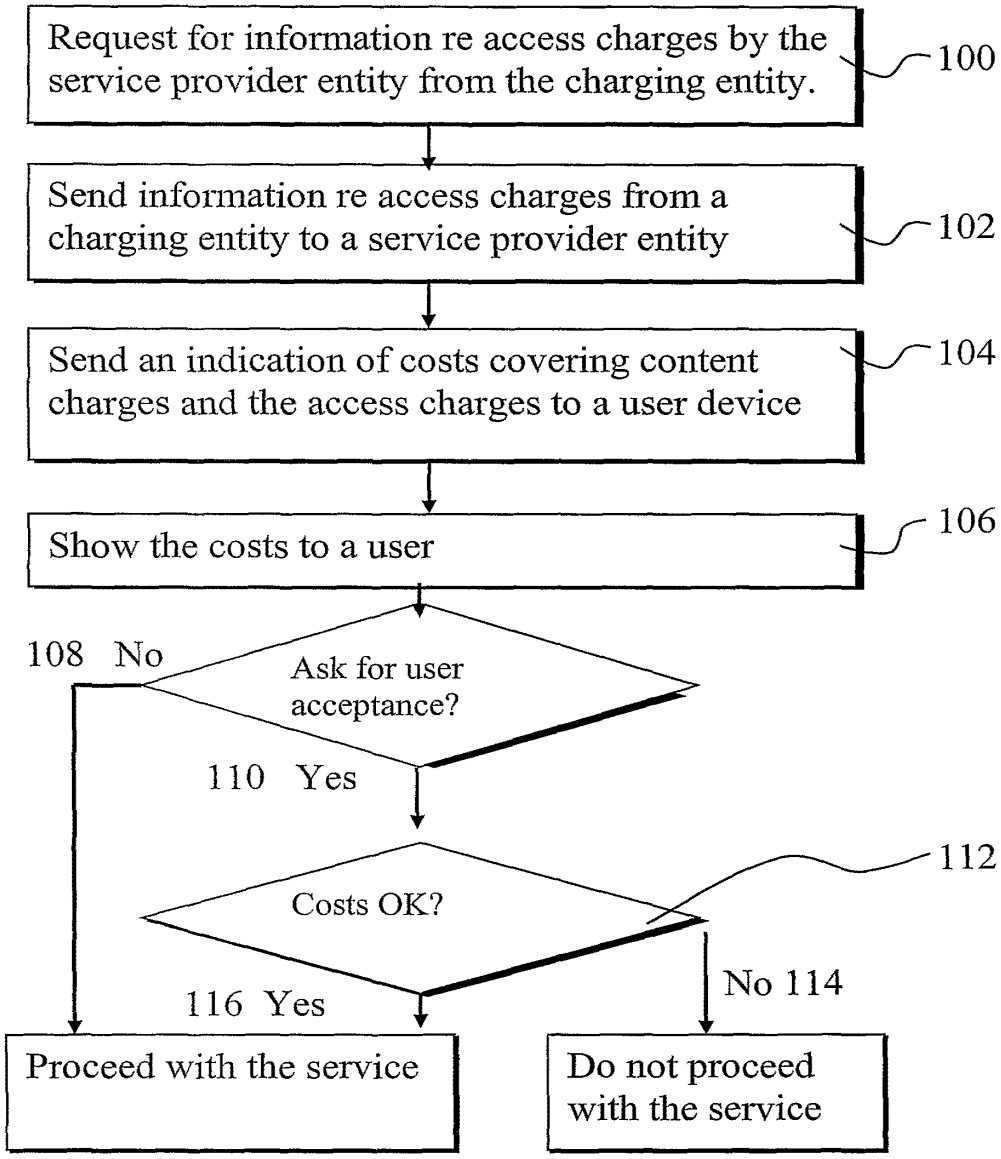

Request for information re access charges by the service provider entity from the charging entity.
100
Send information re access charges from a charging entity to a service provider entity
102
Send an indication of costs covering content charges and the access charges to a user device
104
Show the costs to a user
106
108 No
Ask for user acceptance?
110 Yes
Costs OK?
112
No 114
116 Yes
Proceed with the service
Do not proceed with the service

Fig. 2

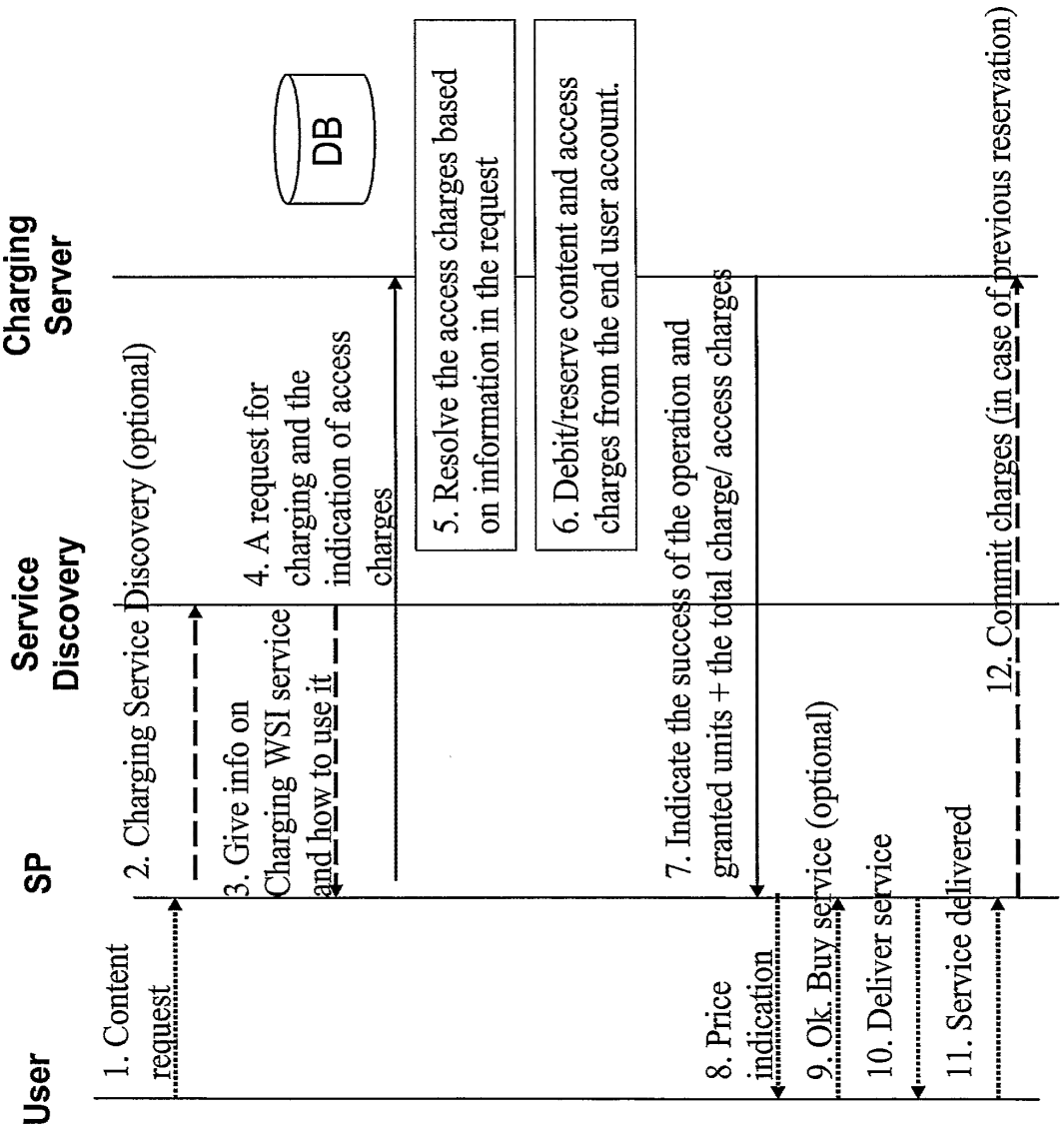

User
SP
Service Discovery
Charging Server
DB
1. Content request
2. Charging Service Discovery (optional)
3. Give info on Charging WSI service and how to use it
4. A request for charging and the indication of access charges
5. Resolve the access charges based on information in the request
6. Debit/reserve content and access charges from the end user account.
7. Indicate the success of the operation and granted units + the total charge/ access charges
8. Price indication
9. Ok. Buy service (optional)
10. Deliver service
11. Service delivered
12. Commit charges (in case of previous reservation)

Fig. 3

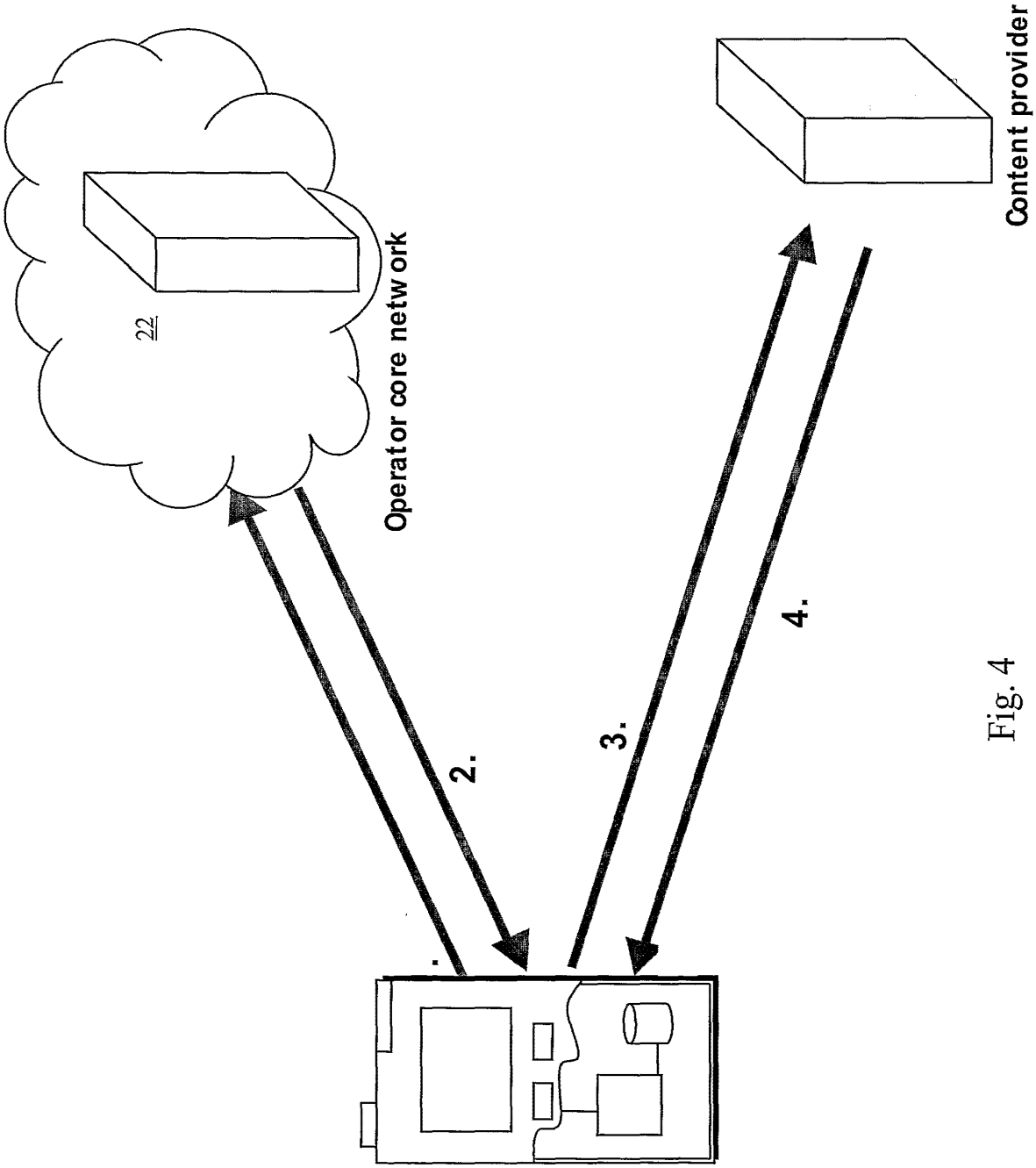


Fig. 4

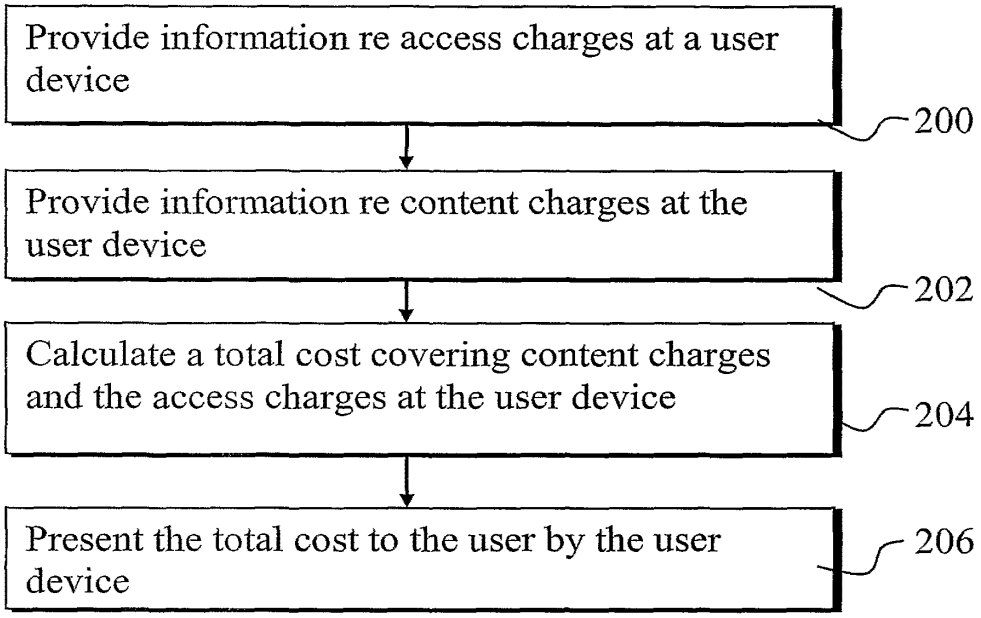

Provide information re access charges at a user device
200
Provide information re content charges at the user device
202
Calculate a total cost covering content charges and the access charges at the user device
204
Present the total cost to the user by the user device
206

Fig. 5

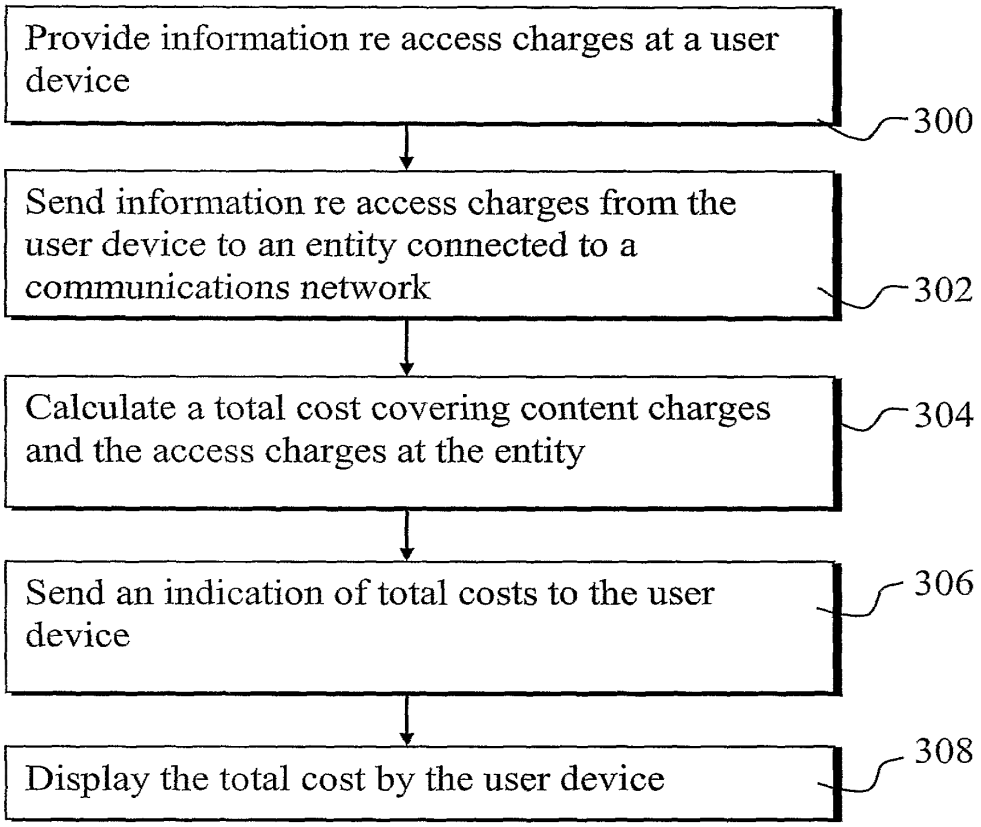

Provide information re access charges at a user device
300
Send information re access charges from the user device to an entity connected to a communications network
302
Calculate a total cost covering content charges and the access charges at the entity
304
Send an indication of total costs to the user device
306
Display the total cost by the user device
308

Fig. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2006/001254

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06Q20/00 H04M15/00

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)
H04M H04L G06Q

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, WPI Data, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/039656 A1 (GERBER HEIKO ET AL) 26 February 2004 (2004-02-26) paragraph [0003] - paragraph [0005] paragraph [0008] - paragraph [0012] paragraph [0016] - paragraph [0025] -----	1-60
X	US 2003/083990 A1 (BERG ANDREAS ET AL) 1 May 2003 (2003-05-01) paragraph [0008] - paragraph [0013] paragraph [0019] - paragraph [0037] paragraph [0043] - paragraph [0055] claims 1-3,6 -----	1-60
X	US 6 240 091 B1 (GINZBOORG PHILIP ET AL) 29 May 2001 (2001-05-29) column 2, line 60 - column 3, line 23 column 5, line 16 - column 12 ----- -/--	1-60

[X] Further documents are listed in the continuation of Box C. [X] 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 document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 August 2006	17/08/2006

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Patlaka, E.

Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 865 262 B1 (MITTS H{DOT OVER (AKAN ET AL) 8 March 2005 (2005-03-08) column 2, line 1 - line 33 column 3, line 18 - column 9, line 11	1-60
A	US 2002/194143 A1 (BANERJEE DWIP N ET AL) 19 December 2002 (2002-12-19) paragraph [0009] - paragraph [0029]	1-60
A	US 5 737 414 A (WALKER ET AL) 7 April 1998 (1998-04-07) the whole document	1-60

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2006/001254

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004039656 A1	26-02-2004	DE 10227395 A1	24-12-2003
		EP 1372101 A2	17-12-2003
US 2003083990 A1	01-05-2003	DE 10148540 A1	24-04-2003
		EP 1298599 A1	02-04-2003
US 6240091 B1	29-05-2001	FI 972980 A	15-01-1999
US 6865262 B1	08-03-2005	AU 2443000 A	18-08-2000
		EP 1153505 A2	14-11-2001
		FI 990170 A	30-07-2000
		WO 0045609 A2	03-08-2000
US 2002194143 A1	19-12-2002	NONE	
US 5737414 A	07-04-1998	AT 324629 T	15-05-2006
		AU 5922996 A	11-12-1996
		BR 9606368 A	23-12-1997
		CA 2195968 A1	28-11-1996
		EP 0782728 A1	09-07-1997
		JP 10507053 T	07-07-1998
		WO 9637848 A1	28-11-1996
		US 5949875 A	07-09-1999

Form PCT/ISA/210 (patent family annex) (April 2005)

Electronic Acknowledgement Receipt

EFS ID:	15837797
Application Number:	12380773
International Application Number:	
Confirmation Number:	5719
Title of Invention:	Verifiable service policy implementation for intermediate networking devices
First Named Inventor/Applicant Name:	Gregory G. Raleigh
Customer Number:	107265
Filer:	Krista Susan Jacobsen/Ann Taylor
Filer Authorized By:	Krista Susan Jacobsen
Attorney Docket Number:	RALEP018 [26WV-160496]
Receipt Date:	22-MAY-2013
Filing Date:	02-MAR-2009
Time Stamp:	02:31:54
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	Information Disclosure Statement (IDS) Form (SB08)	P018IDS.pdf	2645429 91437ed442ecf5ac982637b5401e8dcc240df779	no	5

Warnings:	
Information:	

This is not an USPTO supplied IDS fillable form					
2	Foreign Reference	WO2006120558A1Nokia.pdf	829615 8b7d3998166eaadb50492ebf5e693219d9e238ca	no	34
Warnings:					
Information:					
3	Non Patent Literature	5007.pdf	1364818 ac3efabdd9cf2d2c6092e3e4e29ce4f0c89acf83	no	38
Warnings:					
Information:					
4	Non Patent Literature	5008.pdf	687762 398c819c1af9347f6e06a1a3f3d488160c685c6e	no	15
Warnings:					
Information:					
5	Non Patent Literature	5009.pdf	148140 288fa9a7a559ec967bc22e2da28fc2fafe809bdb	no	4
Warnings:					
Information:					
6	Non Patent Literature	5010.pdf	271395 94e981a4dc60df9e88000bc99cbe69b379948780	no	6
Warnings:					
Information:					
7	Non Patent Literature	5011.pdf	599052 97906c477525af016451a7ccab9b36d32622417e	no	13
Warnings:					
Information:					
8	Non Patent Literature	5012.pdf	970549 48cd6590c9912042e6f8b573f3f418f61e08513a	no	28
Warnings:					
Information:					
9	Non Patent Literature	5013.pdf	446546 9f2430d63ad68694c3d434988483706e9fa02dbd	no	10
Warnings:					
Information:					
10	Non Patent Literature	5014.pdf	235524 527f7e9fb8d5def7db35e8ea5ececfd8f0a4c092	no	6

Warnings:					
Information:					
11	Non Patent Literature	5015.pdf	593734 8ee489b197f1eab5066c7bb743e079ad5bdb847b	no	17
Warnings:					
Information:					
			Total Files Size (in bytes):	8792564	

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.
12/380,773	03/02/2009	Gregory G. Raleigh	RALEP018 [26WV-160496]	5719

107265 7590 07/11/2013

Headwater Partners I LLC - Outside Firm 1
350 Marine Parkway, Suite 300
Redwood Shores, CA 94065

EXAMINER	
SALL, EL HADJI MALICK	

ART UNIT	PAPER NUMBER
2457	

NOTIFICATION DATE	DELIVERY MODE
07/11/2013	ELECTRONIC

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

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

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patent@headwaterllc.com

Office Action Summary	Application No. 12/380,773	Applicant(s) RALEIGH, GREGORY G.	
	Examiner EL HADJI SALL	Art Unit 2457	AIA (First Inventor to File) Status No

-- 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 *9 March 2012*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *79-94* is/are pending in the application.

5a) Of the above claim(s) *1-78* is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *79-94* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

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).

Certified copies:

a)☐ All b)☐ Some * c)☐ None of the:

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

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

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

* 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) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

Continuation of Attachment(s) 2). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :05/08/2012; 06/04/2012; 08/14/2012; 10/12/2012; 12/04/2012; 01/22/2013; 03/22/2013 and 05/22/2013.

DETAILED ACTION

1. This action is in response to a request for continued examination filed on March 9, 2012. Claims 1-78 are cancelled. Claims 79-94 are pending. Claims 79-94 represent VERIFIABLE SERVICE POLICY IMPLEMENTATION FOR INTERMEDIATE NETWORKING DEVICES.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of

activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit http://www.uspto.gov/forms/. The filing date of the application will determine what form should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

2. Claims 79-94 of Application No. 12/380,773 are provisionally rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 and 54-58 and 60-75 of copending Application No. 12/380,774. Although the claims at issue are not identical, they are not patentably distinct from each other because when claims 79 of '773 is compared with claim 1 of '774, it clearly shows that claim 1 of '774 anticipates claim 79 of '773, therefore claims 79-94 are rejected on the ground of nonstatutory double patenting.

This is a provisional nonstatutory double patenting rejection because the patentably indistinct claims have not in fact been patented.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 79-94 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Robinson et al. U.S. 20080005285.

Robinson teaches the invention as claimed including method and system for self-scaling generic policy tracking (see abstract).

As to claims 79, 93 and 94, Robinson discloses an end-user device (wherein clients 132 can be a computer, a phone, or a mobile communication device; see Robinson, paragraph 0032, and figure 1) capable of operating as an intermediate networking device, the first end-user device comprising:

a processor (software executed by devices; see Robinson, paragraph 0024) configured to:

act as a service intermediary or intermediate connection between the first network and one or more other end-user devices (The router 125 and the LAN 130; see Robinson, paragraph 0032, and figure 1);

implement a first service policy set for assisting in control of the use of a first service (determining whether network access should be granted to the at least one client based on the policy state in view; see Robinson, paragraph 0009) on the first network (The system can include a policy key on at least one client for scanning the at least one client for at least one configuration assessing at least one policy compliance based on the configuration; see Robinson, paragraph 0009), the first service policy set

including one or more service policies (The policy key 210 can also configure the client's 132 network access; see Robinson, paragraph 0038), associated with either the end-user device or a particular one of the one or more other end-user devices (The policy key 210 can be installed on an individual node, which can be an endpoint device such as the client 132; see Robinson, paragraph 0039, and figure 3); and

monitor use or attempt use of the first service based on the first service policy set (a policy key (210) on a client (132) for scanning the client for at least one configuration; see Robinson, abstract); and

memory coupled to the processor and configured to provide the processor with instructions (firmware or embedded hardware, such as ROM, storing instructions; see Robinson, paragraph 0025).

As to claim 80, Robinson teaches the first end-user device of claim 79, wherein the first service policy set assists in controlling whether the first end-user device (router) is authorized to operate as the intermediate networking device (paragraph 32).

As to claim 81, Robinson teaches the first end-user device of claim 79, wherein the first end-user device further comprises a first modem to connect with the access network and a second modem to connect with the one or more other end-user devices (paragraph 32, Robinson discloses router that is a network device that forwards packets from one network to another, therefore having ports (i.e. modems) that receive and transmit packet depending on where the packets are coming from. The side connected

to the network is “the first modem” and the side connected to the en-user device is "the second modem").

As to claim 82, Robinson teaches the first end-user device of claim 79, wherein the first network includes one of a 2G, 3G, 4G or WiFi network (wireless protocol connection) (paragraph 39).

As to claim 83, Robinson teaches the first end-user device of claim 79, wherein the first end-user device connects to the other end-user devices using one or more of the following connection types: WiFi, Bluetooth, USB, Ethernet, FireWire, near field communication (paragraph 32).

As to claim 84, Robinson teaches the first end-user device of claim 79, wherein the at least One processor is further configured to perform one or more of:

identify one or more network types over which the first end-user device is authorized to act as the intermediate networking device (a router 125 that can be communicatively coupled to the policy server 110, the outside network 160, and the local area network (LAN) 130. Notably, configurations are not limited to those shown in FIG. 1, and the system can have more or less than the number of network configurations and components shown);

identify one or more particular networks, network identifiers, access point identifiers or base station identifiers over which the first end-user device is authorized to act as the intermediate networking device;

identify one or more geographic locations or regions in which the intermediate net-working device forwarding service is to be active or modified; identify one or more time windows during which the first end-user device is authorized to act as the intermediate networking device; identify one or more network congestion levels during which the first end-user device is authorized to act as the intermediate networking device; identify one or more quality of service classes for Which the first end-user device is authorized to act as the intermediate networking device; identify of one or more net-work destinations for which the first end-user device is authorized to act as the intermediate networking device; identify one or more applications for which the first end-user device is authorized to act as the intermediate networking device; identify one or more other end-user devices for which the first end-user device is authorized to act as the intermediate networking device; identify a limit on the number of other end-user devices for which the first end-user device is authorized to act as the intermediate networking forwarding service; and identify one or more traffic types for which the first end-user device is authorized to act as the intermediate networking device, the one or more traffic types including one or more of content type, file type, protocol type, class of service, transaction type, and level of quality of service (paragraph 32).

As to claim 85, Robinson teaches the end-user device of claim 79, wherein the at least one processor is further configured to set traffic speed (paragraph 62).

As to claim 86, Robinson teaches the first end-user device of claim 79, wherein the at least one processor is further configured to notify a user when the first end-user device is. authorized to act as the intermediate networking device (paragraph 52).

As to claim 87, Robinson teaches the first end-user device of claim 79, wherein the at least one processor is further configured to notify a user when the first end-user device is authorized to act as the intermediate networking device over a roaming network (abstract).

As to claim 88, Robinson teaches the first end-user device of claim 79, wherein the at least one processor is further configured to implement a different intermediate networking device service characteristic in accordance with the first service policy set based on whether the first end-user device is connected to a home network or a roaming network (paragraph 5).

As to claim 89. Robinson teaches the first end-user device of claim 79, wherein the at least one processor is configured to implement a different intermediate networking device service characteristic in accordance with the first service policy set based on identification information of a particular one of the one or more other end-user

devices or identification information of a particular user of a particular one of the :one or more other end-user devices (paragraph 69).

As to claim 90, Robinson teaches the first end-user device of claim 79, further comprising a device agent, and wherein the device agent is configured to notify a user when one of the one or more other end- user devices attempts to or succeeds in connecting to the first end user device (paragraph 34).

As to claim 91, Robinson teaches the first end-user device of claim 79, wherein the first end-user device can monitor service usage and can modify a predetermined policy setting when the service usage meets a predetermined condition (paragraph 41).

As to claim 92, Robinson teaches the first end-user device of claim 79, further comprising:

collecting a plurality of service usage measurements for the one or more other end-user devices use of the first service set on the first network (paragraph 52); and

evaluating the plurality of service usage measurements based on the first service policy set (paragraph 40).

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to El Hadji M Sall whose telephone number is 571-272-4010. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Etienne can be reached on 571-272-4001. 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).

/EL HADJI SALL/

Primary Examiner, Art Unit 2457

Notice of References Cited	Application/Control No. 12/380,773	Applicant(s)/Patent Under Reexamination RALEIGH, GREGORY G.	
	Examiner EL HADJI SALL	Art Unit 2457	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2008/0005285 A1	01-2008	Robinson et al.	709/220
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	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.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Raleigh, Gregory G.
Art Unit	2452
Examiner Name	Nguyen, Thu V.
Attorney Docket Number	RALEP018

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	8135388		2012-03-13	Gailloux, Michael A. et al.	
	2	6947723		2005-09-20	Gurnani, Roger et al.	
	3	8350700		2013-01-08	Fast, Raymond D. et al.	
	4	8204190		2012-06-19	Bang, Jung-Hee et al.	
	5	7962622		2011-06-14	Friend, John et al.	
	6	7583964		2009-09-01	Wong, Gregory A.	
	7	7565141		2009-07-21	Macaluso, Anthony G.	
	8	7373179		2008-05-13	Stine, Ted et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

/ES/	9	7236780		2007-06-26	Benco, David S. et al.	
	10	7039403		2006-05-02	Wong, Gregory A.	
	11	7865182		2011-01-04	Macaluso, Anthony G.	
	12	8370477		2013-02-05	Short, Joel E. et al.	
	13	8364806		2013-01-29	Short, Joel E. et al.	
	14	8279067		2012-10-02	Berger, Thomas R. et al.	
	15	8213296		2012-07-03	Shannon, Frank M. et al.	
	16	8019868		2011-09-13	Rao, Goutham et al.	
	17	8005988		2011-08-23	Maes, Stephane H.	
	18	7978627		2011-07-12	Taylor, William Scott et al.	
	19	7711848		2010-05-04	Maes, Stephane H.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

/ES/	20	6782412		2004-08-24	Brophy, Kevin et al.	
/ES/	21	6081591		2000-06-27	Skoog, Frederick H.	
/ES/	22	6064878		2000-05-16	Denker, John Stewart et al.	
/ES/	23	7730123		2010-06-01	Erickson, Richard R. et al.	
/ES/	24	8024397		2011-09-20	Erickson, Richard R. et al.	
/ES/	25	8156206		2012-04-10	Kiley, Kevin J. et al.	
/ES/	26	8126722		2012-02-28	Robb, Terence Alan et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	20090299857		2009-12-03	Brubaker, Curtis M.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/El Hadji Sall/ (07/01/2013)	Date Considered	07/01/2013

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2013-03-21
Name/Print	Krista S. Jacobsen	Registration Number	59374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Gregory G. Raleigh
Art Unit	2452
Examiner Name	Dohm Chankong
Attorney Docket Number	26WV-160496 [RALEP018]

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	5794142		1998-08-11	VANTTILA et al.	
	2	5903845		1999-05-11	BUHRMANN et al.	
	3	5933778		1999-08-03	BUHRMANN et al.	
	4	6078953		2000-06-20	VAID et al.	
	5	6317584		2001-11-13	ABU-AMARA et al.	
	6	6449479		2002-09-10	SANCHEZ, Eduardo	
	7	6603969		2003-08-05	VUORISTO et al.	
	8	6658254		2003-12-02	PURDY et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

/ES/	9	6785889		2004-08-31	WILLIAMS, Peter	
	10	6829596		2004-12-07	FRAZEE, Steve	
	11	6829696		2004-12-07	BALMER et al.	
	12	6920455		2005-07-19	WESCHLER, Paul	
	13	6998985		2006-02-14	REISMAN et al.	
	14	7024200		2006-04-04	McKENNA et al.	
	15	7027408		2006-04-11	NABKEL, et al.	
	16	7092696		2006-08-15	HOSAIN et al.	
	17	7158792		2007-01-02	COOK et al.	
	18	7174174		2007-02-06	BORIS et al.	
	19	7180855		2007-02-20	LIN	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

/ES/	20	7280818		2007-10-09	CLAYTON, Steve	
	21	7324447		2008-01-29	MORFORD	
	22	7421004		2008-09-02	FEHER, Kamilo	
	23	7450591		2008-11-11	KORLING, et al.	
	24	7486185		2009-02-03	CULPEPPER et al.	
	25	7574731		2009-08-11	FASCENDA, Anthony C.	
	26	7580857		2009-08-25	VanFLEET, et al.	
	27	7617516		2009-11-10	HUSLAK, et al.	
	28	7620065		2009-11-17	FALARDEAU, Eric	
	29	7620162		2009-11-17	AARON et al.	
	30	7668903		2010-02-23	EDWARDS, et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

/ES/	31	7720505		2010-05-18	GOPI, et al.	
	32	7797204		2010-09-14	BALENT, Bruce F.	
	33	7848768		2010-12-07	OMORI, et al.	
	34	7868778		2011-01-11	KENWRIGHT, David Norris	
	35	7873705		2011-01-18	KALISH, Dan	
	36	7882029		2011-02-01	WHITE, Craig R.	
	37	7941184		2011-05-10	PRENDERGAST et al.	
	38	7957511		2011-06-07	DRUDIS et al.	
	39	7975184		2011-07-05	GOFF et al.	
	40	7986935		2011-07-26	D'SOUZA et al.	
	41	8005459		2011-08-23	BALSILLIE, Jim	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

/ES/	42	8010080		2011-08-30	THENTHIRUPERAI, et al.	
/ES/	43	8010081		2011-08-30	ROSKOWSKI, Steve	
/ES/	44	8015133		2011-09-06	WU, et al.	
/ES/	45	8015234		2011-09-06	LUM et al.	
/ES/	46	8023425		2011-09-20	RALEIGH, Gregory G.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	20020120540		2002-08-29	KENDE et al.	
/ES/	2	20020131404		2002-09-19	MEHTA et al.	
/ES/	3	20030013434		2003-01-16	ROSENBERG et al.	
/ES/	4	20040132427		2004-07-08	LEE et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

/ES/	5	20040249918		2004-12-09	SUNSHINE	
/ES/	6	20050048950		2005-03-03	MORPER	
/ES/	7	20050254435		2005-11-17	MOAKLEY et al.	
/ES/	8	20060014519		2006-01-19	MARSH et al.	
/ES/	9	20060112016		2006-05-25	ISHIBASHI	
/ES/	10	20060199608		2006-09-07	DUNN et al.	
/ES/	11	20060258341		2006-11-16	MILLER et al.	
/ES/	12	20070093243		2007-04-26	KAPADEKAR et al.	
/ES/	13	20070259673		2007-11-08	WILLARS et al.	
/ES/	14	20070263558		2007-11-15	SALOMONE	
/ES/	15	20080010452		2008-01-10	HOLTZMAN et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

/ES/	16	20080049630		2008-02-28	KOZISEK et al.	
	17	20080060066		2008-03-06	WYNN et al.	
	18	20080062900		2008-03-13	RAO	
	19	20080147454		2008-06-19	WALKER et al.	
	20	20080162637		2008-07-03	ADAMCZYK et al.	
	21	20080164304		2008-07-10	NARASIMHAN	
	22	20080167027		2008-07-10	GAUTIER et al.	
	23	20080207167		2008-08-28	BUGENHAGEN	
	24	20080221951		2008-09-11	STANFORTH et al.	
	25	20080256593		2008-10-16	VINBERG	
	26	20080311885		2008-12-18	DAWSON et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

/ES/	27	20080318547		2008-12-25	BALLOU et al.	
	28	20080319879		2008-12-25	CARROLL et al.	
	29	20090005005		2009-01-01	FORSTALL et al.	
	30	20090068984		2009-03-12	BURNETT	
	31	20090077622		2009-03-19	BAUM et al.	
	32	20090197585		2009-08-06	AARON, Jeffrey A.	
	33	20090257379		2009-10-15	ROBINSON et al.	
	34	20090286507		2009-11-19	O'NEAL et al.	
	35	20090288140		2009-11-19	HUBER et al.	
	36	20100017506		2010-01-21	FADELL	
	37	20100042675		2010-02-18	FUJII	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

/ES/	38	20100082431		2010-04-01	RAMER et al.	
	39	20100188975		2010-07-29	RALEIGH, Gregory G.	
	40	20100188990		2010-07-29	RALEIGH, Gregory G.	
	41	20100188992		2010-07-29	RALEIGH, Gregory G.	
	42	20100188994		2010-07-29	RALEIGH, Gregory G.	
	43	20100191576		2010-07-29	RALEIGH, Gregory G.	
	44	20100191612		2010-07-29	RALEIGH, Gregory G.	
	45	20100191846		2010-07-29	RALEIGH, Gregory G.	
	46	20100192170		2010-07-29	RALEIGH, Gregory G.	
	47	20100192212		2010-07-29	RALEIGH, Gregory G.	
	48	20100195503		2010-08-05	RALEIGH, Gregory G.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

/ES/	49	20100197268		2010-08-05	RALEIGH, Gregory G., et al.	
/ES/	50	20100198698		2010-08-05	RALEIGH, Gregory G., et al.	
/ES/	51	20100198939		2010-08-05	RALEIGH, Gregory G., et al.	
/ES/	52	20100325420		2010-12-23	KANEKAR	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
/ES/	1	2010088413	WO		2010-08-05	Headwater Partners I LLC		☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
/ES/	1	Search Report and Written Opinion mailed 23 March 2010 from International Serial Number PCT/US2010/021393 filed 19 January 2010.	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/El Hadji Sall/ (07/01/2013)	Date Considered	07/01/2013

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Marc A. Sockol/	Date (YYYY-MM-DD)	2012-05-08
Name/Print	Marc A. Sockol	Registration Number	40823

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Raleigh, Gregory G.
Art Unit	2452
Examiner Name	Chankong, Dohm
Attorney Docket Number	RALEP018

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	6418147		2002-07-09	Wiedeman, Robert A	
	2	6765864		2004-07-20	Natarajan, Shankar et al.	
	3	7610328		2009-10-27	Haase, Oliver et al.	
	4	7650137		2010-01-19	Jobs, Steven P. et al.	
	5	7693720		2010-04-06	Kennewick, Robert A. et al.	
	6	7734784		2010-06-08	Araujo, Wladimir et al.	
	7	7747699		2010-06-29	Prueitt, James K. et al.	
	8	7792708		2010-09-07	Alva, Jessi	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Chankong, Dohm
	Attorney Docket Number	RALEP018

/ES/	9	7797401		2010-09-14	Stewart, Hugh Donal et al.	
	10	7822837		2010-10-26	Urban, Mark et al.	
	11	7949529		2011-05-24	Weider, Chris et al.	
	12	8095666		2012-01-10	Schmidt, Jonathan E. et al.	
	13	8099077		2012-01-17	Chowdhury, Amor et al.	
	14	8099517		2012-01-17	Jia, Lujun R. et al.	
	15	8170553		2012-05-01	Bennett, James D.	
	16	7984130		2011-07-19	Bogineni, Kalyani et al.	
	17	8019687		2011-09-13	Wang, Feng Chi et al.	
	18	8144591		2012-03-27	Ghai, Rajat et al.	
	19	7336960		2008-02-26	Zavalkovsky, Arthur et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Chankong, Dohm
	Attorney Docket Number	RALEP018

/ES/	20	8194549		2012-06-05	Huber, Kurt Donald et al.	
	21	6606744		2003-08-12	Mikurak, Michael G.	
	22	8190675		2012-05-29	Tribbett, David	
	23	8200775		2012-06-12	Moore, James F.	
	24	7069248		2006-06-27	Huber, Adriano	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	20030018524		2003-01-23	Fishman, Dan et al.	
/ES/	2	20030220984		2003-11-27	Jones, Paul David et al.	
/ES/	3	20040021697		2004-02-05	Beaton, Brian Finlay et al.	
/ES/	4	20040107360		2004-06-03	Herrmann, Conrad K. et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Chankong, Dohm
	Attorney Docket Number	RALEP018

/ES/	5	20070061243		2007-03-15	Ramer, Jorey et al.	
	6	20070282896		2007-12-06	Wydroug, Zoe M. et al.	
	7	20080184127		2008-07-31	Rafey, Richter A. et al.	
	8	20090013157		2009-01-08	Beaule, Stephane	
	9	20090079699		2009-03-26	Sun, Jian	
	10	20110126141		2011-05-26	King, Bennett M. et al.	
	11	20100103820		2010-04-29	Fuller, Randy et al.	
	12	20070254675		2007-11-01	Zorlu Ozer, Sebnem et al.	
	13	20080005285		2008-01-03	Robinson, James David et al.	
	14	20090113514		2009-04-30	Hu, Q. James	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Chankong, Dohm
	Attorney Docket Number	RALEP018

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/El Hadji Sall/ (07/01/2013)	Date Considered	07/01/2013

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Chankong, Dohm
	Attorney Docket Number	RALEP018

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

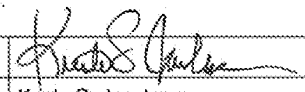
☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2012-08-14
Name/Print	Krista S. Jacobsen	Registration Number	59,374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Raleigh, Gregory G.
Art Unit	2452
Examiner Name	Nguyen, Thu V.
Attorney Docket Number	RALEP018

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	6754470		2004-06-22	Hendrickson, Keith et al.	
	2	8122128		2012-02-21	Burke, II, Robert M. et al.	
	3	8149823		2012-04-03	Turcan, Diane Brown et al.	
	4	8131256		2012-03-06	Martti, Jyrki et al.	
	5	6381316		2002-04-30	Joyce, Simon James et al.	
	6	7965983		2011-06-21	Swan, Tim et al.	
	7	8284740		2012-10-09	O'Connor, Dennis M.	
	8	8116223		2012-02-14	Tian, Dan et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

/ES/	9	6154738		2000-11-28	Call, Charles Gainor	
/ES/	10	8423016		2013-04-16	Buckley, Adrian et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	20110173678		2011-07-14	Kaippallimalil, John et al.	
	2	20080235511		2008-09-25	O'Brien, William G. et al.	
	3	20080240373		2008-10-02	Wilhelm, Robert D.	
	4	20100027559		2010-02-04	LIN, Hung-Ming et al.	
	5	20020116338		2002-08-22	Gonthier, Jean-Charles et al.	
	6	20070061878		2007-03-15	Hagiu, Costin et al.	
	7	20100020822		2010-01-28	Zerillo, Anthony J. et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

/ES/	8	20040203755		2004-10-14	Brunet, Jeffrey et al.	
/ES/	9	20090172077		2009-07-02	Roxburgh, David et al.	
/ES/	10	20080051076		2008-02-28	O'Shaughnessy, John et al.	
/ES/	11	20080313730		2008-12-18	Iftimie, Sorin et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
/ES/	1	2006120558A1	WO		2006-11-16	Nokia Corp.		☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
/ES/	1	2010-09-01 Non-Final Rejection in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices," Examiner Obaidul Huq	☐
/ES/	2	2011-02-28 Amendment After Non-Final Rejection in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices"	☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

/ES/	3	2011-05-09 Notice to the applicant regarding a non-compliant or non-responsive amendment in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices," Examiner Obaidul Huq	☐
/ES/	4	2011-07-05 Amendment After Non-Final Rejection in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices"	☐
/ES/	5	2011-09-06 Supplemental Response or Supplemental Amendment in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices"	☐
/ES/	6	2011-09-14 Final Rejection in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices," Examiner Obaidul Huq	☐
/ES/	7	2012-03-13 Amendment Submitted with Filing of CPA-RCE in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices"	☐
/ES/	8	2012-07-19 Supplemental Amendment in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices"	☐
/ES/	9	2013-03-26 Non-Final Rejection in U.S. Patent Application No. 12/380,774, filed March 2, 2009 and entitled "Verifiable and Accurate Service Usage Monitoring for Intermediate Networking Devices," Examiner Obaidul Huq	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/El Hadji Sall/ (07/01/2013)	Date Considered	07/01/2013

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

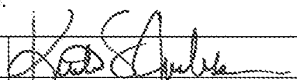
☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2013-05-21
Name/Print	Krista S. Jacobsen	Registration Number	59374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Gregory G. Raleigh
Art Unit	2452
Examiner Name	Dohm Chankong
Attorney Docket Number	26WV-160496 [RALEP018]

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	20090180391		2009-07-16	PETERSEN et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button **Add**

EXAMINER SIGNATURE

Examiner Signature	/El Hadji Sall/ (07/01/2013)	Date Considered	07/01/2013

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Marc A. Sockol/	Date (YYYY-MM-DD)	2012-05-08
Name/Print	Marc A. Sockol	Registration Number	40823

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Raleigh, Gregory G.
Art Unit	2452
Examiner Name	Nguyen, Thu V.
Attorney Docket Number	RALEP018

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	7953808		2011-05-31	Sharp, Christopher Brooke et al.	
	2	8135392		2012-03-13	Marcellino, Chris et al.	
	3	6502131		2002-12-31	Vaid, Aseem et al.	
	4	6505114		2003-01-07	Luciani, Sergio	
	5	6763000		2004-07-13	Walsh, Peter J.	
	6	6967958		2005-11-22	Ono, Yoshiyuki et al.	
	7	7644267		2010-01-05	Ylikoski, Martti et al.	
	8	7710932		2010-05-04	Muthuswamy, Sivakumar et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

/ES/	9	7881199		2011-02-01	Krstulich, Zlatko	
	10	7886047		2011-02-08	Potluri, Dora	
	11	7911975		2011-03-22	Droz, Patrick et al.	
	12	8050275		2011-11-01	Iyer, Jayaraman R.	
	13	8194553		2012-06-05	Liang, Zhi Yong et al.	
	14	8239520		2012-08-07	Grah, Adrian et al.	
	15	7890084		2011-02-15	Dudziak, Thaddeus Jude et al.	
	16	7890111		2011-02-15	Bugenhagen, Michael K.|	
	17	6226277		2001-05-01	Chuah, Mooi Choo	
	18	6839340		2005-01-04	Voit, Eric A. et al.	
	19	6922562		2005-07-26	Ward, Stephen L. et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

/ES/	20	7620041		2009-11-17	Dunn, Jeffrey H. et al.	
	21	7627314		2009-12-01	Carlson, Steven I. et al.	
	22	7792538		2010-09-07	Kozisek, Steven E.	
	23	7801523		2010-09-21	Kenderov, Stoyan	
	24	7877090		2011-01-25	Maes, Stephane H.	
	25	7912025		2011-03-22	Pattenden, Christopher E. S. et al.	
	26	7948968		2011-05-24	Voit, Eric A. et al.	
	27	7970426		2011-06-28	Poe, Brian R. et al.	
	28	8185158		2012-05-22	Tamura, Motoshi et al.	
	29	8254915		2012-08-28	Kozisek, Steven E.	
	30	7418257		2008-08-26	Kim, Myong-Ju	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

/ES/	31	8126123		2012-02-28	Cai, Yigang et al.	
	32	7903553		2011-03-08	Liu, Enhui	
	33	8155620		2012-04-10	Wang, Jun et al.	
	34	8238287		2012-08-07	Gopi, Paramesh et al.	
	35	7113997		2006-09-26	Jayapalan, Jay et al.	
	36	5594777		1997-01-14	Makkonen, Matti et al.	
	37	8244241		2012-08-14	Montemurro, Michael	
	38	7756534		2010-07-13	Anupam, Vinod et al.	
	39	7636574		2009-12-22	Poosala, Viswanath	
	40	6678516		2004-01-13	Nordman, Ian et al.	
	41	6477670		2002-11-05	Ahmadvand, Nima	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

/ES/	42	6038452		2000-03-14	Strawczynski, Leo et al.	
	43	8108520		2012-01-31	Ruutu, Jussi et al.	
	44	7778643		2010-08-17	Laroia, Rajiv et al.	
	45	7668176		2010-02-23	Chuah, Mooi Choo	
	46	7515608		2009-04-07	Yuan, Yuan et al.	
	47	7251218		2007-07-31	Jorgensen, Jacob W.	
	48	7002920		2006-02-21	Ayyagari, Deepak et al.	
	49	7685131		2010-03-23	Batra, Vishal Singh et al.	
	50	7283561		2007-10-16	Picher-Dempsey, Heidi	
	51	7212491		2007-05-01	Koga, Takahiro	
	52	6683853		2004-01-27	KANNAS, Chris et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	20080081606		2008-04-03	Cole, Terry L.	
/ES/	2	20090248883		2009-10-01	Suryanarayana, Lalitha et al.	
/ES/	3	20100144310		2010-06-10	BEDINGFIELD, James Carlton	
/ES/	4	20080132201		2008-06-05	KARLBERG, Johan	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

If you wish to add additional non-patent literature document citation information please click the Add button			
EXAMINER SIGNATURE			
Examiner Signature		Date Considered	
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

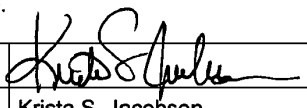
☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2012-10-12
Name/Print	Krista S. Jacobsen	Registration Number	59374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	6	("20030088671" "20040103193" "20050183143" "20060085543" "20080059474" "20080066149" "2008006615").pn.	US-PGPUB; USPAT	OR	ON	2013/06/30 18:59
S2	40	("20090180391" "5794142" "5903845" "5933778" "6078953" "6317584" "6449479" "6603969" "6658254" "6785889" "6829596" "6829696" "6920455" "6998985" "7024200" "7027408" "7092696" "7158792" "7174174" "7180855" "7280818" "7324447" "7421004" "7450591" "7486185" "7574731" "7580857" "7617516" "7620065" "7620162" "7668903" "7720505" "7797204" "7848768" "7868778" "7873705" "7882029" "7941184" "7957511" "7975184").pn.	US-PGPUB; USPAT	OR	ON	2013/06/30 19:51
S3	23	("7986935" "8005459" "8010080" "8010081" "8015133" "8015234" "8023425" "20020120540" "20020131404" "20030013434" "20040132427" "20040249918" "20050048950" "20050254435" "20060014519" "20060112016" "20060199608" "20060258341" "20070093243" "20070259673" "20070263558" "20080010452" "20080049630").pn.	US-PGPUB; USPAT	OR	ON	2013/06/30 19:52
S4	212	("20080060066" "20080062900" "20080147454" "20080162637" "20080164304" "20080167027" "20080207167" "20080221951" "20080256593" "20080311885" "20080318547" "20080319879" "20090005005" "20090068984" "20090077622" "20090197585" "20090257379" "20090286507" "20090288140" "20100017506" "20100042675" "20100082431" "20100188975" "20100188990" "20100188992" "20100188994" "20100191576" "20100191612" "20100191846" "20100192170" "20100192212" "20100195503" "20100197268" "20100198698" "20100198939" "20100325420" "6574465" "7366497" "7388950" "7450927" "7499537" "6418147" "6765864" "7610328" !7650137 "7693720" "7734784" "7747699" "7792708" "7797401" "7822837" "7949529" "8095666" "8099077" "8099517" "8170553" "7984130" "8019687" "8144591" "7336960" "8194549" "6606744" "8190675" "8200775" "7069248" "20030018524" "20030220984" "20040021697" "20040107360"	US-PGPUB; USPAT	OR	ON	2013/06/30 19:52

		"20070061243" "20070282896" "20080184127" "20090013157" "20090079699" "20110126141" "20100103820" "20070254675" "20080005285" "20090113514" "7953808" "8135392" "6502131" "6505114" "6763000" "6967958" "7644267" "7710932" "7881199" "7886047" "7911975" "8050275" "8194553" "8239520" "7890084" "7890111" "6226277" "6839340" "6922562" "7620041" "7627314" "7792538" "7801523" "7877090" "7912025" "7948968" "7970426" "8185158" "8254915" "7418257" "8126123" "7903553" "8155620" "8238287" "7113997" "5594777" "8244241" "7756534" "7636574" "6678516" "6477670" "6038452" "8108520" "7778643" "7668176" "7515608" "7251218" "7002920" "7685131" "7283561" "7212491" "6683853" "20080081606" "20090248883" "20100144310" "20080132201" "7609700" "8255515" "7945240" "7912056" "7920529" "8184530" "8213363" "8214536" "8255689" "7746854" "7068600" "6876653" "6631122" "7599288" "7546629" "7747730" "7609656" "6581092" "7283963" "8271049" "7644151" "20080085707" "20090046723" "20080219268" "20080005285" "20090315735" "20090219170" "20090067372" "20080262798" "20100103820" "20100153781" "8291238" "8068824" "7228354" "5283904" "8208919" "8185152" "7844728" "7873344" "7856226" "7948952" "7957020" "7346410" "7167078" "8102814" "7970350" "8094551" "20090307746" "20050009499" "20100041364" "20100027469" "20010053694" "8135388" "6947723" "8350700" "8204190" "7962622" "7583964" "7565141" "7373179" "7236780" "7039403" "7865182" "8370477" "8364806" "8279067" "8213296" "8019868" "8005988" "7978627" "7711848" "6782412" "6081591" "6064878" "7730123" "8024397" "8156206" "8126722" "20090299857").pn.				
S5	275	S2 S3 S4	US-PGPUB; USPAT	OR	ON	2013/06/30 19:53
S6	4	("20040030705" "20060291477" "20050266880" "6574321").pn.	US-PGPUB; USPAT	OR	ON	2013/06/30 20:35
S7	279	S5 S6	US-PGPUB; USPAT	OR	ON	2013/06/30 20:35
S8	14	"13134005" "13134028" "13309463" "13374959" "13439788" "13441821" "13445110"	US-PGPUB; USPAT	OR	ON	2013/06/30 21:39
S9	1	"20100188995"	US-PGPUB; USPAT	OR	ON	2013/06/30 21:47
S10	11585	709/224.ccls.	USPAT	OR	OFF	2013/06/30 22:04
S11	3	"20080005285" "20100103820"	US-	OR	ON	2013/06/30

		"20040107360"	PGPUB; USPAT			22:10

7/ 1/ 2013 1:40:42 AM
C:\ Users\ esall\ Documents\ EAST\ Workspaces\ 12380773.wsp

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Raleigh, Gregory G.
Art Unit	2452
Examiner Name	Nguyen, Thu V.
Attorney Docket Number	RALEP018

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	7609700		2009-10-27	Ying, Wen-Ping et al.	
	2	8255515		2012-08-28	Melman, David et al.	
	3	7945240		2011-05-17	Klock, Jacqueline et al.	
	4	7912056		2011-03-22	Brassem, Wayne	
	5	7920529		2011-04-05	Mahler, Roger et al.	
	6	8184530		2012-05-22	Swan, Tim L. et al.	
	7	8213363		2012-07-03	Ying, Wen-Ping et al.	
	8	8214536		2012-07-03	Zhao, Wen	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

/ES/	9	8255689		2012-08-28	Kim, Eun Ah et al.	
	10	7746854		2010-06-29	Ambe, Shekhar et al.	
	11	7068600		2006-06-27	Cain, Joseph Bibb	
	12	6876653		2005-04-05	Ambe, Shekhar et al.	
	13	6631122		2003-10-07	Arunachalam, Vaidhyanathan et al.	
	14	7599288		2009-10-06	Cole, Raymond E. et al.	
	15	7546629		2009-06-09	Albert, Anthony et al.	
	16	7747730		2010-06-29	Harlow, James D.	
	17	7609650		2009-10-27	Roskowski, Steve et al.	
	18	6581092		2003-06-17	Motoyama, Tetsuro et al.	
	19	7283963		2007-10-16	Fitzpatrick, John E. et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

/ES/	20	8271049		2012-09-18	Silver, Andrew et al.	
/ES/	21	7644151		2010-01-05	Jerrim, John et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	20080085707		2008-04-10	Fadell, Tony	
	2	20090046723		2009-02-19	Rahman, Reshad A. et al.	
	3	20080219268		2008-09-11	Dennison, Larry R.	
	4	20080005285		2008-01-03	Robinson, James David et al.	
	5	20090315735		2009-12-24	Bhavani, Neeraj S. et al.	
	6	20090219170		2009-09-03	Clark, Ryan C. et al.	
	7	20090067372		2009-03-12	Shah, Keyur C. et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

/ES/	8	20080262798		2008-10-23	KIM, Eun Ah et al.	
/ES/	9	20100103820		2010-04-29	FULLER, Randy et al.	
/ES/	10	20100153781		2010-06-17	HANNA, Stephen R.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2012-12-04
Name/Print	Krista S. Jacobsen	Registration Number	59374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Raleigh, Gregory G.
Art Unit	2452
Examiner Name	Nguyen, Thu V.
Attorney Docket Number	RALEP018

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	8291238		2012-10-16	Ginter, Karl L. et al.	
	2	8068824		2011-11-29	Shan, Xueshan et al.	
	3	7228354		2007-06-05	Chambliss, David Darden et al.	
	4	5283904		1994-02-01	Carson, David G. et al.	
	5	8208919		2012-06-26	Kotecha, Lalit Ratilal	
	6	8185152		2012-05-22	Goldner, Alla	
	7	7844728		2010-11-30	Anderson, Thomas W. et al.	
	8	7873344		2011-01-18	Bowser, Robert et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

/ES/	9	7856226		2010-12-21	Wong, Ellis L. et al.	
	10	7948952		2011-05-24	Hurtta, Tuija et al.	
	11	7957020		2011-06-07	Mine, Ryuta et al.	
	12	7346410		2008-03-18	Uchiyama, Kenji	
	13	7167078		2007-01-23	Pourchot, Shawn C.	
	14	8102814		2012-01-24	Rahman, Shahriar I. et al.	
	15	7970350		2011-06-28	Sheynman, Arnold et al.	
	16	8094551		2012-01-10	Huber, Kurt Donald et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	20090307746		2009-12-10	DI, Jinwen et al.	

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

/ES/	2	20050009499		2005-01-13	Koster, Karl	
/ES/	3	20100041364		2010-02-18	Lott, Robert Wayne et al.	
/ES/	4	20100027469		2010-02-04	Gurajala, Ravindra Babu et al.	
/ES/	5	20010053694		2001-12-20	Igarashi, Yoichiro et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/El Hadji Sall/ (07/01/2013)	Date Considered	07/01/2013

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2452
	Examiner Name	Nguyen, Thu V.
	Attorney Docket Number	RALEP018

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

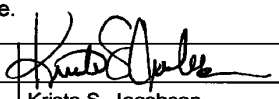
☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2013-01-22
Name/Print	Krista S. Jacobsen	Registration Number	59374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

EFS Web 2.1.17

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12380773	RALEIGH, GREGORY G.
	Examiner	Art Unit
	DOHM CHANKONG	2452

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
709	224	7/1/2013	ES

SEARCH NOTES		
Search Notes	Date	Examiner
Updated Non Patent Litterature Search	7/1/2013	ES
Updated East Search	7/1/2013	ES

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/EL HADJI SALL/ Primary Examiner.Art Unit 2457	

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12380773	RALEIGH, GREGORY G.
	Examiner	Art Unit
	EL HADJI SALL	2457

✓	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	07/01/2013								
	1	-								
	2	-								
	3	-								
	4	-								
	5	-								
	6	-								
	7	-								
	8	-								
	9	-								
	10	-								
	11	-								
	12	-								
	13	-								
	14	-								
	15	-								
	16	-								
	17	-								
	18	-								
	19	-								
	20	-								
	21	-								
	22	-								
	23	-								
	24	-								
	25	-								
	26	-								
	27	-								
	28	-								
	29	-								
	30	-								
	31	-								
	32	-								
	33	-								
	34	-								
	35	-								
	36	-								

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12380773	RALEIGH, GREGORY G.
	Examiner	Art Unit
	EL HADJI SALL	2457

✓	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	07/01/2013								
	37	-								
	38	-								
	39	-								
	40	-								
	41	-								
	42	-								
	43	-								
	44	-								
	45	-								
	46	-								
	47	-								
	48	-								
	49	-								
	50	-								
	51	-								
	52	-								
	53	-								
	54	-								
	55	-								
	56	-								
	57	-								
	58	-								
	59	-								
	60	-								
	61	-								
	62	-								
	63	-								
	64	-								
	65	-								
	66	-								
	67	-								
	68	-								
	69	-								
	70	-								
	71	-								
	72	-								

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12380773	RALEIGH, GREGORY G.
	Examiner	Art Unit
	EL HADJI SALL	2457

✓	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	07/01/2013								
	73	-								
	74	-								
	75	-								
	76	-								
	77	-								
	78	-								
	79	✓								
	80	✓								
	81	✓								
	82	✓								
	83	✓								
	84	✓								
	85	✓								
	86	✓								
	87	✓								
	88	✓								
	89	✓								
	90	✓								
	91	✓								
	92	✓								
	93	✓								
	94	✓								

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Gregory G. Raleigh
Art Unit	2452
Examiner Name	Dohm Chankong
Attorney Docket Number	26WV-160496 [RALEP018]

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	6574465		2003-06-03	MARSH et al.	
/ES/	2	7366497		2008-04-29	NAGATA	
/ES/	3	7388950		2008-06-17	ELSEY et al.	
/ES/	4	7450927		2008-11-11	CRESWELL et al.	
/ES/	5	7499537		2009-03-03	ELSEY et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ES/	1	20030046396		2003-03-06	RICHTER et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/El Hadji Sall/ (07/01/2013)	Date Considered	07/01/2013

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Gregory G. Raleigh
	Art Unit	2452
	Examiner Name	Dohm Chankong
	Attorney Docket Number	26WV-160496 [RALEP018]

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Marc A. Sockol/	Date (YYYY-MM-DD)	2012-06-04
Name/Print	Marc A. Sockol	Registration Number	40823

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12380773
Filing Date	2009-03-02
First Named Inventor	Raleigh, Gregory G.
Art Unit	2457
Examiner Name	Sall, El Hadji Malick
Attorney Docket Number	RALEP018

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6035281		2000-03-07	Crosskey, James P. et al.	
	2	6996393		2006-02-07	Pyhalammi, Seppo et al.	
	3	7760711		2010-07-20	Kung, Fen-Chung et al.	
	4	8000318		2011-08-16	Wiley, William L. et al.	
	5	8098579		2012-01-17	Ray, Amar N. et al.	
	6	8155670		2012-04-10	Fullam, Scott et al.	
	7	8374090		2013-02-12	Morrill, Robert J. et al.	
	8	7457265		2008-11-25	Julka, Vibhor et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2457
	Examiner Name	Sall, El Hadji Malick
	Attorney Docket Number	RALEP018

	9	7729326		2010-06-01	Sekhar, Ramesh	
	10	7929973		2011-04-19	Zavalkovsky, Arthur et al.	
	11	7945945		2011-05-17	Graham, Richard et al.	
	12	8059530		2011-11-15	Cole, Terry L.	
	13	8266681		2012-09-11	Deshpande, Sumit B. et al.	
	14	8280354		2012-10-02	Smith, Christopher et al.	
	15	8331293		2012-12-11	Sood, Kapil	
	16	8019820		2011-09-13	Son, Giyeong et al.	
	17	8155155		2012-04-10	Chow, Albert T. et al.	
	18	8191116		2012-05-29	Gazzard, Daryl	
	19	6292828		2001-09-18	Williams, David L.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2457
	Examiner Name	Sall, El Hadji Malick
	Attorney Docket Number	RALEP018

	20	7043226		2006-05-09	Yamauchi, Toshiaki	
	21	7472189		2008-12-30	Mallya, Arvind R. et al.	
	22	7944948		2011-05-17	Chow, Albert T. et al.	
	23	8005009		2011-08-23	McKee, Neil et al.	
	24	7760861		2010-07-20	Croak, Marian et al.	
	25	8060463		2011-11-15	Spiegel, Joel R.	
	26	8224773		2012-07-17	Spiegel, Joel R.	
	27	8352980		2013-01-08	Howcroft, Jerald Robert	
	28	8386386		2013-02-26	Zhu, Kevin	
	29	8340718		2012-12-25	Colonna, Massimo et al.	
	30	8385896		2013-02-26	Proctor, Jr., James A. et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2457
	Examiner Name	Sall, El Hadji Malick
	Attorney Docket Number	RALEP018

	31	8320949		2012-11-27	Matta, Sudheer Poorna Chandra	
	32	8279864		2012-10-02	Wood, Daniel M.	
	33	8271045		2012-09-18	Parolkar, Satish et al.	
	34	8233883		2012-07-31	De Froment, Eric	
	35	8224382		2012-07-17	Bultman, Michael J.	
	36	8184590		2012-05-22	Rosenblatt, Ariel	
	37	8174970		2012-05-08	Adamczyk, Maria et al.	
	38	8165576		2012-04-24	Raju, Vishwanath et al.	
	39	8073721		2011-12-06	Lewis, Lundy	
	40	8032899		2011-10-04	Archer, Charles J. et al.	
	41	7974624		2011-07-05	Gallagher, Michael D. et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2457
	Examiner Name	Sall, El Hadji Malick
	Attorney Docket Number	RALEP018

	42	7907970		2011-03-15	Park, Vincent D. et al.	
	43	7778176		2010-08-17	Morford, Michael Robert	
	44	7725570		2010-05-25	Lewis, Lundy	
	45	7634388		2009-12-15	Archer, Charles J. et al.	
	46	7633438		2009-12-15	Tysowski, Piotr Konrad	
	47	7593417		2009-09-22	Wang, James et al.	
	48	7551922		2009-06-23	Roskowski, Steve et al.	
	49	7545782		2009-06-09	Rayment, Stephen G. et al.	
	50	7802724		2010-09-28	Nohr, Steven Paul	
	51	7039037		2006-05-02	Wang, Jiwei R. et al.	
	52	6928280		2005-08-09	Xanthos, James et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2457
	Examiner Name	Sall, El Hadji Malick
	Attorney Docket Number	RALEP018

	53	6765925		2004-07-20	Sawyer, Wilson et al.	
	54	5889477		1999-03-30	Fastenrath, Ulrich	
	55	8447980		2013-05-21	Godfrey, James A. et al.	
	56	8429403		2013-04-23	Moret, Eric et al.	
	57	8411587		2013-04-02	Curtis, William et al.	
	58	8396929		2013-03-12	Helfman, Nadav et al.	
	59	8363658		2013-01-29	Delker, Jason R. et al.	
	60	8265004		2012-09-11	Toutonghi, Michael J.	
	61	8233895		2012-07-31	Tysowski, Piotr Konrad	
	62	7685254		2010-03-23	Pandya, Ashish A.	
	63	7181017		2007-02-20	Nagel, Robert H. et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2457
	Examiner Name	Sall, El Hadji Malick
	Attorney Docket Number	RALEP018

	64	6965872		2005-11-15	Grdina, Jerome M.	
	65	8402540		2013-03-19	Kapoor, Harsh et al.	
	66	8135657		2012-03-13	Kapoor, Harsh et al.	
	67	8271992		2012-09-18	Chatley, Scott P. et al.	
	68	8315999		2012-11-20	Chatley, Scott P. et al.	
	69	8332375		2012-12-11	Chatley, Scott P. et al.	
	70	8468337		2013-06-18	Gaur, Santosh P. et al.	
	71	8477778		2013-07-02	Lehmann, Jr., L. Curtis et al.	
	72	6640097		2003-10-28	Corrigan, Louis et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2457
	Examiner Name	Sall, El Hadji Malick
	Attorney Docket Number	RALEP018

	1	20080120668		2008-05-22	Yau, Frank Chuen-Foo	
	2	20030171112		2003-09-11	Lupper, Alfred et al.	
	3	20070300252		2007-12-27	Acharya, Swarup et al.	
	4	20050007993		2005-01-13	Chambers, Mahdi et al.	
	5	20020164983		2002-11-07	Raviv, Li-On et al.	
	6	20070280453		2007-12-06	Kelley, Sean S. et al.	
	7	20100241544		2010-09-23	Benson, Dan et al.	
	8	20090157792		2009-06-18	Fiatal, Trevor	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	1889777A	CN		2006-07-19	Huawei Tech. Co. Ltd.		☐

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2457
	Examiner Name	Sall, El Hadji Malick
	Attorney Docket Number	RALEP018

	2	101155343A	CN		2006-09-29	Huawei Tech. Co. Ltd.		☐
	3	101035308A	CN		2006-03-09	Huawei Tech. Co. Ltd.		☐
	4	2007124279	WO		2007-11-01	Cisco Technology, Inc.		☐
	5	2005008995	WO		2005-01-27	Starhub Ltd.		☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12380773
	Filing Date	2009-03-02
	First Named Inventor	Raleigh, Gregory G.
	Art Unit	2457
	Examiner Name	Sall, El Hadji Malick
	Attorney Docket Number	RALEP018

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature		Date (YYYY-MM-DD)	2013-07-17
Name/Print	Krista S. Jacobsen	Registration Number	59374

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
1 November 2007 (01.11.2007)

PCT

(10) International Publication Number
WO 2007/124279 A2

(51) International Patent Classification:
H04M 1/66 (2006.01)

(21) International Application Number:
PCT/US2007/066514

(22) International Filing Date: 12 April 2007 (12.04.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/408,764 21 April 2006 (21.04.2006) US

(71) Applicant *(for all designated States except US)*: **CISCO TECHNOLOGY, INC., ET AL.** [US/US]; 170 West Tasman Drive, Sjc/10/2/1, San Jose, California 95134-1706 (US).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **LEE, Shze Chew** [MY/US]; 881 Las Palmas, Irvine, California 92602 (US). **GUTMAN, Andrew M.** [US/US]; 26 Saucito, Foothill Ranch, California 92610 (US). **WILLIS, Edward Dean** [US/US]; 3100 Independence Parkway #311-164, Plano, Texas 75075 (US).

(74) Agents: **LAFFERTY, Wm. Brook** et al.; Scientific-Atlanta, Inc., Intellectual Property Dept., 5030 Sugarloaf Parkway, Lawrenceville, Georgia 30044 (US).

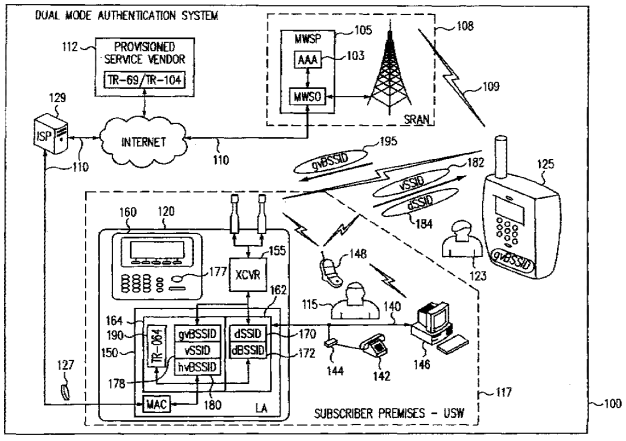
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

[Continued on next page]

(54) Title: SIMPLIFIED DUAL MODE WIRELESS DEVICE AUTHENTICATION APPARATUS AND METHOD



(57) Abstract: Provisioned wireless service (PWS) authentication apparatus and method simplifies determination of PWS authentication state by dual mode access point (DMAP) receiving an identifying credential from supplicant dual mode mobile station (DMMS) within predefined authentication period and comparing with authentication credential. DMMS is provisioned PWS upon authentication. DMAP having multiple BSSID remotely configurable to differentiate between provisioned services (e.g., voice, VoIP) and standard wireline/fixed wireless services. DMAP and DMMS are each identifiable by respective unique provisioned service BSSID. Identifying credential can be pass code supplied to DMMS user by DMAP operator to facilitate authenticated association and to deter wireless channel interlopers.

WO 2007/124279 A2

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.

SIMPLIFIED DUAL MODE WIRELESS DEVICE AUTHENTICATION APPARATUS AND METHOD

by

SHZE CHEW LEE
ANDREW GUTMAN
EDWARD DEAN WILLIS

TECHNICAL FIELD

The present invention relates to security apparatus and methods and, in particular, to apparatus and methods for authentication of a dual-mode wireless device.

BACKGROUND

With the confluence of electronic communications, data, and computing services, (collectively, services) there arises a need to bridge the disparate network infrastructures supporting these services and to address resulting new opportunities and challenges. A wireline network (WLN) employs a structured transmission medium, including copper wire, fiber optic cable, and other defined waveguides. By comparison, a wireless network can be any network with a physical layer that permits constituent devices to communicate using an unstructured transmission medium, such as the atmosphere, or space. Wireless networks have developed within two formerly distinct

spheres: wireless wide area networks (WWAN), which were cast in the formal likeness of wireline telephony networks; and wireless local area networks (WLAN), which are often informally structured, if at all, having coverage zones of at least three of magnitude less than a WWAN. Currently popular WWAN networks can provide mobile wireless services, as specified by the AMPS, D-AMPS, PCS, GSM, and UMTS wireless mobile service standards. A growing diversity of WLAN standards describe the physical-to-network architectures of fixed wireless services, with devices operable with WLAN frequently being capable of being operable with more than one type of fixed wireless service. Dual-mode devices were developed to meet the diverse needs of those using both WWAN and WLAN systems.

Dual-mode services are becoming attractive to mobile operators and their subscribers because of three trends: a growing population of mobile subscribers, the prevalence of home broadband connections, and the availability of low-cost, home wireless access points that support local wireless networking. To satisfy this evolving need, technology manufacturers are developing and introducing into the marketplace, dual-mode devices, that is, devices capable of communicating over mobile radio networks, such as mobile phone networks, and wireless local area networks,

such as those found in the increasingly popular "hotspots," or access zones for wireless networking, frequently providing the myriad of services available over the Internet.

A dual mode device can offer advantages over a single mode device. First, although mobile wireless systems may provide mobile wireless services to the high-mobility receiving stations of subscribers within a broad geographic area, they bear the disadvantages of poor indoor reception and uneven signal availability, particularly in dense urban environments hilly terrain. Second, fixed wireless systems can deliver a vast range of broadband services to stationary or low-mobility receivers located indoors, within a broadcast zone (e.g., hot spots or hot zones), but are disadvantaged by sharply-limited signal range, security and billing concerns, and the uncertainties arising from proprietary ownership and non-uniform product availability. Thus, a dual-mode device can enable a mobile service subscriber to switch from mobile wireless services to fixed wireless services, for example, in an area of poor mobile wireless service coverage. In addition, with a dual-mode device, using dual-mode services, mobile wireless service subscribers may make voice calls when outdoors in the ordinary manner, using the facilities of the subscribed

mobile wireless service at the standard tariff rate. While indoors or in a remote geographic location where a signal compatible with the subscribed mobile wireless network is unavailable, a dual-mode device may permit customers to make and receive voice calls using a fixed wireless network. To reflect the offloading of the subscriber's call bandwidth from the mobile wireless service provider's to a less-expensive fixed wireless network and the Internet, the mobile wireless provider may offer the mobile wireless subscriber lower tariff rates when using a fixed-wireless link. Also, a dual-mode device makes possible voice call handoff and transfer of communication links as a subscriber roams between mobile wireless and fixed wireless systems. Furthermore, dual-mode devices and services create an opportunity for subscribers or vendors who wish to assist a third party with obtaining provider-authorized allocations of mobile wireless voice or dual-mode services. Nevertheless, there is a substantial need to provide apparatus and methods rendering the desired degree of security to protect a mobile wireless provider infrastructure from Internet-based threats, as well as to safeguard provider network operator for their subscribers from interlopers and miscreants.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, aspects and advantages of the present invention will be more fully understood when considered with respect to the following detailed description, appended claims and accompanying drawings, wherein:

FIG. 1 is a graphical depiction of a dual-mode authentication system, as an embodiment of the invention herein;

FIG. 2 is a generalized flow diagram of a subscriber-provisioner dual-mode authentication operation, according to an embodiment of the present invention; and

FIG. 3 is a generalized flow diagram of a subscriber-passthrough dual-mode authentication operation, according to another embodiment of the present invention.

DETAILED DESCRIPTION

The inventive embodiments of the invention described herein include apparatus and methods for provisioning provisioned wireless services (PWS) to an authorized device by a provisioned service provider (PSP) in which a supplicant device may become an authorized device after successful authentication. A PWS can be any wireless service including, without limitation voice service, short

message service (SMS), multimedia message service (MMS), video broadcasts, instant messaging, news and financial information, games and interactive gaming, Web-based services, and premium data services, to name a few.

A PSP can be a mobile wireless service provider, which also may operate a WWAN, also known as a radio area network, or RAN. A mobile telephone network is an exemplary RAN. Typically, WWAN provide service signals over a broad geographic region, using high-powered (more than 10W per channel) transmitters that are licensed to broadcast within defined frequency bands, which typically are allocated and regulated by a public authority. WWAN signals may be encoded or use sophisticated signaling techniques to provide privacy between communicating parties from potential eavesdroppers. Current WLAN transmit signals that are low-powered (under 0.1W per channel), limited-range (under about 300 m), and generated within prescribed frequency bands (e.g., 2.4 GHz, 5 GHz, 11 GHz, and 60 GHz). In general, such fixed wireless networks may be designated "unlicensed spectrum" wireless networks (USW), because by international consent, no operating license is required for wireless systems designed to operate within these constraints. USW can include networks employing the wireless protocols defined by the IEEE Std.

802.11 family of standards (including IEEE WLAN Stds. 802.11a, 802.11b, 802.11g, 802.11n, and 802.11j); IEEE Std. 802.15 (including wireless personal area networks - WPAN); IEEE Std. 802.16 (including wireless metropolitan area networks - WMAN); and by the ETSI Broadband Radio Access Network and Radio LAN Standards (e.g., HiperLAN2, HiperMAN, and HiperRAN), as well as, the TTR Korea WiBRO mobile network standard.

In large part, a wireline network (WLN) can be based on one of the family of standards, IEEE Std. 802.3 CSMA/CD Access Method, including 10 Mbps "Ethernet" (Stds. 802.3a, 802.3i, and 802.3j), 100 Mbps "Fast Ethernet" (Std. 802.3u), 1000 Mbps Gigabit Ethernet [GbE] (Stds. 802.3z, 802.3ab), and 10,000 Mbps GbE (Std. 802.3ae) Because IEEE Stds. 802.3 specify the lowermost networking layers (e.g., OSI Layers 1-3), the inventive embodiments herein are foreseeably operable with access technologies having bandwidth greater than 10 Gigabit Ethernet WLN. Each of the foregoing standards and specifications are incorporated herein, in their entirety. Also as used herein, the term generic access network (GAN) refers to both USW and WLN, when convenient to distinguish both from RAN-based networks. Furthermore, a WLN may include the Internet,

where a person having ordinary skill in the art would recognize that inclusion is appropriate.

As used herein, the like terms "provision" and "provisioned" in verb form, and "provisioning" in gerund form, refer to a process including one or more of, without limitation: creating for an authorized user a service account for a subscribed service, the appropriate access to that account, the rights associated with that account, and the resources for managing the accounts; configuring one or both of authorized user hardware and software to activate the subscribed service; creating or modifying a record in an authorized user database and associating it with the service(s) and service level for which the authorized user has subscribed; providing the authorized user with subscribed provisioned wireless service resources, in accordance with the subscription agreement; and issuing preselected allocation units of PWS to the authorized user, upon request. Performing AAA services in conjunction with PWS requests and usage can be a provisioning activity as well. In general, AAA services include authentication, authorization and accounting, whereby prior to service, a PWS requester is authenticated and authorized to use the service offered by a MWSP or PSV in response to the PWS request; and while the PWS is delivered, PWS usage is

metered and usage data is collected and can be associated with billing and collection.

PWS offered over a subscribed RAN (SRAN) typically are within the context of well-established and highly regulated access control, security, integrity, cost recovery, billing, enforcement, and Quality of Service mechanisms. GAN may lack one, more, or all of these features, simplifying the quest of unscrupulous users to purloin, misuse, or compromise valuable wireless services. To address the disparities in the regulatory and business structures between SRAN and GAN, and to encourage providers to offer valuable data and services regardless of the transmission medium used, a number of entities have put forth standards, provisional recommendations, and proposals for interoperative infrastructure management and policy enforcement. Pragmatic implementations tend to control access to services at a point close to service use, namely the customer premises, by remote management of customer premises equipment (CPE) through which such data and services are requested.

It is desirable to implement embodiments of the present invention in cooperation with remotely managed customer premises equipment (CPE) in accordance with a managed access architecture, premises network, and

management, control, and interoperability principles and standards, articulated by the following exemplary DSL Forum Technical Reports, as amended: TR-044, Auto-Configuration for Basic Internet (IP-based) Services, December 2001; TR-046 Auto-Configuration Architecture & Framework, February 2002; TR-064, LAN-Side DSL CPE Configuration, May 2004; TR-069, CPE WAN Management Protocol, May 2004; TR-092, Broadband Remote Access Server (BRAS) Requirements Document, August 2004; TR-094, Multi-Service Delivery Framework for Home Networks, August 2004; TR-104, DSLHome™ Provisioning Parameters for VoIP CPE, September 2005; TR-110, DSLHome™ Reference Models for VoIP Configurations in the DSL Home, September 2005; and TR-111, Applying TR-069 to Remote Management of Home Networking Devices, December 2005. It is to be understood that other CPE-management models also may apply, including without limitation, those described in European Telecommunications Standards Institute document: Telecommunications and Internet Converged Services and Protocols for Advanced Networking (TISPAN); NGN management; OSS Architecture Release 1 (ETSI TS 188 001 V0.2.9 (2005-07)); and by IEEE Std. 802.21. The foregoing standards of the IEEE, ETSI, Korea TTR, and DSL Forum are incorporated herein by reference, in their entirety.

In general, the three fundamental security processes include access control, authentication, and audit. Of these constituent security processes, access control is a policy-based process that determines whether a supplicant is permitted to access a requested resource or service (i.e., "Are you permitted to access this resource?"). Authentication is a credential-based process by which a supplicant verifies its identity to the authenticator (i.e., "Are you who you say you are?"). Authentication also may include identification, and non-repudiation functions. Audit is an administrative process by which the appropriateness of policy-defined access to resources is monitored, and by which security enforcement mechanisms may be invoked upon identification of a policy violation. Audit also may include analysis of integrity (e.g., of link, data, or identity), intrusion detection, and containment. Finally, authorization can be an executive process that comprehends at least two of the constituent security processes, usually incorporating requirements of security policy, regulatory framework, and the like. For example, in an authorization process where a security policy implements authentication, a supplicant is required to prove its identity before access credentials are issued to the supplicant. In practice, security processes may

vary in scope vertically and horizontally, and be almost as diverse in implementation as the applications needing security. A security process of vertical scope may operate at increasingly complex and abstract layers, e.g., authentication may be described within the context of a device level, a user level, an organization level, and an enterprise level. Similarly, horizontal security processes can include compartments that span communication occurring at one or more points along a communication path. For example, authentication may be compartmentalized with respect to a simple device-to-device exchange, to remote network links, or to a complete end-to-end secure communication exchange. End-to-end security also may result from cooperation of a sequence of cooperating authentication compartments which, in the whole, span the communication path. Frequently, contiguous subprocesses interact or overlap, although there may be no requirement for a given security process to be continuously operable over any portion of the communication path or over more than one physical or logical layer. Cryptographic processes may also be a constituent of authorization, and may include key creation, management, and distribution and encrypted communications. Thus, even if a supplicant is properly authenticated to the desired horizontal and

vertical layers of security, the supplicant may not be able to participate in particular communications because the authorization process denied a requisite encryption key to the supplicant. The aforementioned security principles, as used herein are provided in National Institute of Standards and Technology (NIST) Special Publication 800-12, An Introduction to Computer Security: The NIST Handbook; and NIST Special Publication 800-48, Wireless Network Security: 802.11, Bluetooth and Handheld Devices, which documents are hereby incorporated herein in their entirety. Desirably, security processes exemplified in the present embodiments can implement or facilitate AAA processes of a provisioned service provider, and may further be enhanced by remote configuring of a local authenticator in an USW access point, in accordance with a foregoing remote configuration as a CPE.

Within the above context, FIG. 1 illustrates an embodiment of dual-mode authentication system 100 according to the present invention that includes a USW access point. Mobile wireless service provider (MWSP) 105, coupled to a RAN-based subscribed radio area network (SRAN) 108 and a wireline network (WLN) 110, can provision PWS, when requested, directly, or through an intermediary, which may be a Provisioned Services Vendor (PSV) 112. PSV 112, also

coupled to the WLN 110, can provision PWS to an authorized device, and may provision PWS in cooperation with another provisioned service provider (PSP), which may include MWSP 105. The authorized device may be dual-mode access point (DMAP) 120 of unlicensed spectrum wireless network (USW) 117 operated by MWSP provisioned service subscriber (PSS) 115. DMAP 120 can be a USW access point adapted to couple USW 117 to wireline network (WLN) 110, and to be remotely configurable by a PSP. An authorized user also can be PSS Guest 123. Guest 123 can communicate using dual mode mobile station (DMMS) 125. DMMS 125 can be configurable to communicate, in a first mode, with DMAP 120 over USW 117 and, in a second mode, with MWSP 105 over SRAN 108. DMSS 125 need not be configured to communicate in both modes simultaneously. DMMS 125 may be a supplicant wireless device, e.g., as it seeks to associate with DMAP 120, or may be an associated device, e.g., after association is completed. It is desirable to adapt DMAP 110 to be configurable as a remotely managed CPE using a remote CPE management technique, such as the aforementioned techniques for remotely managed CPE. Using DMMS 125 in communication with the DMAP 120, Guest 123 can request, and may be authorized to receive, a predefined PWS allocation unit, hereafter, a PWS token 127, requested from one of MWSP 105,

PSV 112, and PSS 115. DMAP 120 can be configured to employ a first predefined authentication technique, in which DMAP 120 authenticates the identity of DMMS 125 and, upon DMMS 125 authentication by the predefined authentication technique, to provision PWS token 127 to DMMS 125. Alternatively, DMAP 120 can be configured to facilitate PWS provisioning by employing a second predefined authentication technique, in which DMAP 125 passes authentication credentials obtained from DMMS 125 through to a provisioned service provider (PSP), including one of MWSP 105 and PSV 112. Upon authentication of DMMS 125, the PWS provisioner can transmit PWS token 127 to DMAP 120, which can pass PWS token 127 to DMMS 125.

In general, DMAP 120 can implement link-layer and device-level authentication, as described by IEEE Std. 802.11 (1999) and by IEEE Std. 802.1X, including WEP, WPA, WPA2, MAC filtering, and the like. See, for example, the white paper entitled: "A Comprehensive Review of 802.11 Wireless LAN Security and the Cisco Wireless Security Suite" (October 2003) at URL: http://www.cisco.com/warp/public/cc/pd/witc/ao1200ap/prodlit/wswpf_wp.pdf (verified March 21, 2006), hereinafter referred to as "A Comprehensive Review." However, provisioned service providers may demand user-level

authentication of supplicant guest 123 attempting to access provisioned services, so that the identity of guest 123 is verified. To this end, it may be convenient to implement selected embodiments of the present invention to provide user-level authentication. User-level authentication implementations are well-known in the converged arts art of computer and network security, as may be typified in "A Comprehensive Review", as well as in the Broadcom Corporation White Paper entitled "Securing Home Wi-Fi® Networks: A Simple Solution Can Save Your Identity," Wireless-WP200-x, (May 18, 2005) at URL http://www.54g.org/pdf/Wireless-WP200-RDS.pdf(verified March 21, 2006); and in the Cisco Systems, Inc. Application Note, entitled: "802.1x and EAP-Based Authentication Across Congested WAN Links," March 2002, at URL http://www.cisco.com/warp/public/cc/pd/witc/ao350ap/prodlit/authp_an.pdf (verified March 16, 2006). The foregoing references are hereby incorporated by reference herein in their entirety, but are exemplary, are not to be considered inclusive or limiting examples.

Also, effective security implementations in a wireless/USW environment can include successive layers of constituent security processes, sequences of constituent security processes, and combinations thereof. In a fixed

wireless environment/USW, one device-level authentication implementation, e.g., OSA, effects connectivity between devices in the physical link layer, but is susceptible to breach when viewed from the perspective of a logical, end-to-end implementation. Other device-level authentication methods, such as MAC filtering, can provide an appropriately greater degree of security than OSA, but are not intended to verify the identity of the entity using the device. In this instance, entity authentication techniques may be used to verify the identity of the entity by comparing identification information provided by the entity to the content of a known and trusted information repository. User-level authentication is a form of entity authentication capable of being adapted to the fixed wireless/USW environment, in which the user of a USW supplicant device can provide a credential verifiably asserting the user's identity.

Embodiments of the present invention can be adapted to implement horizontal and vertical constituent and executive security processes which cooperate to identify one of the authentication state, indicating whether guest 123 has proven its identity through DMMS 125, and the eligibility state, indicating whether DMMS 125 is a supplicant device eligible to receive provisioned wireless services. In

selected exemplary embodiments, it is desirable to configure an authenticator, such as local authenticator 150 to implement link-layer, and device-to-device, authentication and identification. Relative to link layer and device-to-device authentication, local authenticator can determine whether supplicant device DMMS 125 is as mobile device, which may be allowed to associate with DMAP 110, and which potentially may be eligible to request provisioned services. The inventive embodiments herein desirably provide remote CPE configuration of local authenticator 150 by provisioned service providers MWSP 105 and PSV 112, by which local authenticator 150 can be configured to implement user-level authentication. In exemplary embodiments, guest 123 may be authenticated at a user level to receive provisioned wireless services using DMMS 125. Local authenticator 150 can challenge a supplicant, such as DMMS 125, to prove its identity, with the result of the challenge being represented by an authentication state. DMMS 125 can communicate to DMAP 110 a pass code entered by guest 123. Local authenticator 150 can evaluate the pass code to determine an authentication state with respect to guest 123. If the authentication state of DMMS 125 indicates that the identity of guest 123 using DMMS 125 is authenticated, then local authenticator

150 may use the identification information to further qualify supplicant device DMMS 125 for eligibility to received selected provisioned services. The term eligibility can comprehend product capabilities as well as service or QoS features that may be available to guest 123 under term of a provisioned service subscription agreement, which agreement may be made between PSS 115 and PSV 112 or MWSP 105.

Embodiments of the present invention can effect one or both of authentication and provisioning, at least in part, by securely transmitted authentication, authorization, and provisioning information from upstream provisioned service providers including, without limitation, MWSP 105 and PSV 112. In contrast, authentication and other security mechanisms and methods that operate autonomously within the local communication range of an access point, typically have at least one non-secure broadcast, through which an interloper or miscreant may be able to gain access to the network broadcasting its availability. Furthermore, in some local authentication schemes, an access point is adapted to allow the device-level authentication, linking and association of other supplicant mobile stations that may present acceptable device-level authentication or identifying credentials to the soliciting access point,

within an activation or accession period. These schemes may permit interloping or miscreant mobile stations may be among the plural supplicant devices. Advantageously, embodiments of the present invention can limit accession by supplicant devices by terminating access point activation upon successful authentication of a supplicant device, even if the authentication period of predetermined length has not elapsed.

Thus, PWS authentication according to embodiments of the present invention, can provide a secure authentication process by which the identity of Guest 123 using DMMS 125 is verified. Although embodiments of the present invention are conveniently illustrated in the context of access points, such as DMAP 120, which are capable of providing one or both of multiple SSID and BSSID, it must be understood that PWS authentication can be implemented with DMAP 120 providing a single SSID, a single BSSID, or both. In such an instance, differentiation between provisioned and non-provisioned services (e.g., VoIP and ISP data, respectively) can be implemented in a component or function cooperating with DMAP 120, such as a router (not shown) capable of managing data packets tagged or identified by content or requisite QoS. DMAP 120 may operate with PWS authenticated mobiles stations such as DMMS 125 and may

reject traffic from non-PWS-authenticated mobile stations. In such a case, DMAP 120 may accept all traffic from the PWS-authenticated client, with the router (not shown) coupled thereto, managing service differentiation. Router service differentiation, for example, may be accomplished by using internal queueing policies, by priority handling techniques generally guided by IEEE Stds. 802.1p or 802.1q, or by combinations thereof. The router (not shown) may be configured to differentially manage provisioned traffic from a PWS-authenticated mobile station, such as DMMS 125, and also may offer virtual LAN (VLAN) functions. The aforementioned IEEE Stds. 802.1p and 802.1q are hereby incorporated herein in their entirety. DMAP 120 may be configured to accept provisioned service traffic from one or more PWS-authenticated mobile stations, such as DMMS 125, and to reject non-provisioned service traffic. DMAP 120 also may be a constituent of a multifunction dual-mode wireless service apparatus in which the aforementioned router (not shown) also is a constituent device cooperating with DMAP 120.

Also disposed on the premises of PSS 115 can be subscriber home network (SHN) 140, which may subsume, and may be at least partially co-located with USW 117. SHN 140 home can include subscriber home telephone 142. If

telephone 142 is an analog device, an adaptor such as foreign exchange system gateway (FXS) 144, may be coupled between SHN 140 and telephone 142. An FXS gateway can be adapted to connect a standard analog telephone or fax machine to a digital, IP-based data networks, and can be exemplified by Linksys® SPA1001 Phone Adapter, produced by Cisco/Linksys®, Irvine, CA. FXS 144 enables a user to communicate with other digital communication devices to which FXS 144 is coupled, such as DMAP 120. Advantageously, using an adaptor such as FXS 144, PSS 115 can use telephone 142 to remotely control, configure, and operate DMAP 120, at least in part, including supplying activation and security codes to DMAP 120. Conveniently, telephone 142 may be located in a room or office, on the premises of PSS 115, remote to DMAP 120 but coupled to SHN 140. SHN 140 also may include computer 146, irrespective of type or configuration (e.g., desktop, laptop, personal digital assistant), or mode of connection (e.g., wired or wireless). DMAP 120 may Computer 146 may be dispositioned with the appropriate hardware and software, which may be useful in communicating with, and at least partially configuring, DMAP 120. Also, PSS 115 may have, as part of SHN 140, wireless handset 148, which may possess dual mode mobile station functionality, or may operate as a

communicating device on USW 117. Handset 148 may be adapted to allow PSS 115 to modify a configuration of DMAP 120. DMAP 120 further may be a constituent of a multifunction dual mode wireless service apparatus, which includes one or more functions of an analog telephone adaptor (ATA), having FXS and outgoing foreign-service office (FXO) features, but which may be adapted to receive signals from analog telephony devices coupled thereto, which signals can be used to modify or configure the operation or function of DMAP 120, including activating DMAP 120 for an authentication period.

DMAP 120 can include subscriber interface 160, transceiver 155, and local authenticator (LA) 150. Desirably, subscriber interface 160 includes features such as manual entry keys, and a display, which may be a screen display or other display providing DMAP-related information and feedback to PSS in a visually perceivable format. Advantageously, all or part of subscriber interface 160 may be provided in hardware, software, or an operable combination thereof. In addition, subscriber interface 160 may be a distributed interface, in that a portion of interface 160 can be implemented on computer 146, for example, in a web browser interface. This convenient functionality can allow PSS 115 to remotely control,

configure, and operate DMAP 120, at least in part, including supplying activation and security codes to DMAP 120. Conveniently, computer 146 may be located in a room or office, on the premises of PSS 115, remote to DMAP 120 but coupled to SHN 140. Typically, DMAP 120 includes transceiver 155, configured to bidirectionally wirelessly communicate with associated and supplicant wireless devices, including DMMS 125. DMAP 120 also may wirelessly communicate with computer 146 and PSS wireless handset 148 if the respective devices are configured and disposed to do so. Local authenticator (LA) 150 is a processing unit of DMAP 120, adapted to perform one or more of effecting association of supplicant wireless devices with DMAP 120 in the context of USW 117; facilitating recognition, verification, and differentiation of signals from associated devices; and to preserve and manage connectivity among associated devices coupled to DMAP 120. Moreover, LA 150 can be adapted to authenticate, in a first authentication mode, or to facilitate authentication, in a second authentication mode, of supplicant devices including DMMS 125. Also, upon authentication of DMMS 125, LA 150 can be configured to provision PWS token 127 to DMMS 125, or to pass PWS token 127 to DMMS 125, after DMMS 125 is authenticated by a PSP, such as MWSP 105 or PSV 112.

It may be desirable to differentiate between PWS and non-provisioned services, with the latter being provided, for example, by ISP 129. It also may be desirable to further differentiate between different types or classes of PWS provided by the same PSP (e.g., MWSP 105, PSV 112) or between the same type or class of PWS provided by a first PSP, e.g., MWSP 105, and a second PSP, e.g., PSV 112. To facilitate explanation of differentiated service management, PWS hereafter are referred to a "voice services," and non-provisioned services hereafter are referred to a "data services." Currently, wireless devices such as DMAP 120, typically employ a unique, typically alphanumeric, identifier, called a service set identifier (SSID) that wireless networking devices use to establish and to maintain wireless connectivity. Multiple access points on a network or sub-network, including DMAP 120, can use the same SSID to identify the particular wireless network which it forms or with which it is associated. An access point, including DMAP 120, also can employ a unique identifier, namely a basic service set identifier (BSSID) to distinguish itself from other wireless network access points. DMAP 120 can be configured with a basic service set, relative to wireless networking devices, such as DMMS 125, which may seek to associate with DMAP 120. By

extension, the basic service set of DMAP 120 may be uniquely identified with a basic service set identifier (BSSID) that may be used in a manner similar to a medium access controller (MAC) address relative to other base stations. Embodiments of the present invention can be implemented where DMAP 120 is capable of producing a single SSID, which implementation may provide one undifferentiated service channel adapted to convey both provisioned data and non-provisioned data. Desirably, DMAP 120 can be capable of producing multiple SSIDs and BSSIDs. Exemplary access points capable of producing multiple, configurable SSIDs include the CISCO AIRONET 1100 Series Access Point, the LINKSYS WRTP54G Wireless Router with VoIP, and the LINKSYS WAP54GP Wireless-G Access Point, both available from Cisco Systems, Inc., San Jose, California.

In that regard, DMAP 120 may be configured to have a data-service BSSID (dBSSID 170) to identify a basic service set established for non-provisioned signal (e.g., data) communication; and a host voice-service BSSID (hvBSSID 180) to identify a basic service set established for signal communications related to provisioned wireless services, e.g., voice services. Separation of data and voice services can be advantageous when it is desirable, as here, to separately manage non-provisioned and provisioned

traffic. Thus configured with plural BSSIDs, DMAP 120 can perform content filtering. In addition, it may be desirable to assign multiple hvBSSIDs 180 to DMAP 120, permitting further differentiation of provisioned services, for example, based upon predefined content characteristics. LA 150 also can include data service interface 162 and provisioned service interface 164. Data service interface 162 generally recognizes and processes data and non-provisioned service content, such that PSS 115 may have control over, and associated privacy of, the content of signals directed to dBSSID 170. Data service interface also can process traffic from SHN 140, and can direct voice service signals therefrom to provisioned service interface 164. Provisioned service interface 164 generally recognizes and processes provisioned service content, such as voice services, such that the respective PSP (e.g., MWSP 105 or PSV 112) has control over the content of signals directed to hvBSSID 180.

Desirably, vBSSID numbers may be assigned in a manner similar to MAC addresses, i.e., a range of vBSSID values for dual-mode access points, such as DMAP 120, can be allocated to defined entities, such as a PSV 112 or mobile wireless service provider (MWSP) 105. Thus, each dual mode access point, such as DMAP 110, may be provided with at

least one respective unique vBSSID, such as hvBSSID 180. Typically, BSSIDs are programmable into an access point and, thus, DMAP 120 may have hvBSSID 180 pre-assigned thereto, for example, before it is placed in USW 117 for use by PSS 115. Alternately, a PSP, such as MWSP 105, or PSV 112, may remotely configure DMAP 120 by assigning a unique hvBSSID 180 as part of a registration process, and thereby establish provisioned service filtering, e.g., voice-service filtering, in DMAP 120. The registration process may be part of aforementioned CPE configuration and management process, in accordance with a remote management protocol, such as TR-069 CPE WAN Management Protocol. In this example, it is desirable to include in DMAP 120 managed CPE device interface 190 that can initiate and maintain filtering to implement differentiated content management, in accordance with CPE-side configuration management and maintenance functions, similar to those described in DSL Forum Technical Report TR-064. In a particular example, through the facility of interface 190, a PSP, such as MWSP 105 and PSV 112, may remotely provision services and functions of DMAP 120 in accordance with provisioning parameters for VoIP CPE services (e.g., DSL Forum Technical Report TR-104), with VoIP signals being processed differentially from others, and managed according

to a VoIP provisioning agreement between the selected PSP and PSS 115. With voice-service filtering, signals received over USW 117 and directed to hvBSSID 180 can be managed, metered, and transmitted over WLN 110 to the respective PSP, e.g., PSV 112 or MWSP 105. Suitable voice signals for such voice-service filtering, can include voice-over-Internet-Protocol (VoIP) signals, as well as related voice traffic, such as voice-over-WLAN (VoWLAN) signals. Advantageously, signals not directed to hvBSSID 180 may not be controlled, altered, or affected by voice-service filtering. Accordingly, the radio set of DMAP 120, as represented of transceiver 155, may establish and manage a voice channel for provisioned voice signals (e.g., VoIP signals) separately from a data channel for non-provisioned signals (e.g., bulk data packet signals). Interface 190 may conveniently be disposed and operable within LA 150.

DMAP 120 may broadcast to indicate availability to provide wireless service. While broadcasting, DMAP 120 can transmit over voice channel 182, for example, a voice beacon bearing vSSID 178 to supplicant devices, associated devices, or both, thereby identifying voice channel 182. Similarly, DMAP 120 can transmit over data channel 184, for example, a data beacon bearing dSSID 172 to supplicant devices, associated devices, or both, thereby identifying

data channel 184. Accordingly, an exemplary supplicant wireless device, which may be DMMS 125, can identify an appropriate channel 182, 184 over which to communicate with DMAP 120. Exemplary DMAP 120 can provide, through voice service interface 135, a voice-service channel typically identified by vSSID 150 and, through data service interface 137, a data-service channel typically identified by dSSID 155.

It can be expedient to allocate and assign a range, or block, of vBSSID values to an identified DMMS entity including, for example, a DMMS manufacturer, DMMS distributor, DMMS vendor, DMMS service provider, PSV 112, and MWSP 105. By associating a vBSSID in this way, gvBSSID 195 may be indicative of the provider of DMMS 125, its corresponding service capabilities, and its corresponding appliance feature sets (e.g., VoIP, MMS, video, GPS). Beneficially, DMMS 125 can be assigned unique vBSSID, for example, gvBSSID 195, as a virtual MAC address corresponding to and identifying DMMS 125. gvBSSID 195 may indicate that DMMS 125 corresponds to a series of VoIP-capable appliances of a particular manufacture; is capable of SIP-based VoIP messaging; and was supplied to guest 163 within the context of an agreement with PSV 112. Embodiments of the present invention can be implemented to

configure DMAP 120 to provision, to accept, or to reject specific services to selected gvBSSID identifiers. Selection or rejection of a particular gvBSSID may be accomplished using well-known MAC filtering techniques or functional equivalents thereof. For example, DMAP 120 can be configured by PSV 112, to reject voice-service requests from those DMMS bearing gvBSSID identifiers which denote dual-mode appliances not within the scope of a voice-service agreement with PSV 112. MWSP 105 and other PSP may be able to similarly interact with DMAP 120, or the remotely managed functions of DMAP 120 may be exclusively under the control of PSV 112.

For numerous reasons, Guest 123 may wish to receive authorization to use PWS on DMMS 125. One exemplary reason may arise from DMMS 125 being located out of range of signals from SRAN 108. For example, Guest 123 may be indoors or may be in a foreign geographic region where RAN signals compatible with DMMS 125 may be unavailable. USW 117 may be disposed in a public venue such as an airport or large shopping plaza, for example, and PSS 115 may operate USW 117 in that venue. USW 117 also may be disposed outdoors, owing to the deployment of fixed wireless "neighborhood area" or "metropolitan area" networks currently undergoing widespread deployment, as well as more

robust WiFi™ equipment. Conveniently, Guest 123 may be able to communicate with DMAP 120 over USW 117 using DMMS 125, and thus may seek to be provisioned with PWS, including, for example, an allocation of VoIP services, in order to make and receive calls while in range of USW 117 or a compatibly interoperating USW. Similarly, Guest 123 may wish to receive non-voice PWS (e.g., priority stock market feeds available from PSV 112), which may not otherwise be available to Guest 123 through services offered by PSS 115 through ISP 129. Alternatively, Guest 123 may be a guest in the private home of PSS 115, and PSS 115 may wish to transfer PWS token 127 to DMMS 125 of Guest 123. PWS token may be representative of a portion of preallocated PWS or credit for PWS, for which accounting may be maintained in DMAP 120 for PSS 115, or in a PWS account of PSS 115 managed by a PSP, such as MWSP 105 or PSV 112.

Beneficially, DMMS 125 can be configured to facilitate DMAP 120 with provisioning voice service (as an exemplary PWS) to DMMS 125 by adapting to communicate voice signals through provisioned service interface 164 by way of DMAP voice channel 182, which may be identified by vSSID 178. Similarly, DMMS 125 may seek to associate with DMAP 120 and to communicate data signals through data service

interface 162, using data channel 184 that can be identified by dSSID 155 and be configured separately and distinctly from voice channel 182. As indicated above, some form of authentication can be desirable for wireless communication services, particularly for provisioned services, such as voice services (e.g., VoIP services), which may use a potentially vulnerable wireless link. DMMS 125 may facilitate DMAP 120 provisioning of voice services by supplying to DMAP 120 identifying credentials during association supplication or upon request of DMAP 120. Identifying credentials may include a predetermined pass code, a predefined unique supplicant device identifier, and a combination thereof. DMAP 120 may store therein one or more pass codes and one or more predefined unique supplicant device identifiers corresponding to wireless devices that may be authenticated to DMAP 120. Authentication of DMMS 125 to DMAP 120 can be designated "PWS authentication." By providing identifying credentials, PWS authentication of the identity of supplicant device DMMS 125 can be simplified, potentially expediting authorization of DMMS 125 to be provisioned with PWS. It also may be beneficial to perform a "pre-access authorization," which may include, for example, authenticating the identity of Guest 123 using well-known

authentication methods, with a successful pre-access authentication being followed by PSS 115 providing Guest 123 a PWS authentication pass code.

In a particular example of advantageous inventive embodiments herein, Guest 163 may desire to use DMMS 125 through DMAP 120 to receive provisioned voice services (e.g., VoIP) across USW 117. Although DMMS 125 may be able to couple to mobile wireless link 109 to receive voice services from MWSP 105, Guest 123 may wish to place a VoIP call through DMAP 120 and across WLN 110, perhaps because of a lower tariff charged by MWSP 105 for IP-based traffic. PSV 112 may be capable of provisioning PWS, such as VoIP voice service, to DMMS 125, for example, as a discount vendor of MWSP 105 services. PSV 112 may coordinate such third party provisioning with the MWSP AAA entity 103, so that DMMS 125 can be authorized to make and receive VoIP calls using the facilities of MWSP 105. Typically, communications between PSV 112 and MWSP AAA 103 are made using secure communication techniques, with safeguards against Internet interlopers and miscreants. Both PSV 112 and MWSP AAA 103 may decline to provision PWS requested by an outside party, such as Guest 123, unless sufficient safeguards are undertaken, including authenticating the identity of a requester, of the supplicant device for which

the provisioned service is requested, or both. Therefore, to satisfy a desire of MWSP 105 and PSV 112 for secure access to provisioned services, it may be expedient to provide authentication of supplicant device DMMS 125 as it requests to be provisioned, PWS through DMAP 120, including voice service over IP-based WLN 110. PSS 115 also may desire safeguards operable with DMAP 120 to reduce the likelihood of intrusion into USW 117 by a miscreant seeking to misappropriate or misuse assets associated with DMAP 120, including for example, PWS token 127 or sensitive data and access information of PSS 115, relating to service provisioning through DMAP 120 with a PSP. At the same time, from the perspective of Guest 123 and also of PSS 115, it can be desirable to simplify the mechanics of these safeguards, particularly in scenarios where PSS 115 and Guest 123 can cooperatively operate DMAP 120 and DMMS 125, respectively, to facilitate PWS authentication of DMMS 125 for PWS provisioning, including supplying PWS token 127. In one exemplary scenario, which may be useful in circumstances where PSS 115 is a business owner offering a hotspot to customers or other transient persons, PSS 115 can verify the identity of Guest 123, that is perform pre-access authentication of Guest 123, using an identification credential such as a vehicle operator's permit (i.e.,

driver's license), a passport, or other form of identification suitable for the level of security desired. Biometric and other physical personal authentication techniques may be used in addition or in substitution. PSS 115 may not require Guest 123 to produce an identification credential for pre-access authentication, for example, where Guest 123 is a long-time customer, or where USW 117 is disposed in the home of PSS 115 and Guest 123 is person known to PSS 115. Upon a satisfactory pre-access authentication, or if PSS 115 is willing to proceed based on trust of Guest 123, then PSS 115 may offer Guest 123 an identification credential to be used with DMMS 125 during PWS authentication, that is, when Guest 123 operates DMMS 125 to request PWS from a PSP. Pre-access authentication may be a constituent process component of a simple but exemplary PWS authentication method embodiment according to the present invention. However, it is to be understood that PWS authentication of Guest 123 using DMMS 125 by DMAP 120 according to embodiments of the present invention is desirably a user-level authentication that does not require pre-authentication.

An exemplary PWS authentication method embodiment according to the present invention may proceed when PSS 115 activates DMAP 120 by depressing single key 177.

Conveniently, activation key 177 may be dedicated to facilitating association of DMMS 125 with DMAP 120. In response to activation by key 177, DMAP 120 may broadcast, for a predefined authentication period, a voice beacon bearing vSSID 178 on voice channel 182. It can be beneficial to limit the predefined authentication period, for example, to about three minutes, to provide sufficient time for DMMS 125 to perform USW-authentication and to become associated with DMAP 120, yet to minimize the ability of a miscreant or interloper having a USW-capable device from associating with DMAP 120. The actual length of the predefined authentication period may be adjustable to meet the operating environment in which DMAP 120 is deployed. During the predefined authentication period, DMMS 125 can similarly be activated, for example, by Guest 123, causing DMMS 125 to become a supplicant device to the wireless network (USW 117) represented by DMAP 120, identifiable by broadcasting a supplicant device probe request frame on every available USW radio channel, including DMAP 120 voice channel 182. In response, DMAP 120 can transmit a voice beacon over voice channel 182 bearing vSSID 178, as a probe response frame. DMMS 125 then may select DMAP 120 for voice-service access and may send an open authentication request, a form of USW-

authentication, to DMAP 120. Typically, open authentication is directed to facilitating connectivity and, once in communication with DMMS 125, LA 150 in DMAP 120 can provide a favorable authentication reply to DMMS 125. Upon successful USW-authentication, DMMS 125 may send an association request frame to DMAP 120, transmitting gvBSSID 195, which also may indicate a request to be provisioned voice-service, for example, in the form of PWS token 127 by DMAP 120, where DMAP 120 is configured to provision PWS token 127, or through DMAP 120 over data network link 120, where a PSP such as MWSP 105 or PSV 112 may be designated to engage DMMS 125 in AAA functions to establish authorization to be provisioned the requested wireless service (e.g., voice service). DMAP 120 may have stored therein gvBSSID 195, corresponding to DMMS 125, and it may be sufficient for selected embodiments of PWS authentication methods that gvBSSID 195 identifies DMMS 125 as a dual-mode device, which can be permitted to request, and to be provisioned PWS token 127 and that receipt by DMAP 120 of an identification credential from DMMS 125, in the form of gvBSSID 195, can authenticate supplicant device DMMS 125 to DMAP 120. If the request of DMMS 125 is unsuccessful (e.g., signal loss or authentication failure) during the predefined authentication period, DMAP 120 may

permit to DMMS 125 having gvBSSID 195, to continue authentication and association attempts, until the predefined authentication period expires, while denying access to other supplicant devices seeking access but without gvBSSID 195.

Alternatively, PSS 115 may enter a host pass code into DMAP 120 by way of interface 160, which is stored by LA 150 during a predefined authentication period. PSS 115 can issue to Guest 123 a guest pass code that is the same as, or corresponds to, the host pass code entered by PSS 115 into DMAP 120. As Guest 123 activates DMMS 125 to become a supplicant device, Guest 123 enter the guest pass code into DMMS 125. When DMMS requests to associate with DMAP 120 during the authentication period, DMMS 125 can undertake a USW-authentication with DMAP 120, in accordance with the network authentication and encryption protocols employed in USW 117. In addition, DMMS 125 can implement an embodiment of the inventive PWS authentication methods by transmitting the guest pass code to DMAP 120. LA 150 can process the guest pass code received from DMMS 125 and compare it with the host pass code supplied by PSS 115. Upon a favorable comparison, DMMS 125 can be considered to be an authenticated device. DMMS 125 may transmit gvSSID 195 along with the guest pass code as a component of the PWS

authentication identification credentials, or may transmit gvBSSID 195 subsequently, after LA 150 indicates a favorable comparison of guest pass code to stored host pass code. If pre-access authentication is employed to authenticate the identity of Guest 123, then pass code-type PWS authentication of DMMS 125 can be sufficient to infer verification of the identity of Guest 123, if such security is indicated. Otherwise, pass code-type authentication can be sufficient to verify the identity of DMMS 125. Foreseeable variations of the foregoing authentication techniques may be employed, including using biometric authentication devices coupled to DMMS 125 or DMAP 120, for example, as an adjunct to or in substitution for, codes provided by PSS 115. Even if USW-authentication and PWS authentication processes are successfully completed between DMAP 120 and DMMS 125, a successful exchange of encryption keys, such as through a WEP security encryption protocol, may be additionally implemented to permit DMMS 125 to successfully exchange voice services through DMAP 120 over wired network 120. As used herein, the term USW-authentication can include network authentication and encryption protocols such as, without limitation, WEP, WPA, WPA2, IEEE Std. 802.11i, IEEE Std. 802.1x, RADIUS, and EAP security protocols.

Although the identity of DMMS 125 may be verified, it may not be authorized (or capable) of receiving the requested PWS. Thus, LA 150 may examine gvBSSID 195 to determine whether the identity of DMMS 125 corresponds to a type of DMMS permitted to receive PWS token 127. Alternatively, DMAP 120 may direct gvBSSID 195 as an identifying credential to the PSP identified as being designated to provision PWS for requests coming from DMAP 120. e.g., PSV 112. Also, DMAP 120 may be configured by PSV 112, to examine gvBSSID 195 and to determine whether to provision DMMS 125 with requested PWS (e.g., voice services) over WLN 110, once DMMS 125 has been PWS-authenticated. In addition, embodiments of the present invention may receive or request from DMMS 125 other information which may be pertinent to determining whether to provision PSW to authenticated device DMMS 125, for example, whether authenticated device DMMS 125 is associated with an active subscription between Guest 123 and the provisioning PSP, the class of service requested, QoS requirement, the number of tokens to be allocated, etc. In certain exemplary embodiments of PSW authentication, DMAP 120 may use gvBSSID 195 to perform a type of MAC address authentication, in which the gvBSSID 195 of DMMS 125 is verified against a locally configured list of

allowed guest vBSSIDs, or against AAA information maintained on an external authentication server, for example, of PSV 112, MWSP 105, or of MWSP AAA 103 (for convenience, simply "PSV 112"). Alternatively, as another embodiment of PSW authentication, DMAP 120 may communicate gvBSSID 195 to PSV 112, where approval or rejection of DMMS 125 may be made, based on a variety of criteria. Moreover, DMAP 120 may be configured to permit enrollment of selected DMMS 125, that is, to enter gvBSSID 195 on the locally configured list of DMAP 120, or to facilitate enrollment of DMMS 125 by forwarding gvBSSID 195 to PSV 112. Enrollment may permit DMAP 120 or PSV 112 to grant or transfer PWS access credits, including representations thereof (e.g., PWS token 127), to DMMS 125, which may permit DMMS 125 to receive voice services (e.g., make and receive VoIP calls) through DMAP 120, or to otherwise be provisioned by PSV 112 to use voice services over suitable USW other than USW 117. If DMAP 120 confirms, or is notified by PSV 112, that DMMS 125 is permitted to associate with DMAP 120, then USW-authentication may be employed. In alternative embodiments of the present invention, USW-authentication may be performed prior to PSW authentication.

FIG. 2 illustrates an embodiment of an authentication method 200 according to the present invention, namely,

subscriber-provisioner DMAP PWS authentication method 200, which also may feature PWS provisioning. FIG. 2 is described with respect to FIG. 1 and the reference numerals of FIG. 2 refer to like entities in FIG. 1. Method 200 may be beneficial, for example, when a voice-services subscriber seeks to facilitate and manage the allocation of provisioned voice and selected IP services to a guest, while selectively controlling provisioning functions at the subscriber location. Method 200 may also be desirable, for example, to a small business owner, for example, PSS 115, hosting a wireless networking hotspot, for example, USW 117, through which allocation units of VoIP and other provisioned services may be purchased by customers of the small business. As used with respect to FIG. 1, a voice-service allocation unit can be designated as a "token," such as PWS token 127. Pursuant to a request or agreement by PSS 115, DMAP 120 may be authorized and configured (Step 205) by a PSP, such as PSV 112 or MWSP 105, to seek voice-service requests from supplicant devices, such as DMMS 125, and to offer to authenticated supplicant devices PWS token 127, which can be a voice-service token.

Once configured, the PSP may supply DMAP 120 with PWS tokens or functional equivalents (Step 210), which may be requested by Guest DMMS. It may be beneficial for PSS 115

to purchase selected quantities of PWS token 127, perhaps at a discount, for example, through a volume-purchaser discount agreement with a preselected PSP, e.g., MWSP 105. In addition, PSS 115 may have a defined block of provisioned service credits (e.g., PWS tokens 127) associated with an account with MWSP 105, which may be managed by MWSP AAA unit 103 and which may be supplied to properly authenticated supplicants, for example, who request PWS. Therefore, MWSP 105 can authorize DMAP 120 (step 205) to offer a defined quantity of PWS tokens to properly authorized and authenticated guest devices, such as DMMS 125. MWSP 105 also may associate with DMAP 120 a predetermined number of PWS token 127 for provisioning to DMMS 125, in addition to performing other configurations to DMAP 120, for example, in accordance with CPE management protocols, e.g., TR-064, TR-069, and TR-104.

In embodiments of PWS authentication method 200, subscriber PSS 115 can activate DMAP 120 (Step 215), for example, by entering a pass code. When activated, DMAP 120 can be enabled to broadcast availability for association requests and to accept requests for association from supplicant devices for a predefined authentication period (step 220). During the predefined authentication period, DMAP 120 can broadcast vSSID 178 (step 225) to indicate its

availability for voice-service calls 182. A supplicant device, such as DMMS 125 may reply to DMAP 120 by supplying identifying credentials which may include, or be supplemented by, one or both of a pass code or gvBSSID 195 (step 230). Desirably, PSS 115 can provide the pass code to Guest 123, who enters the pass code into DMMS 125. DMAP 120 can receive the request to associate, along with the pass code, transmitted by DMMS 125, within the predefined authentication period. DMAP 120 can employ LA 150 to evaluate the identifying credentials received from DMMS 125, for example, to perform PWS authentication (step 235). Step 235 also may include USW-authentication. If the pass code supplied by DMMS 125 satisfactorily compares with an authentication credential stored in a first memory in DMAP 120 during the authentication period, then DMMS 125 can be considered to be authenticated. If, on the other hand, the comparison is unsatisfactory, DMMS 125 may reattempt to be authenticated within the predefined authentication period. The authentication period may be terminated once the authentication of DMMS 125 is successful, for example, to deter interlopers. The (first) authentication credential can include the pass code provided to Guest 123 by PSS 115; an authentication certificate, identifier, or symbol supplied securely by MWSP 105 or PSV 112; or a combination

thereof. DMMS 125 also may supply DMAP 110 with an additional identifying credential concurrently with the pass code, or in response to a communication separate in time from DMMS 125 supplying the pass code. Exemplary additional identifying credentials include, without limitation, gvBSSID 195, a PWS subscriber identifier (not shown), and a unique personal identifier, such as a vehicle operator's license). LA 150 can include a second memory in which to store a second authentication credential, used to evaluate an additional identifying credential. In selected embodiments of the present invention, successful PWS authentication may be completed after LA 150 verifies the pass code, the additional identifying credential, or both.

Upon successful authentication of the identifying credentials of DMMS 125, it is desirable to determine whether supplicant device DMMS 125 is a supplicant device suitable to be granted access to PWS resources (step 240), including receiving relevant information from DMMS 125, including, for example, gvBSSID 195 and the terms of the PWS request (class of service, QoS, number of tokens, etc.). LA 150 can process the information gathered from DMMS 125 at Step 245, to determine whether DMMS 125 should receive PWS token 127 (step 250), as well as how many PWS token 127 and other terms of PWS provisioning. In

embodiments of the present invention, LA 150 may store a list or template of gvBSSID values indicative of wireless devices which may be authorized by MWSP 105 to receive PWS token 127 from DMAP 120. LA 150 also may evaluate gvBSSID 195 to determine whether DMMS 125 is capable of using the requested PWS resources or is limited by capability or by agreement in gaining access to PWS resources. Such a list or template can be dynamically updated via WLN 110 by WMSP 105, or MWSP AAA 103.

Where LA 150 determines that the PWS request of DMMS 125 can be fulfilled (step 255), then DMAP 125 can provide voice service PWS token 127 to DMMS 125 (step 260), permitting DMMS 125 to use PWS in an allocation corresponding to granted PWS token 127. On the other hand, where LA 150 determines at Step 255 that the PWS request of DMMS 125 cannot be fulfilled, it may be desirable to permit DMMS 125 to re-attempt a request to receive an allocation of PWS before the predefined authentication period elapses (step 220). Once DMMS 125 is provisioned PWS token 127, it may be desirable to terminate the predefined authentication period, for example, to deter miscreant operators of a USW wireless device from seeking to interlope on USW 117 or impermissibly gain access to PWS.

FIG. 3 illustrates another embodiment of an authentication method 300 according to the present invention, namely subscriber-passthrough DMAP PWS authentication method 300, which also may feature PWS provisioning. Similar to FIG.2, FIG. 3 is described with respect to FIG. 1 and the reference numerals of FIG. 3 refer to like entities in FIG. 1. Method 300 may be beneficial, for example, when a voice-services subscriber seeks to facilitate and manage the allocation of provisioned voice and selected IP services to a guest, while passing through authentication and provisioning functions to a designated PSP, such as MWSP 105 or PSV 112.

As used with respect to FIG. 1, a voice-service allocation unit can be designated as a "token," such as PWS token 127. Method 300 may also be desirable, for example, to a small business owner PSS 115, hosting a wireless networking hotspot, such as USW 117, but where PSS 115 does not desire to resell PWS tokens. Method 300 also may desirable where PSS 115 operates a home network and wishes to facilitate a request of Guest 123 to receive PWS tokens 127 for DMMS 125, but not to be a host-provisioner. To commence an embodiment of the present inventive methods, namely an embodiment of a subscriber-passthrough DMAP PWS authentication method, subscriber PSS 115 can activate DMAP

120 (Step 310), for example, by entering a pass code. Activation of DMAP 120 can continue for a predefined authentication period (step 320). When activated, DMAP 120 can broadcast vSSID 178 to indicate availability (Step 325) for association requests and to accept requests for association from supplicant devices, including DMMS 125, for example, to make and receive voice-service calls over voice channel 182. A supplicant device, such as DMMS 125, may reply to DMAP 120 by supplying identifying credentials within the predefined authentication period. DMMS 125 identifying credentials may include, or be supplemented by, one or both of a pass code or gvBSSID 195 (step 330).

Desirably, where a pass code is employed, PSS 115 can provide the pass code to Guest 123, who enters the pass code into DMMS 125. PSS 115 may supply the pass code to Guest 123 subsequent to a successful pre-access authentication. DMAP 120 can receive the request to associate, along with the pass code, transmitted by supplicant device DMMS 125, and can employ LA 150 to evaluate the identifying credentials received from DMMS 125, for example, to perform PWS authentication (step 335). Step 335 also may include USW-authentication, as described with respect to Step 235 in FIG. 2. If the pass code supplied by DMMS 125 satisfactorily compares with the pass

code stored in DMAP 120 during the authentication period, then DMMS 125 can be considered to be authenticated. If, on the other hand, the comparison is unsatisfactory, DMMS 125 may reattempt to be authenticated within the predefined authentication period. The authentication period may be terminated once the authentication of DMMS 125 is successful, for example, to deter interlopers. Also, it may be desirable to terminate the authentication period upon a failed authentication attempt.

Upon successful authentication of the identifying credentials of DMMS 125, it is desirable to determine whether supplicant device DMMS 125 is a supplicant device suitable to be granted access to PWS resources (step 340), which can be indicated by gvBSSID 195. Upon a favorable evaluation of DMMS 125 suitability to access PWS resources, LA 150 may receive DMMS 125 request (Step 345) for a PWS token 127, e.g., a voice service token. The request may include, without limitation, gvBSSID 195 and the terms of the PWS request (class of service, QoS, number of tokens, etc.). LA 150 can pass through (Step 350) gvBSSID 195, and other information, including that collected at Step 345, to a designated PSP, such as MWSP AAA 103 and PSV 112. PSW authentication, as well as provisioning of PSW tokens 127, can be performed and managed (Step 355) by the designated

one of MWSP AAA 103 or PSV 112. Such PSP authentication and provisioning may be desirable to Guest 123, for example, where Guest 123 is a subscriber to PWS services of MWSP 105 or PSV 112, and may be using USW 117 and DMAP 120 to access PWS tokens 127, which may be associated with an existing PWS provisioning account of Guest 123 for DMMS 125.

Upon a favorable authentication and provisioning of PWS tokens 127 on behalf of DMMS 125 at Step 355, the designated PSP may then communicate PWS tokens 127 through to DMAP 120 which, in turn, transmit the requested PWS tokens 127 to DMMS 125 (Step 360). Once DMMS 125 is provisioned PWS token 127 at Step 360, it may be desirable to terminate the predefined authentication period, for example, to deter miscreant operators of a USW wireless device from seeking to interlope on USW 117 or impermissibly gain access to PWS. It also may be desirable to permit DMMS 125 to re-attempt authorization during the predefined authentication period, as well as to terminate the authentication period upon an unsuccessful authentication attempt.

A variety of hardware and software functions have been described herein. Depending upon the implementation, many of the hardware functions may be emulated using software.

Likewise, software functions may be performed using hardware components having hardwired circuitry; and some of the hardware or software functions may be configured using alternative technologies known to skilled artisans, including without limitation, firmware and application specific integrated circuits. The elements in the Figures are to be taken as logical and thus, can be implemented in a consolidated or distributed manner to achieve a desired result.

Moreover, many alterations and modifications may be made by those having ordinary skill in the art, without departing from the spirit and scope of the invention. Therefore, it must be understood that the illustrated embodiments have been set forth only for the purposes of example, and that it should not be taken as limiting the invention as defined by the following claims. The following claims are, therefore, to be read to include not only the combination of elements which are literally set forth, but all equivalent elements for performing substantially the same function in substantially the same way to obtain substantially the same result. The claims are thus to be understood to include what is specifically illustrated and described above, what is conceptually

equivalent, and also what incorporates the ideas of the invention.

CLAIMS

What is claimed is:

1. A fixed wireless (USW) access point, comprising:

a local authenticator:

wherein the local authenticator is configured to be activated by a subscriber;

wherein the local authenticator is configured to receive an identifying credential from a dual mode mobile station;

wherein the local authenticator is configured to analyze the identifying credential, thereby determining an authentication state resulting therefrom; and

wherein the local authenticator is configured to one of grant access and deny access by the dual mode mobile station to the USW access point responsive to the authentication state.

2. The USW access point of Claim 1, wherein the local authenticator is configured to differentially process a signal communicated with the dual mode mobile station in response to the authentication state.

3. The USW access point of Claim 2, further comprising:

a provisioned service interface coupled to the local authenticator, wherein the provisioned service interface is configured to differentially process the provisioned service signal in response to the authentication state.

4. The USW access point of Claim 3:

wherein the provisioned service interface is configured to provide a provisioned service channel identifiable by a provisioned service set identifier (vSSID),

wherein the provisioned service interface is configured to correspond to a provisioned service basic service set identifiable by a provisioned service basic service set identifier (hvBSSID),

wherein the hvBSSID corresponds to the vSSID and is configurably unique to the provisioned service interface, and

wherein the signal communicated with the dual mode mobile station is a provisioned service signal communicated over the provisioned service channel to the USW access point corresponding to hvBSSID.

5. The USW access point of Claim 4, wherein the provisioned service interface is configured to accept the identifying credential within a predefined authentication period and configured to determine an authentication state corresponding to an identifying credential, if accepted within the predefined authentication period.

6. The USW access point of Claim 3, wherein the local authenticator further comprises a managed CPE interface coupled to a provisioned service provider and coupled to the provisioned service interface, the managed CPE interface being remotely configurable by the provisioned service provider, the managed CPE interface modifying differential processing of the provisioned service signal in response to the authentication state.

7. The USW access point of Claim 4, wherein the identifying credential comprises a provisioned service basic service set identifier (gvBSSID) configurably unique to the dual mode mobile station, and wherein the managed CPE interface is configured to modify differential processing of the provisioned service signal in response to the gvBSSID.

8. The USW access point of Claim 5 configured such that a single keystroke on a key coupled to the provisioned service interface commences the predefined authentication period and activates the provisioned service interface to determine the authentication state corresponding to the identifying credential, if accepted within the predefined authentication period.

9. A method for authenticating to a USW access point, a dual mode mobile station seeking provisioning of a provisioned wireless service, the method comprising:

receiving an identifying credential from the dual mode mobile station by the USW access point;

evaluating the identifying credential from the dual mode mobile station by the USW access point relative to an authentication credential stored in the USW access point; and

determining a PWS authentication state of the dual mode mobile station corresponding to the identifying credential.

10. The method of Claim 7, further comprising:

if the PWS authentication state is authenticated, then receiving a request for a provisioned service token from the dual mode mobile station;

evaluating an eligibility state of the dual mode mobile station for being provisioned a provisioned service token; and

if the eligibility state is eligible, then provisioning the provisioned service token to the dual mode mobile station by the USW access point.

11. The method of Claim 7, wherein evaluating the identifying credential further comprises:

evaluating the identifying credential from the dual mode mobile station by the USW access point relative to a provisioning management configuration received from a managed CPE interface disposed in the USW access point.

12. The method of Claim 9, wherein receiving the identifying credential from the dual mode mobile station comprises is receiving the identifying credential from the dual mode mobile station within a predefined authentication period.