

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371		Attorney Docket No. 8241P073
		U.S. Application No. (if known, see 37 CFR 1.5)
International Application No. PCT/US2012/057152	International Filing Date 25 September 2012 (25.09.2012)	Priority Date Claimed 13 July 2012 (13.07.2012)
Title of Invention METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK		
First Named Inventor DAGUM, Leonardo; BEDNARZ, Philip; GOLDBURG, Marc; TEHRANI, Ardavan Maleki; RHEE, Wonjong		
<p>Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.</p> <p>1. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). NOTE: The express request under 35 U.S.C. 371(f) will not be effective unless the requirements under 35 U.S.C. 371(c)(1), (2), and (4) for payment of the basic national fee, copy of the International Application and English translation thereof (if required), and the oath or declaration of the inventor(s) have been received.</p> <p>2. <input checked="" type="checkbox"/> A copy of the International Application (35 U.S.C. 371(c)(2)) is attached hereto (not required if the International Application was previously communicated by the International Bureau or was filed in the United States Receiving Office (RO/US)).</p> <p>3. An English language translation of the International Application (35 U.S.C. 371(c)(2))</p> <p>a. <input type="checkbox"/> is attached hereto.</p> <p>b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4).</p> <p>4. An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4))</p> <p>a. <input type="checkbox"/> is attached.</p> <p>b. <input checked="" type="checkbox"/> was previously filed in the international phase under PCT Rule 4.17(iv).</p> <p>Items 5 to 8 below concern amendments made in the international phase.</p> <p><u>PCT Article 19 and 34 amendments</u></p> <p>5. <input type="checkbox"/> Amendments to the claims under PCT Article 19 are attached (not required if communicated by the International Bureau) (35 U.S.C. 371(c)(3)).</p> <p>6. <input type="checkbox"/> English translation of the PCT Article 19 amendment is attached (35 U.S.C. 371(c)(3)).</p> <p>7. <input type="checkbox"/> English translation of annexes (Article 19 and/or 34 amendments only) of the International Preliminary Examination Report is attached (35 U.S.C. 371(c)(5)).</p> <p><u>Cancellation of amendments made in the international phase</u></p> <p>8a. <input type="checkbox"/> Do not enter the amendment made in the international phase under PCT Article 19.</p> <p>8b. <input type="checkbox"/> Do not enter the amendment made in the international phase under PCT Article 34.</p> <p>NOTE: A proper amendment made in English under Article 19 or 34 will be entered in the U.S. national phase application absent a clear instruction from applicant not to enter the amendment(s).</p> <p>The following items 9 to 17 concern a document(s) or information included.</p> <p>9. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</p> <p>10. <input checked="" type="checkbox"/> A preliminary amendment.</p> <p>11. <input checked="" type="checkbox"/> An Application Data Sheet under 37 CFR 1.76.</p> <p>12. <input type="checkbox"/> A substitute specification. NOTE: A substitute specification cannot include claims. See 37 CFR 1.125(b).</p> <p>13. <input checked="" type="checkbox"/> A power of attorney and/or change of address letter.</p> <p>14. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.3 and 37 CFR 1.821-1.825.</p> <p>15. <input type="checkbox"/> Assignment papers (<i>cover sheet and document(s)</i>). Name of Assignee: _____</p> <p>16. <input type="checkbox"/> 37 CFR 3.73(c) Statement (<i>when there is an Assignee</i>). _____</p>		

This collection of information is required by 37 CFR 1.414 and 1.491-1.492. 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 15 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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U.S. APPLN. No. (if known – see 37 CFR 1.5)	INTERNATIONAL APPLICATION No. PCT/US2012/057152	ATTORNEY DOCKET No. 8241P073
17. <input type="checkbox"/> Other items or information:		
The following fees have been submitted.		CALCULATIONS
18. <input checked="" type="checkbox"/> Basic national fee (37 CFR 1.492(a)) \$280		\$ 280
19. <input checked="" type="checkbox"/> Examination fee (37 CFR 1.492(c)) If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4) \$0 All other situations \$720		\$ 720
20. <input checked="" type="checkbox"/> Search fee (37 CFR 1.492(b)) If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4) \$0 Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority \$120 International Search Report prepared by an ISA other than the US and provided to the Office or previously communicated to the US by the IB \$480 All other situations \$600		\$ 480
TOTAL OF 18, 19, and 20 =		\$ 1,480
<input type="checkbox"/> Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing in compliance with 37 CFR 1.821(c) or (e) in an electronic medium or computer program listing in an electronic medium) (37 CFR 1.492(j)). Fee for each additional 50 sheets of paper or fraction thereof \$400		
Total Sheets	Extra Sheets	Number of each addition 50 or fraction thereof (round up to a whole number)
- 100 =	/ 50 =	x \$400
		\$
Surcharge of \$140.00 for furnishing any of the search fee, examination fee, or the oath or declaration after the date of commencement of the national stage (37 CFR 1.492(h)).		\$
CLAIMS	NUMBER FILED	NUMBER EXTRA
Total claims	73 - 20 =	53
Independent claims	4 - 3 =	1
MULTIPLE DEPENDENT CLAIM(S) (if applicable)		+ \$780
Processing fee of \$140.00 for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(i)).		\$
TOTAL OF ABOVE CALCULATIONS =		\$ 6,140
<input type="checkbox"/> Applicant asserts small entity status. See 37 CFR 1.27. Fees above are reduced by 1/2.		
<input type="checkbox"/> Applicant certifies micro entity status. See 37 CFR 1.29. Fees above are reduced by 3/4. Applicant must attach form PTO/SB/15A or B or equivalent.		
TOTAL NATIONAL FEE =		\$ 6,140
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property.		\$
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Correspondence Address

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Signature	/Gregory D. Caldwell/	Date	January 12, 2015
Name (Print/Type)	Gregory D. Caldwell	Registration No. (Attorney/Agent)	39,926



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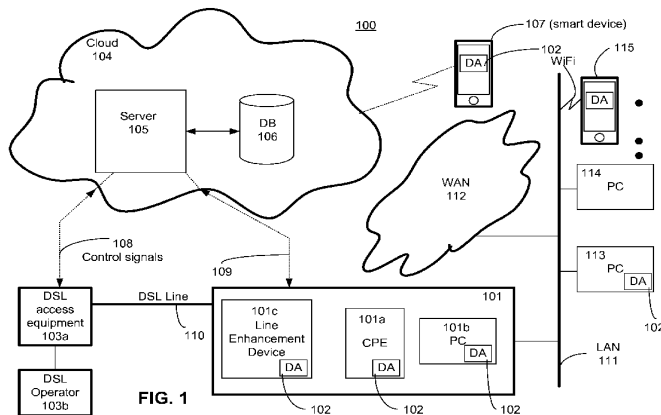
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Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

[Continued on next page]

(54) **Title:** METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK



(57) **Abstract:** Described is a method performed by a downloadable agent, the method comprising: collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and transmitting the WAN performance information to a machine; wherein the machine is operable to: store and analyze the performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and its service provider. Described is a corresponding system which comprises a database; and a server coupled to the database, the server operable to: receive WAN performance information from a downloadable agent; store the information in the database, analyze the information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

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**METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A
COMMUNICATION SYSTEM, DEVICE, OR LINK**

CLAIM OF PRIORITY

[0001] This application claims priority to, and incorporates by reference in its entirety, U.S. Provisional Application No. 61/671,672 filed July 13, 2012, and entitled “METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK.”

BACKGROUND

[0002] In current practice, Wide Area Network (WAN) and/or Local Area Network (LAN) performance information is not centrally analyzed by a communication device coupled to such networks to account for information such as topological information, geographical information, user’s network usage pattern, quality of network connection, time, throughput, etc. Accordingly, communication devices coupled to such networks may operate with lower performance than otherwise possible because the communication devices have no means for knowing performance data that can be used to intelligently assess and manage performance of the communication device and/or network connection. An example of a communication device is a smart phone, computer, a router, etc.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] Embodiments of the disclosure will be understood more fully from the detailed description given below and from the accompanying drawings of various embodiments of the disclosure, which, however, should not be taken to limit the disclosure to the specific embodiments, but are for explanation and understanding only.

[0004] **Fig. 1** is a communication network with some or all communication devices having a downloadable agent to assist with performance analysis, according to one embodiment of the disclosure.

[0005] **Fig. 2** is a system with a server (or the analysis machine) operable to communicate with one or more downloadable agents, according to one embodiment of the disclosure.

[0006] **Fig. 3** is a flowchart of a method performed by the downloadable agent and an analysis machine of the communication network, according to one embodiment of the disclosure.

[0007] **Fig. 4A** is a flowchart of a method performed by the downloadable agent, according to another embodiment of the disclosure.

[0008] **Fig. 4B** is a flowchart of a method performed by the server (or analysis machine), according to one embodiment of the disclosure.

[0009] **Fig. 5A** is flowchart of a method for performing a diagnostic test, according to one embodiment of the disclosure.

[0010] **Fig. 5B** is flowchart of a method for running (i.e., executing) functions, according to another embodiment of the disclosure.

[0011] **Fig. 6A** is an exemplary report provided by the server based on the information received from the downloadable agent, according to one embodiment of the disclosure.

[0012] **Fig. 6B** is another exemplary report provided by the server based on the information received from the downloadable agent, according to one embodiment of the disclosure.

[0013] **Fig. 7** is a processor-based system having machine-readable storage medium with computer executable instructions of a downloadable agent, according to one embodiment of the disclosure.

[0014] **Fig. 8** is a processor-based system having machine-readable storage medium with computer executable instructions executed by the server, according to one embodiment of the disclosure.

DETAILED DESCRIPTION

[0015] One of the problems with current communication systems is that information about the communication device and communication device performance inside the local area network (LAN) is generally available to other devices on the LAN, however not available to machines outside the LAN; i.e., the wide area network (WAN), or the cloud. In order to overcome this and other problems, the embodiments of this disclosure describe an agent (also called downloadable agent herein) which is placed inside the LAN, where the agent collects data on behalf of the cloud or WAN-based server and then transfers that data to the cloud or WAN-based server for analysis. Such an embodiment allows collection of information on all devices centrally for a comprehensive analysis.

[0016] The embodiments herein describe a method performed by a downloadable agent for collecting information associated with a communication device and then sending the collected information to another machine for analysis. In one embodiment, other interfaces of the communication device may be used in conjunction or independent of the downloadable agent to collect information associated with the communication device and then to send that collected information to another machine for analysis.

[0017] In one embodiment, the other machine is a server in a cloud which has access to information related to many communication devices and can use that information to generate a performance report for the communication device. In one embodiment, the server in the cloud does not have access to information of the communication devices in the absence of the downloadable agents. The downloadable agent, that may be downloaded on a user's browser or installed on the communication device, provides the server access to the information associated with the communication device. In one embodiment, the downloadable agent receives the report. In one embodiment, the report can be used to enhance the performance of the communication device. In one embodiment, the method comprises: collecting wide area network (WAN) performance information, wherein the downloadable agent is executable on a computing device coupled to a (local area network) LAN of a broadband subscriber, wherein the LAN is coupled by another

device to a WAN; and transmitting the WAN performance information to a machine. In one embodiment, the downloadable agent may be executable on a variety of different computer platforms and operating systems.

[0018] The term “Local Area Network” (LAN) herein generally refers to a computer or communication network that interconnects computers or communication devices in a limited area such as a home, school, computer laboratory, or office building using network media.

[0019] The term “Wide Area Network” (WAN) herein generally refers to a telecommunication network that covers a broad area (i.e., any network that links across metropolitan, regional, or national boundaries) compared to the limited area covered by a LAN.

[0020] In one embodiment, the machine (e.g., a server in a cloud) is operable to: store the WAN performance information in a database associated with the machine, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber’s service provider. In one embodiment, the broadband subscriber and/or the broadband subscriber’s service provider analyses the report and adjusts various performance parameters associated with the communication device or the networking devices with which it communicates to enhance the performance of the communication.

[0021] The term “performance” herein refers generally to network throughput (e.g., TCP/UDP), latency, jitter, connectivity, error rates, power consumption, transmit power, etc. Improving performance of the communication system includes increasing throughput, reducing error rate and latency, improving (i.e., reducing) jitter, reducing power consumption, etc. for the communicating system. The term “TCP” stands for Transmission Control Protocol. The term “UDP” refers to User Datagram Protocol. The term “successful” herein refers to an indication suggesting safe receipt of a packet that is often confirmed by ACK (acknowledge) message packet. In another embodiment, operational data such as error counts, retransmission counts, modulation, signal strength, etc. are used to estimate the performance and throughput of the communications link.

[0022] The embodiments herein allow a user of a communication device to install (download) an agent on their communication device, for example, personal computer, tablet computer, laptop, network gateway, smart phone, smart device, computer, DSL (Digital Subscriber Line) access equipment, router, etc) so that the communication device is able to collect performance related information for analysis by another machine (e.g., a server on a cloud) and then receive at least one of several statistical and commercial analyses including throughput and other measures of communications performance; availability of higher bandwidth for operating a communication device/link (e.g., DSL) service; purchase information (or service product information) for improving communication device/link (e.g., DSL) service performance; or utilization information for optimizing a consumers' communication device/link (e.g., DSL) service cost. Such downloadable agent allows for customized enhancement of user experience with a communication device by enhancing the communication device's or link's performance.

[0023] In the following description, numerous details are discussed to provide a more thorough explanation of embodiments of the present disclosure. It will be apparent, however, to one skilled in the art, that embodiments of the present disclosure may be practiced without these specific details. In other instances, well-known structures and devices are shown in block diagram form, rather than in detail, in order to avoid obscuring embodiments of the present disclosure.

[0024] Note that in the corresponding drawings of the embodiments, signals are represented with lines. Some lines may be thicker, to indicate more constituent signal paths, and/or have arrows at one or more ends, to indicate primary information flow direction. Such indications are not intended to be limiting. Rather, the lines are used in connection with one or more exemplary embodiments to facilitate easier understanding of a circuit or a logical unit. Any represented signal, as dictated by design needs or preferences, may actually comprise one or more signals that may travel in either direction and may be implemented with any suitable type of signal scheme.

[0025] In the following description and claims, the term "coupled" and its derivatives may be used. The term "coupled" herein refers to two or more elements

which are in direct contact (physically, electrically, magnetically, electromagnetically, optically, etc.). The term “coupled” herein may also refer to two or more elements that are not in direct contact with each other, but still cooperate or interact with each other.

[0026] As used herein, unless otherwise specified the use of the ordinal adjectives “first,” “second,” and “third,” etc., to describe a common object, merely indicate that different instances of like objects are being referred to, and are not intended to imply that the objects so described must be in a given sequence, either temporally, spatially, in ranking or in any other manner.

[0027] **Fig. 1** is a communication network 100 with some or all communication devices having a respective downloadable agent (DA) to assist with performance analysis, according to one embodiment of the disclosure. In one embodiment, the communication network 100 comprises a local network 101 (e.g., a network at home) having Customer Premises Equipment (CPE) 101a and a personal computer (PC) 101b. In one embodiment, the local area network (LAN) 101 optionally comprises a line enhancement device 101c which is any device coupled to the DSL 110 that improves the quality or performance on the DSL 110. In one embodiment, the line enhancement device 101c is a standalone device. In another embodiment, the line enhancement device 101c is integrated with the CPE 101a. In one embodiment, one or more devices of the LAN (e.g., home LAN) 101 are operable to communicate with the server 105 via the Internet 109 (via wired or wireless connections).

[0028] In one embodiment, the communication network 100 comprises a server 105 coupled to a database 106, wherein the server and/or the database 106 reside in a cloud 104.

[0029] The term “cloud” herein refers generally to cloud computing which is the delivery of computing and storage capacity as a service to a community of end-recipients. The term “cloud” is indicated with use of a cloud-shaped symbol 104 as an abstraction for the complex infrastructure it contains in system diagrams. Cloud computing entrusts services with a user's data, software and computation over a network. In one embodiment, the server 105 resides in the cloud 104 and is

operable to perform complex analysis (e.g., statistical) based on information collected from other communication devices via the Internet.

[0030] In one embodiment, the communication network 100 comprises a DSL access equipment 103a (also called a DSL access network, or DSL node) which is operable to communicate with the CPE 101a via a DSL line 110. In one embodiment, the DSL access equipment 103a comprises a DSLAM (digital subscriber line access multiplexer). In one embodiment, the DSL access equipment 103a comprises a CO (central office). In one embodiment, the DSL access equipment 103a receives control signals 108 from the server 105 that instruct a DSL operator 103b about ways to improve performance of its customers e.g., CPE 101a, etc.

[0031] In one embodiment, the control signals 108 include at least one or more of signals or commands related to: power, for example, transmit power, spectrum control, for example, Power Spectral Density (PSD) mask, margin, data rate, latency/delay, coding, for example, Forward Error Correction (FEC) coding.

[0032] In one embodiment, the server 105 is operable to access external communication devices (external to the cloud 104) through cloud-based applications via a web browser or mobile application. In the embodiments discussed herein the downloadable agent (DA) 102 is operable to communicate with the resources (e.g., server 105, database 106) of the cloud 104. In one embodiment, the DA 102 may be downloaded from any platform e.g., a disk, memory stick, web browser, web server, etc. In one embodiment, the DA 102 associated with a communication device executes on an Internet browser (e.g., Safari®, Netscape®, FireFox®, Internet Explorer®, etc). In one embodiment, the DA 102 associated with the communication device is accessible remotely via the Internet.

[0033] In one embodiment, the DA 102 is operable to execute on multiple computing platforms with different operating systems. For example, the DA 102 may operate on operating systems including Android, Berkley Software Distribution (BSD), iOS, GNU/Linux, Apple Mac OS X, Microsoft Windows, Windows Phone, and IBM z/OS. In one embodiment, the DA 102 is operable to execute in a virtual machine (VM). A VM is a software implementation of a machine (e.g., a computer)

that executes programs like a physical machine. Examples of virtual machines include a Java Virtual Machine and the previously mentioned operating systems executing in VMWare, Virtual Box or the like. In one embodiment, the DA 102 may receive automatic updates to keep the application up to date with the latest features. In one embodiment, the downloadable agent is dynamically downloaded to the computing device.

[0034] The term “dynamically” herein refers to the downloading of an agent by the computing device on-demand and prior to use of the agent. A dynamically downloaded agent may be deleted from the computing device following the use of that agent.

[0035] In one embodiment, the communication network 100 comprises a wireless device, for example, a smart device (e.g., smart phone, tablet, etc) with a DA 102. In one embodiment, the DA 102 is operable to review an analysis report generated by the server 105 for any of the communicating devices it has authorization to access.

[0036] In one embodiment, the server 105 is operable to receive WAN performance information from a DA 102, wherein the DA 102 is executable on a computing device (e.g., 101a-b, 107, 113) coupled to a LAN 111 of a broadband subscriber, wherein the LAN 111 is coupled by another device to a WAN 112. In one embodiment, a DSL modem and a home gateway couple the LAN 111 to the WAN 112. In one embodiment, the DSL modem and home gateway are integrated into a single enclosure.

[0037] In one embodiment, the DA 102 associated with the communication device collects data locally within the communication device and then periodically sends the collected data to the server 105. In one embodiment, the DA 102 may wait for certain conditions or thresholds to be met before sending all collected data to the server 105.

[0038] In one embodiment, the conditions and/or thresholds are related to a function of the type of data collected. For example, collected data may include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network

identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[0039] In one embodiment, the conditions are limits or thresholds on a performance level related to collected data. In one embodiment, a condition is an upper limit on jitter, or a lower limit on throughput. For example, if throughput drops below a lower limit/threshold, then the DA 102 may report and send the data to the server 105. In another example, if packet loss exceeds an upper limit, then the DA 102 may report and send the data to the server. In one embodiment, a condition is time expiration on a scheduled collection. For example, the DA 102 may send data to the server 105 after a pre-defined time is expired.

[0040] In another embodiment, server 105 collects information from the DA's, through server initiated communication. In one embodiment, server 105 collects information by polling or scheduled based system. One such example of polling is ping. In one embodiment, the server 105 may send a signal to a DA 102, or ping a DA 102, or communicate with a DA 102 on scheduled basis, after which the DA 102 sends collected information to the server 105.

[0041] In one embodiment, the computing device is one of: computer, personal computer, laptop/desktop, smart phone, tablet computing device; an access point (AP); a base station; a wireless smart phone device; a wireless LAN device; an access gateway; a router, a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled

gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[0042] In one embodiment, the server 105 is operable to store the WAN performance information in the database 106 associated with the server 105. In one embodiment, the server 105 is operable to store the WAN performance information with an associated timestamp. In one embodiment, the DA 102 is operable to collect LAN performance data from at least one of the computing device (e.g., 101b) and another device (e.g., PC 113) coupled to the LAN 111. In one embodiment, the server 105 is operable to receive the LAN performance data from the DA 102.

[0043] In one embodiment, the WAN and LAN performance information include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[0044] Topological information may include information regarding the WAN or LAN topology. For example, whether a DSL modem is behind a firewall, or whether the Internet gateway is connected to a Wi-Fi access point via a router. The geographical information may include the address or global positioning system (GPS) location of the WAN or LAN modem, or the Internet gateway. The geographical information may be useful for, for example, neighborhood analysis, and for correlating information regarding neighbors, or users in a given geographical location. Environment Statistics may include any statistics related to the environment surrounding the WAN or LAN. For example, usage statistics, statistics on periods of peak operation, statistics on the data traffic (peak traffic, average traffic, etc.).

[0045] In one embodiment, LAN performance information also includes, without limitation: LAN media type, such as Ethernet, Wi-Fi, or powerline adapters; LAN media throughput rates; channel assignments for Wi-Fi media; Wi-Fi mode such as 802.11g or 802.11n; Wi-Fi transmit power levels; and spectral masks for powerline communication.

[0046] In one embodiment, the server 105 is operable to analyze the WAN performance information to generate an analysis result. In one embodiment, the server 105 is operable to generate analysis result by computing throughput of DSL connection 110 by collecting current performance metrics associated with DSL service. In one embodiment, the server 105 is operable to perform statistical analysis, including throughput, based on information received from the DA 102 and other information in the database.

[0047] In one embodiment, the server 105 is operable to compute throughput of a communication link (e.g., Wi-Fi or Ethernet link 109) by probing. In one embodiment, the process of probing comprises: transmitting probing data from a communication device (e.g., PC 101b) to another communication device (e.g., PC 113); and waiting for a predetermined time before reading operational data including counter values related to user data traffic. In one embodiment, the counter values include at least one of packet error counts, packet retransmission counts, successful ACK message counts, etc. The throughput information discussed in this embodiment and other embodiments of this disclosure could include at least one or more of the following: instantaneous speed or data rate, average data rate, and/or information on the peak and minimum data rates of a connection or communication link associated with the LAN and/or with the associated WAN.

[0048] The term “active probing” or simply “probing” herein generally refers to testing of a communication network by sending test pattern/data over the network from one communication device to another communication device, and then measuring the response from the sent test pattern. The response data is also referred herein as “active data” or “active measurement data” which is data associated with active probing of a communication network.

[0049] The term “operational data” herein generally refers to user visible or accessible data and is generally used for debugging and basic performance monitoring of communications systems.

[0050] In one embodiment, the method of probing comprises: transmitting probing data from a communication device (e.g., PC 101b) to another communication device (e.g., PC 113); and receiving a report indicating amount of data or data received by the other communication device.

[0051] In one embodiment, the server 105 is operable to determine availability of higher bandwidth for operating a DSL service. In one embodiment, the server 105 is operable to determine purchase information (or service product information) for improving DSL service performance. In one embodiment, the server 105 is operable to determine network, service, or communication link utilization information for optimizing a consumer DSL service cost. In one embodiment, the server 105 is operable to group data in the database 106 according to at least one of geographical location, services type, service provider, or time. The service product information includes information regarding the type and specification of the DSL service or services which is a DSL service user/customer has purchased from the DSL service provider.

[0052] In one embodiment, the server 105 receives information from other devices and/or sources other than the communication devices to perform a comprehensive analysis of the performance of the communication system as a whole and/or individually for the communication devices in the communication system. Examples of the other devices and/or sources include near-by radio stations, location of AM radio stations, goals or business rules defined by an operator, weather forecast from the National Weather Service, etc.

[0053] In one embodiment, the server 105 is operable to report the analysis result by sending availability of higher bandwidth for operating a DSL service to the DA 102 of 101a. In one embodiment, the server 105 is operable to report the analysis result by sending purchase information (or service product information) to PC 101b, smart device 107, or the user for improving DSL service performance. In one embodiment, the server 105 is operable to report the analysis result by sending

utilization information to PC 101b, smart device 107, or any device accessible by the user for optimizing consumer DSL service cost. In one embodiment, the DA 102 receives updated or new operational parameters from the server 105 based on the analysis performed by the server 105. For example, the server 105 when analyzing the data collected by the DA 102 of 101a, also takes into account historical information about the communication device 101a and information from other communication devices coupled to the network to provide updated operational parameters to the DA 102 of 101a so that the communication device 101a operates more efficiently under the current circumstances.

[0054] In one embodiment, the server 105 is operable to report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider. In one embodiment, the server 105 is operable to report the analysis result by sending statistical analysis to the PC 101b, smart device 107, or any device accessible by the user, the statistical analysis including throughput. In one embodiment, the server 105 is operable to report the analysis result by sending availability of higher bandwidth for operating a DSL service to the DA 102 of 101a. In one embodiment, the server 105 is operable to report the analysis result by sending purchase information (or service product information) to PC 101b, smart device 107, or the user for improving DSL service performance. In one embodiment, the server 105 is operable to report the analysis result by sending utilization information to PC 101b, smart device 107, or any device accessible by the user for optimizing consumer DSL service cost.

[0055] In one embodiment, the server 105 is operable to receive an on-demand change request. In one embodiment, the on-demand change is associated with at least one of: throughput, latency, packet loss, or jitter. For example, DA 102 of the PC 101b sends a request via connection 109 to the server 105 to acquire higher throughput than current throughput for its DSL line 110. In such an embodiment, the server 105 performs analysis based on available data in the database 106 and determines if the on-demand request by the PC 102c can be met. If it can be met, a report is provided to the DA 102 by the server 105 with information (e.g., cost etc) about how to improve throughput.

[0056] In one embodiment, the server 105 provides a marketplace of ideas for the communication devices for trading bandwidth (or performance) for media (or related) services. For example, the server 105 may provide information to the communication devices (after performing its analysis from the collected and historical information of the communication system) such as subscription to premium media services, direct payment, etc in exchange for improved performance.

[0057] **Fig. 2** is a system 200 with the server 105 (or the analysis machine) operable to communicate with one or more downloadable agents 102, according to one embodiment of the disclosure. Embodiments of **Fig. 2** are described with reference to **Fig. 1**. In one embodiment, the system 200 comprises a device 201 (e.g., cloud 104) having the server 105 coupled to the database 106.

[0058] In one embodiment, the server 105 comprises: a first module 202 for collecting the WAN and LAN performance and configuration information. In one embodiment, the server 105 comprises a second module 203 for performing statistical analysis using the WAN and LAN performance and configuration information. In one embodiment, the server 105 comprises a third module 204 for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider.

[0059] In one embodiment, the modules (e.g., DA 102) that receive the instruction and command from the third module 204 are accessible by the Internet. In one embodiment, the server 105 comprises: a management interface 205 for communicating with the DA 102 (any one of DAs 1-N, where 'N' is a positive integer) via the Internet 206 (e.g., 111, 109 of **Fig. 1**). In one embodiment, the server 105 comprises: a user interface module 207 for providing access to other communication devices and for displaying information associated with the first 202, second 203 and third 204 modules.

[0060] **Fig. 3** is a flowchart 300 of a method performed by the downloadable agent 102 and an analysis machine 105 (also referred to as the server 105) of the

communication network 100, according to one embodiment of the disclosure. Although the blocks in the flowcharts with reference to **Fig 3** are shown in a particular order, the order of the actions can be modified. Thus, the illustrated embodiments can be performed in a different order, and some actions/blocks may be performed in parallel. The flowchart of **Fig. 3** is illustrated with reference to the embodiments of **Figs. 1-2**. Some of the blocks and/or operations listed in **Fig. 3** are optional in accordance with certain embodiments. The numbering of the blocks presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur. Additionally, operations from the various flows may be utilized in a variety of combinations.

[0061] At block 301, the DA 102 collects WAN performance information, wherein the DA 102 is executable on a computing device (e.g., 101c) coupled to a LAN 111 of a broadband subscriber, wherein the LAN 111 is coupled by another device (e.g., PC 113) to a WAN 112. At block 302, the DA 102 transmits the WAN performance information to a machine (e.g., server 105). At block 303, the DA 102 is operable to collect LAN performance data from at least one of the computing device (e.g., 101c) and the other device (e.g., PC 113) coupled to the LAN 111.

[0062] At block 304, the DA 102 is operable to transmit the LAN performance data to the server 105. At block 305, the server 105 is operable to store the WAN/LAN performance information in the database 106 associated with the machine 105. At block 306, the server 105 is operable to store the WAN/LAN performance information with an associated timestamp. At block 307, the server 105 is operable to analyze the WAN/LAN performance information to generate an analysis result. At block 308, the server is operable to report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider. At block 309, the DA 102 receives the report with the analysis result from the server 105.

[0063] **Fig. 4A** is a flowchart 400 of a method performed by the downloadable agent 102, according to another embodiment of the disclosure. Although the blocks in the flowcharts with reference to **Fig 4A** are shown in a particular order, the order of the actions can be modified. Thus, the illustrated

embodiments can be performed in a different order, and some actions/blocks may be performed in parallel. The flowchart of **Fig. 4A** is illustrated with reference to the embodiments of **Figs. 1-2**. Some of the blocks and/or operations listed in **Fig. 4A** are optional in accordance with certain embodiments. The numbering of the blocks presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur. Additionally, operations from the various flows may be utilized in a variety of combinations.

[0064] At block 401, the downloadable agent 102 collects first information related to performance of a network device (e.g., 101c) associated with the downloadable agent 102. At block 402, the DA 102 sends the first information to a machine (e.g., server 105), wherein the first information is stored in a database 106 coupled to the machine 105, and wherein the machine 105 is operable to: receive second information from another downloadable agent (e.g., 102 of PC 113); and analyze the first and second information with reference to data already stored in the database 106. In one embodiment, the first and second information is time stamped.

[0065] In one embodiment, the first and second information include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, error information (link error rate), type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[0066] At block 403, the DA 102 receives a report of the analyzed first and second information. In one embodiment, reporting the analysis result comprises at least one of: sending statistical analysis including throughput; sending availability of higher bandwidth for operating a DSL service; sending purchase information (or service product information) for improving DSL service performance; or sending utilization information for optimizing a consumers DSL service cost.

[0067] In one embodiment, the downloadable agent 102 is executable on multiple computing machines (e.g., PC, smart phone, tablet, CPE, etc). In one embodiment, the downloadable agent 102 is communicatively coupled to a first

LAN device 101c. In one embodiment, the method of collecting first information comprises collecting information from multiple computing entities (e.g., 114, 101a, 101b) coupled to the first LAN device 101c. In one embodiment, the other downloadable agent 102 is communicatively coupled to a second LAN device 113. In one embodiment, the other downloadable agent (e.g., 102 of 113) is operable to collect information from multiple computing entities (e.g., 114 and others) coupled to the second LAN device 113, the second LAN device 113 being different from the first LAN device 101c.

[0068] In one embodiment, the network device, and the first and second LAN devices comprise at least one of: computer, personal computer (PC), laptop, tablet PC, smart phone, an access point (AP); a base station; a wireless mobile device; a wireless LAN device; a DSLAM; an access gateway; a router; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch, wearable devices, internet enabled cameras, etc.

[0069] In one embodiment, the machine is a server 105 in a cloud 104. In one embodiment, the method further comprises: sending an on-demand change request associated with at least one of: throughput, or latency. In one embodiment, the method of receiving the report comprises at least one of: receiving statistical analysis including throughput; receiving availability of higher bandwidth for

operating a DSL service; receiving purchase information (or service product information) for improving DSL service performance; or receiving utilization information for optimizing a consumers DSL service cost.

[0070] **Fig. 4B** is a flowchart 410 of a method performed by the server 105 (or analysis machine), according to one embodiment of the disclosure. Although the blocks in the flowcharts with reference to **Fig. 4B** are shown in a particular order, the order of the actions can be modified. Thus, the illustrated embodiments can be performed in a different order, and some actions/blocks may be performed in parallel. The flowchart of **Fig. 4B** is illustrated with reference to the embodiments of **Figs. 1-3**. Some of the blocks and/or operations listed in **Fig. 4B** are optional in accordance with certain embodiments. The numbering of the blocks presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur. Additionally, operations from the various flows may be utilized in a variety of combinations.

[0071] At block 411, the server 105 receives first information from a first downloadable agent 102 (e.g., DA 1 of **Fig. 2**). At block 412, the server 105 receives second information from a second downloadable agent 102 (e.g., DA 2 of **Fig. 2**). In one embodiment, the first and second information are time stamped. In one embodiment, the first and second information includes at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[0072] In one embodiment, the first (e.g., DA 1 of **Fig. 2**) and second (e.g., DA 2 of **Fig. 2**) agents are executable on multiple computing machines. In one embodiment, the first downloadable agent (e.g., DA 1 of **Fig. 2**) is communicatively coupled to a first LAN device 101c. In one embodiment, the first downloadable agent (e.g., DA 1 of **Fig. 2**) is operable to collect information from multiple computing entities (e.g., 101a, 101b) coupled to the first LAN device 101c. In one

embodiment, the first LAN device and the second LAN device are on the same LAN 111. In one embodiment, the first and second LAN devices are coupled to distinct LANs (not shown).

[0073] In one embodiment, the second downloadable agent (e.g., DA 1 of **Fig. 2**) is communicatively coupled to a second LAN device 113. In one embodiment, the second downloadable agent (e.g., DA 1 of **Fig. 2**) is operable to collect information from multiple computing entities (e.g., 114, and others) coupled to the second LAN device 113, the second LAN device 113 being different from the first LAN device 101c.

[0074] In one embodiment, the first PC 101b and second 113 LAN devices comprise at least one of: Computer, personal computer (PC), laptop, tablet PC, smart phone, an access point (AP); a base station; a wireless smart phone device; a wireless LAN device; a router; an access gateway; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch, wearable devices, internet enabled cameras, etc.

[0075] In one embodiment, the first (e.g., DA 1 of **Fig. 2**) and second (e.g., DA 2 of **Fig. 2**) downloadable agents execute on devices coupled to the same LAN 111. In one embodiment, the first and second downloadable agents execute on devices coupled to distinct LANs (not shown). In such an embodiment, server 105

may (a) process data from distinct LANs separately, to produce analyses and recommendations for each LAN based solely on measurements made from the DAs attached to each respective LAN device; or (b) process data from distinct LANs jointly, to produce analyses and recommendations for each LAN based, at least in part, on data reported from other LANs.

[0076] The term “measurement” herein generally refers to information that is collected, and optionally processed, by the DAs from the LAN devices. In one embodiment, the DAs process the information, and send the processed information to the server 105. For example, as opposed to sending collected information regarding raw data rate, the DAs may process the raw data rate and other related information collected over time, to measure throughput and send the measured throughput to the server 105. The measured throughput may be the average raw data rate over a specified period of time.

[0077] In one embodiment, jointly processed results from multiple LANs are used to determine whether one of the LANs is under or over-performing relative to its neighboring LANs. In one embodiment, server 105 processes data from the distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN. In this embodiment, recommendations and analyses are generated for a LAN based on data collected from it and data collected from other LANs.

[0078] In one embodiment, jointly processed results from multiple LANs are used to determine whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN. In one embodiment, comparing performance among LANs may require the presence of downloadable agents on multiple LANs. In one embodiment, comparing performances of access to a particular remote host can be done from a single LAN or from multiple LANs.

[0079] In one embodiment, LAN measurements that determine whether a LAN is under or over performing relative to its neighboring LANs, include basic estimates of throughput and stability. In one embodiment, LAN measurements

include measurements made from a particular LAN to one or more servers on the Internet to assess average Internet access performance or to access performance for particular Internet sites from devices attached to the LAN.

[0080] At block 413, the server 105 stores the first and second information in the database 106. At block 404, the server analyzes the first and second information with reference to data already stored in the database 106. In one embodiment, the method of analyzing the first information with reference to the second information comprises at least one of: performing statistical analysis including throughput; determining availability of higher bandwidth for operating a DSL service; determining purchase information (or service product information) for improving DSL service performance; determining utilization information for optimizing a consumers DSL service cost; or grouping data in the database according to at least one of geographical location, services type, service provider, or time.

[0081] At block 415, the server 105 reports the analyzed first and second information to a management entity (e.g., Internet service provider (ISP), DSL controller 103, CPE 101a, PC 101b, PC 113, smart phone 114, etc). In one embodiment, the method of reporting comprises at least one of: providing statistical analysis including throughput; providing availability of higher bandwidth for operating a DSL service; providing purchase information (or service product information) for improving DSL service performance; or providing utilization information for optimizing a consumers DSL service cost, providing latency information for gaming, providing line bandwidth assessment (e.g., whether a line can support more bandwidth than its current bandwidth), providing stability information about a line (e.g., whether a line is now stable enough for higher throughput).

[0082] In one embodiment, the method further comprises: determining control information for a DSL operator, the control information according to the analyzed first and second information; and recommending the DSL operator with the control information to improve performance of a DSL service. In one embodiment, the control information relates to on-demand change in performance

of the DSL service. In one embodiment, the on-demand change is associated with at least one of: throughput, latency, packet loss, or jitter. In one embodiment, the method of receiving the first and second information is via Internet.

[0083] **Fig. 5A** is flowchart 500 of a method for performing a diagnostic test, according to one embodiment of the disclosure. Although the blocks in the flowchart with reference to **Fig. 5A** are shown in a particular order, the order of the actions can be modified. Thus, the illustrated embodiments can be performed in a different order, and some actions/blocks may be performed in parallel.

[0084] At block 501, the user/customer accesses a test page. In one embodiment, the test page is accessible over the web. **Fig. 6A** is an exemplary report 600 (or test page) provided by the server 105 based on the information received from the DA 102, according to one embodiment of the disclosure. In one embodiment, the test page provides a number of test options. For example, at block 502 a user may choose to perform a Run Speed test (a test option), which is also shown as the tab Speed Test in **Fig. 6A**. In another example, at block 503 a user/customer may run a utilization test (another test option), shown by the tab Utilization Test in **Fig. 6A**. The report 600 illustrates a speed test result page, after performing a speed test. In this particular non-limiting illustration, the report 600 shows the download and upload speeds in Mbps, and also shows an estimate of the response time of the communication device under test. In one embodiment, the report 600 is accessible by a subscriber or user/customer of the particular Internet service being tested.

[0085] At block 504, the system (machine on which the agent is running) seeks permission from the user/customer to run the downloadable agent 102 on the machine. If the permission is granted, the downloadable agent 102 attempts to access the communication device (such as a DSL modem) diagnostics page, and would try to run a speed test (e.g., at block 505) or utilization test. If the connection fails, for example due to a link error, the process moves back as shown by block 506. If the test is successful, the process moves to block 507, which checks whether the user/customer is login to the system/server (such as server 105). If the user is logged in, a more complete report is shown to the user at block 508 which includes

current and past results. If the user/customer was not logged in, then at block 509 only current results are shown.

[0086] The flowcharts discussed herein are merely examples, of an example embodiment, and not all blocks need to be performed. Other embodiments of the disclosure could also map to a similar flowchart. For example, at block 505, the downloadable agent 102 may collect data and produce analysis for the LAN and WAN performance of some other device on the LAN, rather than collecting data and producing analyses for the device on which the DA 102 executes.

[0087] **Fig. 5B** is flowchart 510 of a method for running (i.e., executing) functions, according to another embodiment of the disclosure. The figure is similar to **Fig. 5A**, but more general. Although the blocks in the flowchart with reference to **Fig. 5B** are shown in a particular order, the order of the actions can be modified. Thus, the illustrated embodiments can be performed in a different order, and some actions/blocks may be performed in parallel.

[0088] At block 511, the user/customer accesses a Graphic User Interface (GUI) page. In one embodiment, the GUI page is accessible over the web. In one embodiment, the GUI page provides a number of functions for running diagnostics, performance measurement or data collection. For example, at block 512 a user may choose to perform data collection. In another example, at block 513 a user/customer may run a diagnostics function or a performance measurement..

[0089] At block 514, the system (machine on which the agent is running) seeks permission from the user/customer to run the downloadable agent 102 on the machine. If the permission is granted, the downloadable agent 102 attempts to access the communication device (such as a DSL modem), and would try to run one of the functions above (e.g., at block 515), such as a performance measurement or diagnostics test. If the connection fails, for example due to a link error, the process moves back as shown by block 516. If the test is successful, the process moves to block 507, which checks whether the user/customer is login to the system/server (such as server 105). If the user is logged in, a more complete report is shown to the user at block 518 which includes current and past results. If the user/customer was not logged in, then at block 519 only current results are shown.

[0090] The flowcharts discussed herein are merely examples, of an example embodiment, and not all blocks need to be performed. Other embodiments of the disclosure could also map to a similar flowchart. For example, at block 505, the downloadable agent 102 may collect data and produce analysis for the LAN and WAN performance of some other device on the LAN, rather than collecting data and producing analyses for the device on which the DA 102 executes.

[0091] **Fig. 6B** is another exemplary report 620 provided by the server based on received information from the downloadable agent, according to one embodiment of the disclosure. The report 620 depicts a usage report, according to one embodiment. The report 620, for example, includes information on utilization of the capacity of the subscriber or user/customer link. The report 620 may also provide information on whether a customer link has the potential to operate at higher speeds. The report 620 also shows a Traffic Usage Report. The example Traffic Usage Report shows traffic information collected over a week, such as Download Usage, max data rate used, max available data rate, etc.

[0092] **Fig. 7** is a processor-based system 700 having machine-readable storage medium with computer executable instructions of a downloadable agent, according to one embodiment of the disclosure. The storage medium 704 and associated computer executable instructions 102/704a may be in any of the communication devices and/or servers discussed herein. The computer-machine-readable/executable instructions 102/704a are executed by a processor 701. Elements of embodiments are provided as machine-readable medium for storing the computer-executable instructions (e.g., instructions to implement the flowcharts of **Figs. 2 and 4** and other processes discussed in the description).

[0093] In one embodiment, the processor-based system 700 further comprises a database 702 to store data used by the instructions 102/704a. In one embodiment, the processor-based system 700 includes a network interface 705 to communicate with other devices. In one embodiment, the components of the processor-based system 700 communicate with one another via a network bus 703.

[0094] The machine-readable storage medium 704 may include, but is not limited to, flash memory, optical disks, hard disk drive (HDD), Solid State Drive

(SSD), CD-Read Only Memory (CD-ROMs), DVD ROMs, RAMs, EPROMs, EEPROMs, magnetic or optical cards, or other type of machine-readable media suitable for storing electronic or computer-executable instructions. For example, embodiments of the disclosure may be downloaded as a computer program (e.g., BIOS) which may be transferred from a remote computer (e.g., a server) to a requesting computer (e.g., a client) by way of data signals via a communication link (e.g., a modem or network connection).

[0095] **Fig. 8** is a processor-based system 800 having machine-readable storage medium with computer executable instructions executed by the server 105, according to one embodiment of the disclosure. The storage medium 804 and associated computer executable instructions 202/203/204/804a may be in any of the communication devices and/or servers discussed herein. The computer-machine-readable/executable instructions 202/203/204/804a are executed by a processor 801 of the server 105. Elements of embodiments are provided as machine-readable medium for storing the computer-executable instructions (e.g., instructions to implement the flowcharts of **Figs. 2, 4, 6B** and other processes discussed in the description).

[0096] In one embodiment, the processor-based system 800 further comprises a database 802 to store data used by the instructions 202/203/204/804a. In one embodiment, the processor-based system 800 includes a network interface 605 to communicate with other devices. In one embodiment, the components of the processor-based system 600 communicate with one another via a network bus 803.

[0097] The machine-readable storage medium 804 may include, but is not limited to, flash memory, optical disks, hard disk drive (HDD), Solid State Drive (SSD), CD-Read Only Memory (CD-ROMs), DVD ROMs, RAMs, EPROMs, EEPROMs, magnetic or optical cards, or other type of machine-readable media suitable for storing electronic or computer-executable instructions. For example, embodiments of the disclosure may be downloaded as a computer program (e.g., BIOS) which may be transferred from a remote computer (e.g., a server) to a requesting computer (e.g., a client) by way of data signals via a communication link (e.g., a modem or network connection).

[0098] Reference in the specification to "an embodiment," "one embodiment," "some embodiments," or "other embodiments" means that a particular feature, structure, or characteristic described in connection with the embodiments is included in at least some embodiments, but not necessarily all embodiments. The various appearances of "an embodiment," "one embodiment," or "some embodiments" are not necessarily all referring to the same embodiments. If the specification states a component, feature, structure, or characteristic "may," "might," or "could" be included, that particular component, feature, structure, or characteristic is not required to be included. If the specification or claim refers to "a" or "an" element, that does not mean there is only one of the elements. If the specification or claims refer to "an additional" element, that does not preclude there being more than one of the additional element.

[0099] Furthermore, the particular features, structures, functions, or characteristics may be combined in any suitable manner in one or more embodiments. For example, a first embodiment may be combined with a second embodiment anywhere the particular features, structures, functions, or characteristics associated with the two embodiments are not mutually exclusive.

[00100] While the disclosure has been described in conjunction with specific embodiments thereof, many alternatives, modifications and variations of such embodiments will be apparent to those of ordinary skill in the art in light of the foregoing description. The embodiments of the disclosure are intended to embrace all such alternatives, modifications, and variations as to fall within the broad scope of the appended claims.

[00101] The following examples pertain to further embodiments. Specifics in the examples may be used anywhere in one or more embodiments. All optional features of the apparatus described herein may also be implemented with respect to a method or process.

[00102] For example, in one embodiment a method performed by a downloadable agent comprises: collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN;

and transmitting the WAN performance information to a machine; wherein the machine is operable to: store the WAN performance information in a database associated with the machine, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

[00103] In one embodiment, the other device is a router. In one embodiment, the machine is operable to store the WAN performance information with an associated timestamp. In one embodiment, the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN. In one embodiment, the method further comprises transmitting by the downloadable agent the LAN performance data to the machine.

[00104] In one embodiment, the downloadable agent is executable in a virtual machine on the computing device. In one embodiment, the downloadable agent is dynamically downloaded to the computing device. In one embodiment, the method further comprises receiving the analysis result, wherein receiving the analysis result comprises at least one of: receiving statistical analysis including throughput; receiving availability of higher bandwidth for operating a DSL service; receiving purchase information (or service product information) for improving DSL service performance; or receiving utilization information for optimizing a consumers DSL service cost.

[00105] In one embodiment, the WAN performance information includes at least one of: topological information, geographical information, throughput, latency, jitter, packet loss, time, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, user's provisioned WAN service, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[00106] In one embodiment, the method further comprises: sending an on-demand change request associated with at least one of: throughput, or latency. In one embodiment, the machine is a server that resides in a cloud. In one embodiment, the computing device is one of: a personal computer; a gaming

console; an access point (AP); a base station; a wireless smart phone device; a wireless LAN device; an access gateway; a router; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[00107] In another example, a machine readable storage medium is provided having computer executable instructions that when executed cause a processor to perform a method according to any one of method discussed above.

[00108] In another example, a system comprises: a database; and a server coupled to the database, the server operable to: receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and store the WAN performance information in the database associated with the server, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

[00109] In one embodiment, the server resides in a cloud. In one embodiment, the server is operable to store the WAN performance information with an associated timestamp. In one embodiment, the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other

device coupled to the LAN. In one embodiment, the server is operable to receive from the downloadable agent the LAN performance data. In one embodiment, the server comprises: a first module for collecting the WAN performance information; a second module for performing statistical analysis using the first WAN performance information; and a third module for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider.

[00110] In one embodiment, the modules that receive the instruction and command from the third module are accessible by internet. In one embodiment, the server comprises: a management interface for communicating with the downloadable agent via internet. In one embodiment, the server comprises: a user interface module for providing access and for displaying information associated with the first, second, third modules.

[00111] In one embodiment, the server is operable to compute throughput of DSL connection by collecting current performance metrics associated with DSL service. In one embodiment, the server to perform throughput computation with reference to a website. In one embodiment, the throughput computation comprises probing a network. In one embodiment, the downloadable agent is executable in a virtual machine on the computing device. In one embodiment, the downloadable agent is dynamically downloaded to the computing device.

[00112] In one embodiment, reporting the analysis result comprises at least one of: sending statistical analysis including throughput; sending availability of higher bandwidth for operating a DSL service; sending purchase information (or service product information) for improving DSL service performance; or sending utilization information for optimizing a consumers DSL service cost. In one embodiment, the WAN performance information includes at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power,

frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[00113] In one embodiment, the system is operable to receive an on-demand change request associated with at least one of: throughput, or latency. In one embodiment, the computing device is one of: an access point (AP); a base station; a wireless smartphone device; a wireless LAN device; an access gateway; a router, a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[00114] In another example, a method performed by a server comprises: receiving first information from a first downloadable agent; receiving second information from a second downloadable agent; storing the first and second information in a database; analyzing the first and second information with reference to data already stored in the database; and reporting the analyzed first and second information to a management entity.

[00115] In one embodiment, the first and second information are time stamped. In one embodiment, the first and second agents are executable on multiple computing machines. In one embodiment, the first downloadable agent is communicatively coupled to a first LAN device. In one embodiment, the first downloadable agent is operable to collect information from multiple computing

entities coupled to the first LAN device. In one embodiment, the second downloadable agent is communicatively coupled to a second LAN device. In one embodiment, the second downloadable agent is operable to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.

[00116] In one embodiment, the first and second LAN devices comprise at least one of: tablet computing device; an access point (AP); a base station; a wireless smartphone device; a wireless LAN device; a router; an access gateway; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[00117] In one embodiment, the first and second downloadable agents execute on devices coupled to the same LAN. In one embodiment, the first and second downloadable agents execute on devices coupled to distinct LANs. In one embodiment, the method further comprises: determining control information for a DSL operator, the control information according to the analyzed first and second information; and recommending the DSL operator with the control information to improve performance of a DSL service.

[00118] In one embodiment, the control information relates to on-demand change in performance of the DSL service. In one embodiment, the on-demand

change is associated with at least one of: throughput, latency, packet loss, or jitter. In one embodiment, the method of reporting comprises at least one of: providing statistical analysis including throughput; providing availability of higher bandwidth for operating a DSL service; providing purchase information (or service product information) for improving DSL service performance; or providing utilization information for optimizing a consumers DSL service cost. In one embodiment, the method of receiving the first and second information is via Internet.

[00119] In one embodiment, the first and second information includes at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[00120] In one embodiment, the method of analyzing the first information with reference to the second information comprises at least one of: performing statistical analysis including throughput; determining availability of higher bandwidth for operating a DSL service; determining purchase information (or service product information) for improving DSL service performance; determining utilization information for optimizing a consumers DSL service cost; or grouping data in the database according to at least one of geographical location, services type, service provider, or time.

[00121] In one embodiment, the method further comprises: processing data from the distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by corresponding first or second downloadable agents. In one embodiment, the method of further comprises: processing data from the distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN. In one embodiment, the analyses for each LAN include at least one of: whether the LAN is under or over

performing relative to a neighboring LAN; or whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN.

[00122] In one embodiment, the server comprises: a first module for collecting the first and second information; a second module for performing statistical analysis using the first and/or second information; and a third module for generating instruction and command for the first and/or second devices or modules according to the statistical analysis. In one embodiment, the modules that receive the instruction and command from the third module are accessible by internet. In one embodiment, the server comprises: a management interface for communicating with the first and second downloadable agents via internet. In one embodiment, the server comprises: a user interface module for providing access and for displaying information associated with the first, second, third modules.

[00123] In one embodiment, the first information is collected by a downloadable agent coupled to a DSL connection, the downloadable agent to send the first information to the server. In one embodiment, the server resides in a cloud. In one embodiment, the server is operable to compute throughput of a DSL connection by collecting current performance metrics associated with the DSL service. In one embodiment, the server to perform throughput computation with reference to a website. In one embodiment, the throughput computation comprises probing a network.

[00124] In one embodiment, the method of probing comprises: transmitting probing data from a communication device to another communication device; and waiting for a predetermined time before reading operational data including counter values related to user data traffic. In one embodiment, the method of probing comprises: transmitting probing data from a communication device to another communication device; and receiving a report indicating amount of data or data received by the other communication device. In one embodiment, the server is operable to apply a machine learning algorithm for training a performance estimation algorithm for the communication device.

[00125] In another example, a machine readable storage medium is provided having computer executable instructions that when executed cause a processor to perform a method according to the method discussed above.

[00126] In another example, a system comprises: a database; a communication interface for communicating with other devices; and a server coupled to the database and the communication interface, wherein the server is operable to perform a method according to the method discussed above.

[00127] In one embodiment, the server comprises: a first module for collecting the first and second information; a second module for performing statistical analysis using the first and/or second information; and a third module for generating instruction and command for the first and/or second devices or modules according to the statistical analysis. In one embodiment, the modules that receive the instruction and command from the third module are accessible by internet. In one embodiment, the server comprises: a management interface for communicating with the first and second agents via internet. In one embodiment, the server comprises: a user interface module for providing access and for displaying information associated with the first, second, third modules.

[00128] In one embodiment, the first information is collected by a downloadable agent coupled to a DSL connection, the downloadable agent to send the first information to the server. In one embodiment, the server is operable to compute throughput of the DSL connection by collecting current performance metrics associated with the DSL service. In one embodiment, the server to perform throughput computation with reference to a website. In one embodiment, the throughput computation comprises probing a network. In one embodiment, the server resides in a cloud. In one embodiment, the communication interface comprises at least one of: a wired Ethernet interface; a powerline communications interface; or a wireless interface.

[00129] In one embodiment, the other devices comprise at least one of: tablet computing device; an access point (AP); a base station; a wireless mobile device; a wireless LAN device; an access gateway; a router; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE)

modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[00130] In another example, a method performed by a downloadable agent on a processor comprises: collecting first information related to performance of a network device associated with the downloadable agent; sending the first information to a machine, wherein the first information is stored in a database coupled to the machine, and wherein the machine is operable to: receive second information from another downloadable agent; and analyze the first and second information with reference to data already stored in the database; and receiving a report of the analyzed first and second information.

[00131] In one embodiment, the first and second information is time stamped. In one embodiment, the downloadable agent is executable on multiple computing machines. In one embodiment, the downloadable agent is communicatively coupled to a first LAN device. In one embodiment, the method of collecting first information comprises collecting information from multiple computing entities coupled to the first LAN device. In one embodiment, the other downloadable agent is communicatively coupled to a second LAN device. In one embodiment, the other downloadable agent is operable to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.

[00132] In one embodiment, the network device, and the first and second LAN devices comprise at least one of: tablet computing device; an access point (AP); a base station; a wireless mobile device; a wireless LAN device; a DSLAM; an access gateway; a router; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[00133] In one embodiment, the machine is a server in a cloud. In one embodiment, the first and second information include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[00134] In one embodiment, the method further comprises: sending an on-demand change request associated with at least one of: throughput, or latency. In one embodiment, the method of receiving the report comprises at least one of: receiving statistical analysis including throughput; receiving availability of higher bandwidth for operating a DSL service; receiving purchase information (or service

product information) for improving DSL service performance; or receiving utilization information for optimizing a consumers DSL service cost.

[00135] In one embodiment, the machine is operable to: process data from distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by respective downloadable agents coupled to respective distinct LANs. In one embodiment, the machine is operable to: process data from distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN. In one embodiment, the analyses for each LAN include at least one of: whether the LAN is under or over performing relative to a neighboring LAN; or whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN.

[00136] In another example, a method performed by a downloadable agent on a processor comprises: collecting first information related to performance of a network device associated with the downloadable agent; sending the first information to a machine, wherein the first information is stored in a database coupled to the machine, and wherein the machine is operable to: receive second information from another downloadable agent; and analyze the first and second information with reference to data already stored in the database; and receiving a report of the analyzed first and second information.

[00137] In one embodiment, the first and second information is time stamped. In one embodiment, the downloadable agent is executable on multiple computing machines. In one embodiment, the downloadable agent is communicatively coupled to a first LAN device.

[00138] In one embodiment, collecting first information comprises collecting information from multiple computing entities coupled to the first LAN device. In one embodiment, the other downloadable agent is communicatively coupled to a second LAN device. In one embodiment, the other downloadable agent is operable

to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.

[00139] In one embodiment, the network device and the first and second LAN devices comprise at least one of: an access point (AP); a base station; a wireless mobile device; a wireless LAN device; a DSLAM; an access gateway; a router; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; an Ethernet connected network switch; wearable device; and internet enabled cameras.

[00140] In one embodiment, the machine is a server in a cloud. In one embodiment, the first and second information include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[00141] In one embodiment, the further comprises: sending an on-demand change request associated with at least one of: throughput, or latency. In one embodiment, receiving the report comprises at least one of: receiving statistical analysis including throughput; receiving availability of higher bandwidth for

operating a DSL service; receiving service product information for improving DSL service performance; or receiving utilization information for optimizing a consumers DSL service cost.

[00142] In one embodiment, the machine is operable to: process data from distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by respective downloadable agents coupled to respective distinct LANs. In one embodiment, the machine is operable to: process data from distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN.

[00143] In one embodiment, the analyses for each LAN include at least one of: whether the LAN is under or over performing relative to a neighboring LAN; or whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN. In one embodiment, the downloadable agent is executable on an Internet browser. In one embodiment, the downloadable agent is accessible remotely via the Internet.

[00144] In one embodiment, the method further comprises periodically sending collected first information to the machine. In one embodiment, the method further comprises waiting for a predetermined condition or threshold to be satisfied before sending the first information to the machine. In one embodiment, the predetermined condition or threshold is at least one of: a function of a type of data collected, or limit or threshold on a performance level associated with the collected data. In one embodiment, the machine is operable the first information by polling or scheduled based system. In one embodiment, the method further comprises collecting data from at least one of: National Weather Service; radio station; or operator.

[00145] In another example, a machine readable storage medium is provided having computer executable instructions that when executed cause a processor to perform a method according to the method discussed above.

[00146] An abstract is provided that will allow the reader to ascertain the nature and gist of the technical disclosure. The abstract is submitted with the understanding that it will not be used to limit the scope or meaning of the claims. The following claims are hereby incorporated into the detailed description, with each claim standing on its own as a separate embodiment.

CLAIMS

We claim:

1. A method performed by a downloadable agent, the method comprising:
 - collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
 - transmitting the WAN performance information to a machine, wherein the machine is operable to:
 - store the WAN performance information in a database associated with the machine,
 - analyze the WAN performance information to generate an analysis result; and
 - report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.
2. The method of claim 1, wherein the other device is a router.
3. The method of claim 1, wherein the machine is operable to store the WAN performance information with an associated timestamp.
4. The method of claim 1 wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.
5. The method of claim 4 further comprises transmitting by the downloadable agent the LAN performance data to the machine.

6. The method of claim 1, wherein the downloadable agent is executable in a virtual machine on the computing device.
7. The method of claim 1, wherein the downloadable agent is executable in a virtual machine on the computing device.
8. The method of claim 1 further comprises receiving the analysis result, wherein receiving the analysis result comprises at least one of:
 - receiving statistical analysis including throughput;
 - receiving availability of higher bandwidth for operating a DSL service;
 - receiving service product information for improving DSL service performance; or
 - receiving utilization information for optimizing a consumers DSL service cost.
9. The method of claim 1, wherein the WAN performance information includes at least one of:
 - topological information,
 - geographical information,
 - throughput,
 - latency,
 - jitter,
 - packet loss,
 - time,
 - type of communication device,
 - device network identification,
 - manufacturer and model of equipment,
 - equipment characteristics,
 - firmware,
 - user's network usage pattern,
 - user's provisioned WAN service,

RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

10. The method of claim 1 further comprises:
 - sending an on-demand change request associated with at least one of: throughput, or latency.
11. The method of claim 1, wherein the machine is a server that resides in a cloud.
12. The method of claim 1, wherein the computing device is one of:
 - tablet computing device;
 - a personal computer;
 - a gaming console;
 - an access point (AP);
 - a base station;
 - a wireless smartphone device;
 - a wireless LAN device;
 - an access gateway;
 - a router;
 - a performance enhancement device;
 - a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
 - a cable CPE modem;
 - an in-home powerline device;
 - a Home Phoneline Network Alliance (HPNA) based device;
 - an in-home coax distribution device;
 - a G.hn (Global Home Networking Standard) compatible device;
 - an in-home metering communication device;

an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; and
internet enabled cameras.

13. The method of claim 1, wherein the downloadable agent is executable on an Internet browser.
14. The method of claim 1, wherein the downloadable agent is accessible remotely via the Internet.
15. The method of claim 1 further comprises periodically sending collected WAN performance information to the machine.
16. The method of claim 1 further comprises waiting for a predetermined condition or threshold to be satisfied before sending collected WAN performance information to the machine.

17. The method of claim 16, where the predetermined condition or threshold is at least one of:
- a function of a type of data collected, or
 - limit or threshold on a performance level associated with the collected data.
18. The method of claim 1, wherein the machine is operable to collect WAN performance information by polling or scheduled based system.
19. The method of claim 1 further comprises collecting data from at least one of:
- National Weather Service;
 - radio station; or
 - operator.
20. A machine readable storage medium having computer executable instructions that when executed cause a processor to perform a method according to any one of method claims 1 to 19.
21. A system comprising:
- a database; and
 - a server coupled to the database, the server operable to:
 - receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
 - store the WAN performance information in the database associated with the server,
 - analyze the WAN performance information to generate an analysis result; and
 - report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

22. The system of claim 21, wherein the server resides in a cloud.
23. The system of claim 21, wherein the server is operable to store the WAN performance information with an associated timestamp.
24. The system of claim 21, wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.
25. The system of claim 24, wherein the server is operable to receive from the downloadable agent the LAN performance data.
26. The system of claim 25, wherein the server comprises:
 - a first module for collecting the WAN performance information;
 - a second module for performing statistical analysis using the first WAN performance information; and
 - a third module for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider..
27. The system of claim 26, wherein the modules that receive the instruction and command from the third module are accessible by internet.
28. The system of claim 26, wherein the server comprises:
 - a management interface for communicating with the downloadable agent via internet.
29. The system of claim 26, wherein the server comprises:
 - a user interface module for providing access and for displaying

information associated with the first, second, third modules.

30. The system of claim 21, wherein the server is operable to compute throughput of DSL connection by collecting current performance metrics associated with DSL service.
31. The system of claim 30, wherein the server to perform throughput computation with reference to a website.
32. The system of claim 31, wherein the throughput computation comprises probing a network.
33. The system of claim 21, wherein the downloadable agent is executable in a virtual machine on the computing device.
34. The system of claim 21, wherein the downloadable agent is dynamically downloaded to the computing device.
35. The system of claim 21, wherein the server is operable to report the analysis result by performing at least one of:
 - sending statistical analysis including throughput;
 - sending availability of higher bandwidth for operating a DSL service;
 - sending service product information for improving DSL service performance; or
 - sending utilization information for optimizing a consumers DSL service cost.
36. The system of claim 21, wherein the WAN performance information includes at least one of:
 - topological information,
 - geographical information,

time,
throughput,
latency,
jitter,
packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency
bands and mode of operation,
environment statistics, or
data on operation of communication devices.

37. The system of claim 21, wherein the server is operable to receive an on-demand change request associated with at least one of: throughput, or latency.

38. The system of claim 21, wherein the computing device is one of:
tablet computing device;
an access point (AP);
a base station;
a wireless smartphone device;
a wireless LAN device;
an access gateway;
a router,
a performance enhancement device;
a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;

a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; and
internet enabled cameras.

39. The system of claim 21, wherein the server is operable to provide a marketplace of ideas for the communication devices for trading bandwidth for media services.

40. The system of claim 21, wherein the server is operable to collect WAN performance information by polling or scheduled based system.
41. A method comprising:
receiving first information from a first downloadable agent;
receiving second information from a second downloadable agent;
storing the first and second information in a database;
analyzing the first and second information with reference to data already stored in the database; and
reporting the analyzed first and second information to a management entity.
42. The method of claim 41, wherein the first and second information are time stamped.
43. The method of claim 41, wherein the first and second agents are executable on multiple computing machines.
44. The method of claim 41, wherein the first downloadable agent is communicatively coupled to a first LAN device.
45. The method of claim 44, wherein the first downloadable agent is operable to collect information from multiple computing entities coupled to the first LAN device.
46. The method of claim 44, wherein the second downloadable agent is communicatively coupled to a second LAN device.
47. The method of claim 46, wherein the second downloadable agent is operable to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.

48. The method of claim 47, wherein the first and second LAN devices comprise at least one of:

- an access point (AP);
- a base station;
- a wireless smartphone device;
- a wireless LAN device;
- a router
- an access gateway;
- a performance enhancement device;
- a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
- a cable CPE modem;
- an in-home powerline device;
- a Home Phoneline Network Alliance (HPNA) based device;
- an in-home coax distribution device;
- a G.hn (Global Home Networking Standard) compatible device;
- an in-home metering communication device;
- an in-home appliance communicatively interfaced with the LAN;
- a wireless femtocell base station;
- a wireless Wi-Fi compatible base station;
- a wireless mobile device repeater;
- a wireless mobile device base station;
- nodes within an ad-hoc/mesh network;
- a set-top box (STB)/set-top unit (STU) customer electronics device;
- an Internet Protocol (IP) enabled television;
- an IP enabled media player;
- an IP enabled gaming console;
- an Ethernet gateway;
- a computing device connected to the LAN;
- an Ethernet connected computer peripheral device;

an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; and
internet enabled cameras.

49. The method of claim 41, wherein the first and second downloadable agents execute on devices coupled to the same LAN.

50. The method of claim 41, wherein the first and second downloadable agents execute on devices coupled to distinct LANs.

51. The method of claim 50 further comprises:

processing data from the distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by corresponding first or second downloadable agents.

52. The method of claim 50 further comprises:

processing data from the distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN.

53. The method of claims 51 or 52, wherein the analyses for each LAN include at least one of:

whether the LAN is under or over performing relative to a neighboring LAN; or

whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN.

54. The method of claim 41 further comprises:
- determining control information for a DSL operator, the control information according to the analyzed first and second information; and
 - recommending the DSL operator with the control information to improve performance of a DSL service.
55. The method of claim 54, wherein the control information includes at least one or more of signals or commands related to:
- power,
 - spectrum control,
 - margin, data rate,
 - latency/delay, or
 - coding.
56. The method of claim 54, wherein the control information relates to on-demand change in performance of the DSL service.
57. The method of claim 56, wherein the on-demand change is associated with at least one of:
- throughput,
 - latency,
 - packet loss, or
 - jitter.
58. The method of claim 41, wherein reporting comprises at least one of:
- providing statistical analysis including throughput;

providing availability of higher bandwidth for operating a DSL service;
providing service product information for improving DSL service performance; or
providing utilization information for optimizing a consumers DSL service cost.

59. The method of claim 41, wherein receiving the first and second information is via Internet.

60. The method of claim 41, wherein the first and second information includes at least one of:

topological information,
geographical information,
time,
throughput,
latency,
jitter,
packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency bands and mode of operation,
environment statistics, or
data on operation of communication devices.

61. The method of claim 41, wherein analyzing the first information with

- reference to the second information comprises at least one of:
- performing statistical analysis including throughput;
 - determining availability of higher bandwidth for operating a DSL service;
 - determining service product information for improving DSL service performance;
 - determining utilization information for optimizing a consumers DSL service cost; or
 - grouping data in the database according to at least one of geographical location, services type, service provider, or time.
62. The method of claim 41, wherein the methods of receiving, analyzing, and reporting are performed by a server.
63. The method of claim 62, wherein the server comprises:
- a first module for collecting the first and second information;
 - a second module for performing statistical analysis using the first and/or second information; and
 - a third module for generating instruction and command for the first and/or second devices or modules according to the statistical analysis.
64. The method of claim 63, wherein the modules that receive the instruction and command from the third module are accessible by internet.
65. The method of claim 63, wherein the server comprises:
- a management interface for communicating with the first and second downloadable agents via internet.
66. The method of claim 63, wherein the server comprises:
- a user interface module for providing access and for displaying information associated with the first, second, third modules.

67. The method of claim 63, wherein the first information is collected by a downloadable agent coupled to a DSL connection, the downloadable agent to send the first information to the server.
68. The method of claim 63, wherein the server resides in a cloud.
69. The method of claim 63, wherein the server is operable to compute throughput of a DSL connection by collecting current performance metrics associated with the DSL service.
70. The method of claim 69, wherein the server to perform throughput computation with reference to a website.
71. The method of claim 70, wherein the throughput computation comprises probing a network.
72. The method of claim 71, wherein probing comprises:
transmitting probing data from a communication device to another communication device; and
waiting for a predetermined time before reading operational data including counter values related to user data traffic.
73. The method of claim 71, wherein probing comprises:
transmitting probing data from a communication device to another communication device; and
receiving a report indicating amount of data or data received by the other communication device.
74. The method of claim 72, wherein the server to apply a machine learning algorithm for training a performance estimation algorithm for the

communication device.

75. A machine readable storage medium having computer executable instructions that when executed cause a processor to perform a method according to any one of method claims 41 to 74.
76. A system comprising:
a database;
a communication interface for communicating with other devices;
and
a server coupled to the database and the communication interface, the server operable to perform a method according to any one of method claims 38 to 59.
77. The system of claim 76, wherein the server comprises:
a first module for collecting the first and second information;
a second module for performing statistical analysis using the first and/or second information; and
a third module for generating instruction and command for the first and/or second devices or modules according to the statistical analysis.
78. The system of claim 77, wherein the modules that receive the instruction and command from the third module are accessible by internet.
79. The system of claim 77, wherein the server comprises:
a management interface for communicating with the first and second agents via internet.
80. The system of claim 77, wherein the server comprises:
a user interface module for providing access and for displaying information associated with the first, second, third modules.

81. The system of claim 77, wherein the first information is collected by a downloadable agent coupled to a DSL connection, the downloadable agent to send the first information to the server.
82. The system of claim 81, wherein the server is operable to compute throughput of the DSL connection by collecting current performance metrics associated with the DSL service.
83. The system of claim 81, wherein the server to perform throughput computation with reference to a website.
84. The system of claim 83, wherein the throughput computation comprises probing a network.
85. The system of claim 76, wherein the server resides in a cloud.
86. The system of claim 76, wherein the communication interface comprises at least one of:
- a wired Ethernet interface;
 - a powerline communications interface; or
 - a wireless interface.
87. The system of claim 76, wherein the other devices comprise at least one of:
- tablet computing device;
 - an access point (AP);
 - a base station;
 - a wireless mobile device;
 - a wireless LAN device;
 - an access gateway;
 - a router;
 - a performance enhancement device;

a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; and
internet enabled cameras.

88. A method performed by a downloadable agent on a processor, the method comprising:
collecting first information related to performance of a network

device associated with the downloadable agent;
 sending the first information to a machine, wherein the first information is stored in a database coupled to the machine, and wherein the machine is operable to:
 receive second information from another downloadable agent;
 and
 analyze the first and second information with reference to data already stored in the database; and
 receiving a report of the analyzed first and second information.

89. The method of claim 88, wherein the first and second information is time stamped.
90. The method of claim 88, wherein the downloadable agent is executable on multiple computing machines.
91. The method of claim 88, wherein the downloadable agent is communicatively coupled to a first LAN device.
92. The method of claim 91, wherein collecting first information comprises collecting information from multiple computing entities coupled to the first LAN device.
93. The method of claim 91, wherein the other downloadable agent is communicatively coupled to a second LAN device.
94. The method of claim 93, wherein the other downloadable agent is operable to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.
95. The method of claim 94, wherein the network device and the first and

second LAN devices comprise at least one of:

- an access point (AP);
- a base station;
- a wireless mobile device;
- a wireless LAN device;
- a DSLAM;
- an access gateway;
- a router;
- a performance enhancement device;
- a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
- an in-home powerline device;
- a Home Phoneline Network Alliance (HPNA) based device;
- an in-home coax distribution device;
- a G.hn (Global Home Networking Standard) compatible device;
- an in-home metering communication device;
- an in-home appliance communicatively interfaced with the LAN;
- a wireless femtocell base station;
- a wireless Wi-Fi compatible base station;
- a wireless mobile device repeater;
- a wireless mobile device base station;
- nodes within an ad-hoc/mesh network;
- a set-top box (STB)/set-top unit (STU) customer electronics device;
- an Internet Protocol (IP) enabled television;
- an IP enabled media player;
- an IP enabled gaming console;
- an Ethernet gateway;
- a computing device connected to the LAN;
- an Ethernet connected computer peripheral device;
- an Ethernet connected router;
- an Ethernet connected wireless bridge;

an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; and
internet enabled cameras.

96. The method of claim 88, wherein the machine is a server in a cloud.

97. The method of claim 88, wherein the first and second information include at least one of:

topological information,
geographical information,
time,
throughput,
latency,
jitter,
packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency
bands and mode of operation,
environment statistics, or
data on operation of communication devices.

98. The method of claim 88 further comprises:

 sending an on-demand change request associated with at least one of:
throughput, or latency.

99. The method of claim 88, wherein receiving the report comprises at least one of:
- receiving statistical analysis including throughput;
 - receiving availability of higher bandwidth for operating a DSL service;
 - receiving service product information for improving DSL service performance; or
 - receiving utilization information for optimizing a consumers DSL service cost.
100. The method of claim 88, wherein the machine is operable to:
- process data from distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by respective downloadable agents coupled to respective distinct LANs.
101. The method of claim 88, wherein the machine is operable to:
- process data from distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN.
102. The method of claims 100 or 101, wherein the analyses for each LAN include at least one of:
- whether the LAN is under or over performing relative to a neighboring LAN; or
 - whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN.

103. The method of claim 88, wherein the downloadable agent is executable on an Internet browser.
104. The method of claim 88, wherein the downloadable agent is accessible remotely via the Internet.
105. The method of claim 88 further comprises periodically sending collected first information to the machine.
106. The method of claim 88 further comprises waiting for a predetermined condition or threshold to be satisfied before sending the first information to the machine.
107. The method of claim 106, where the predetermined condition or threshold is at least one of:
a function of a type of data collected, or
limit or threshold on a performance level associated with the collected data.
108. The method of claim 88, wherein the machine is operable the first information by polling or scheduled based system.
109. The method of claim 1 further comprises collecting data from at least one of:
National Weather Service;
radio station; or
operator.
110. A machine readable storage medium having computer executable instructions that when executed cause a processor to perform a method according to any one of method claims 88-109.

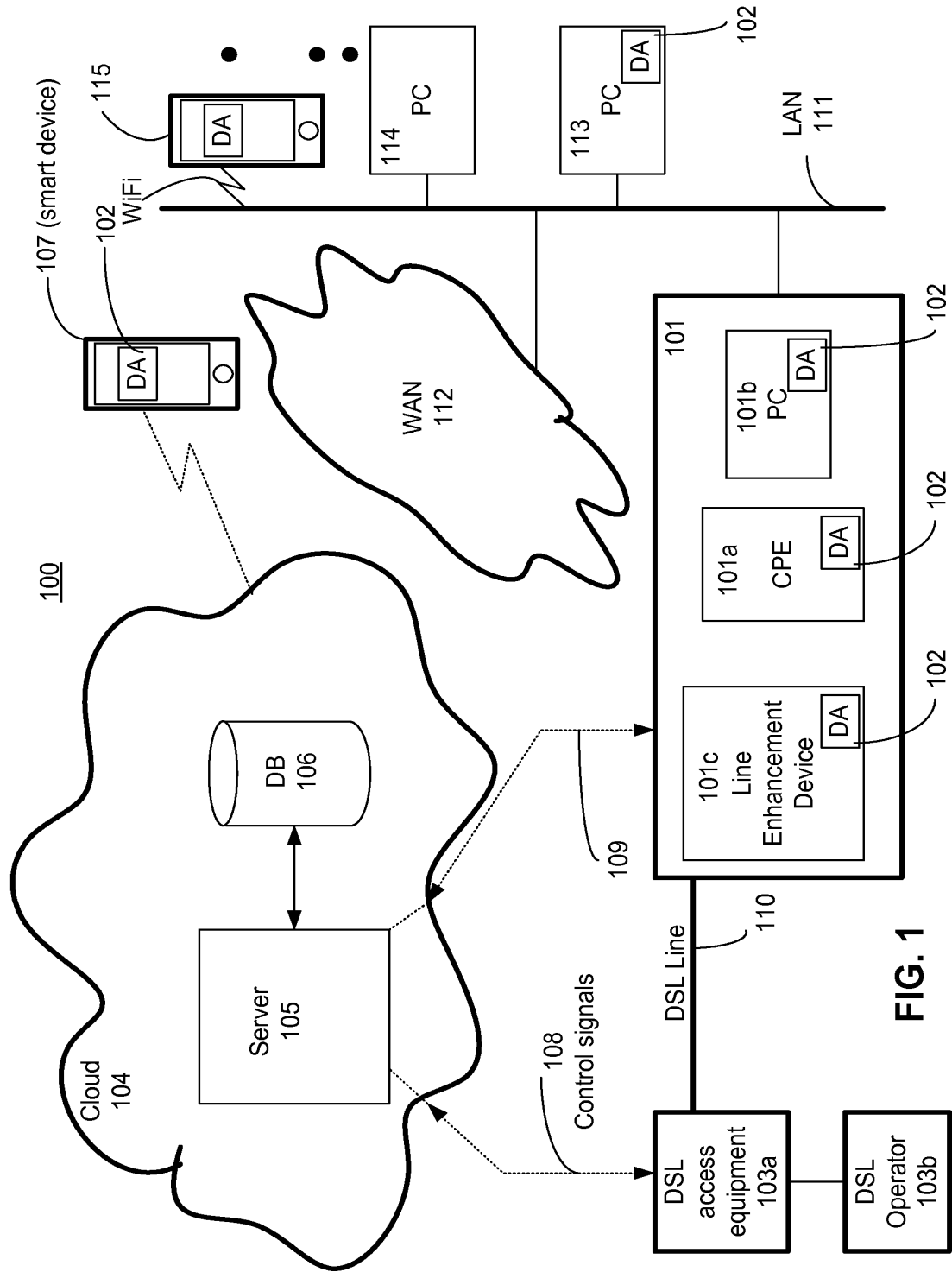


FIG. 1

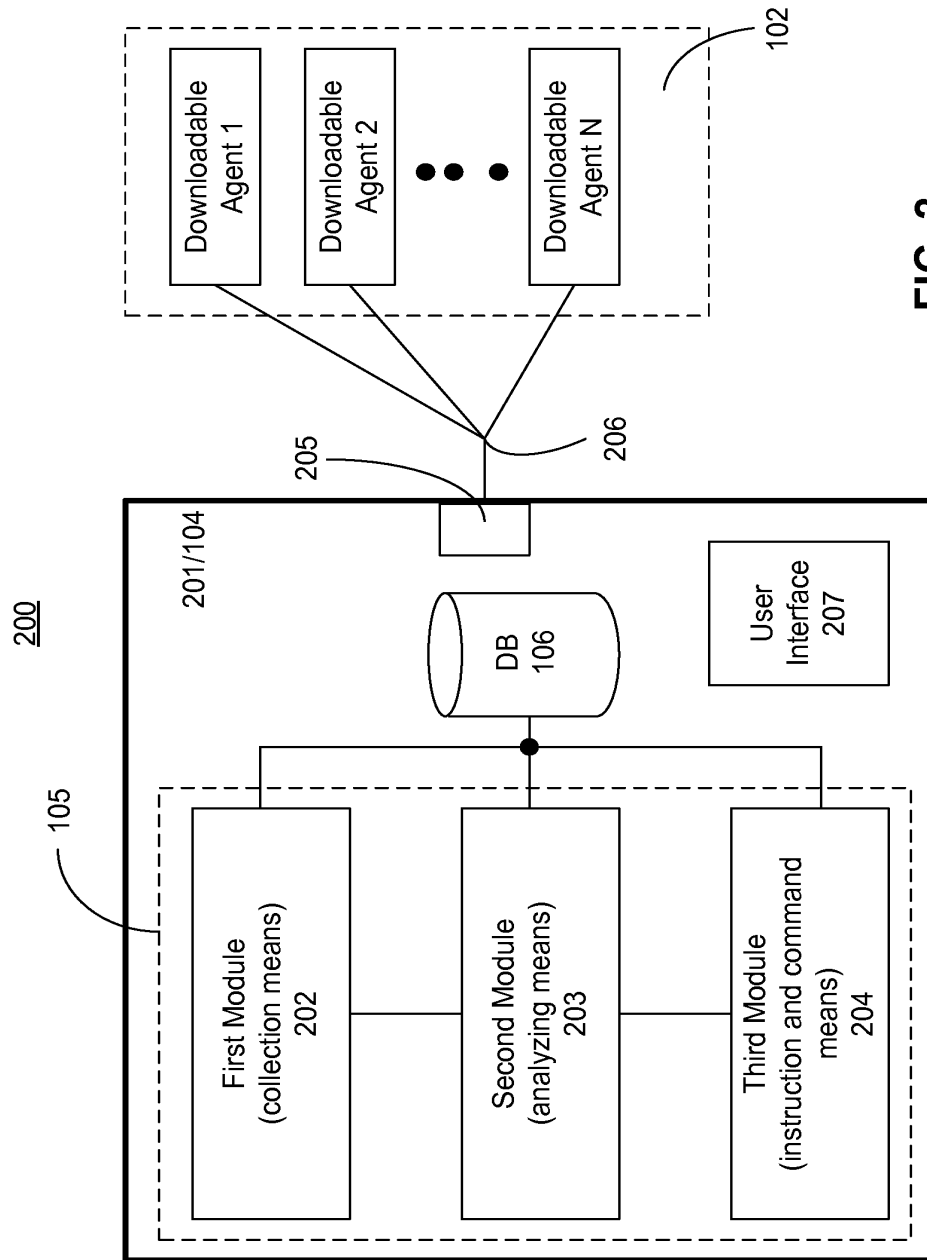


FIG. 2

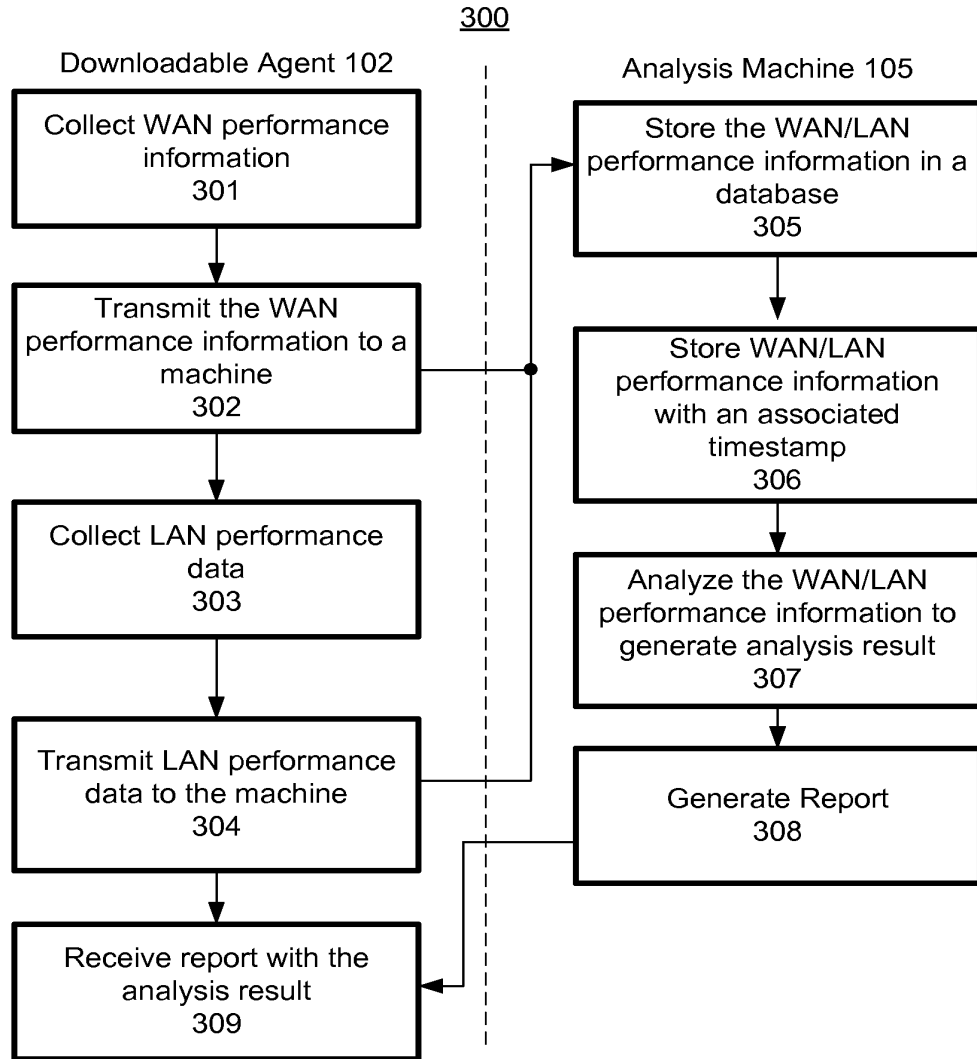
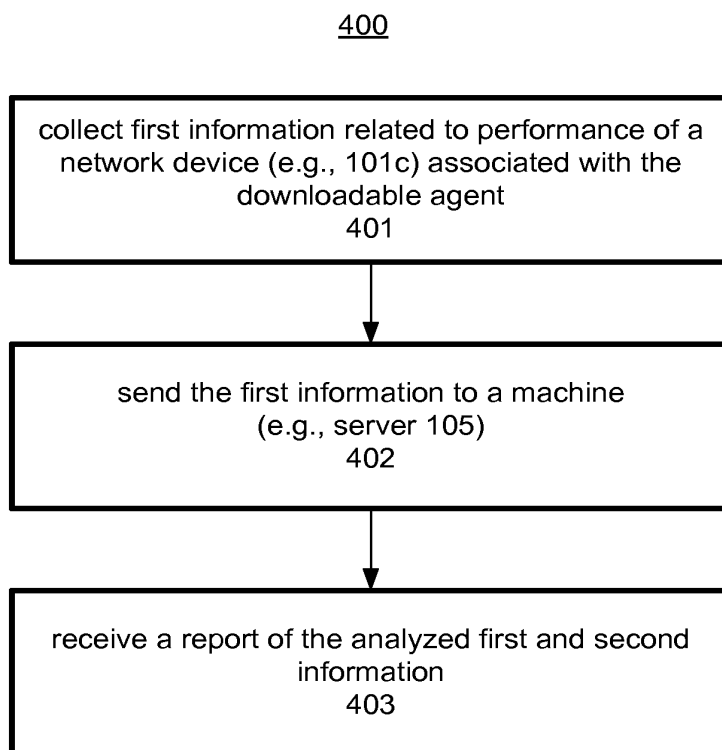
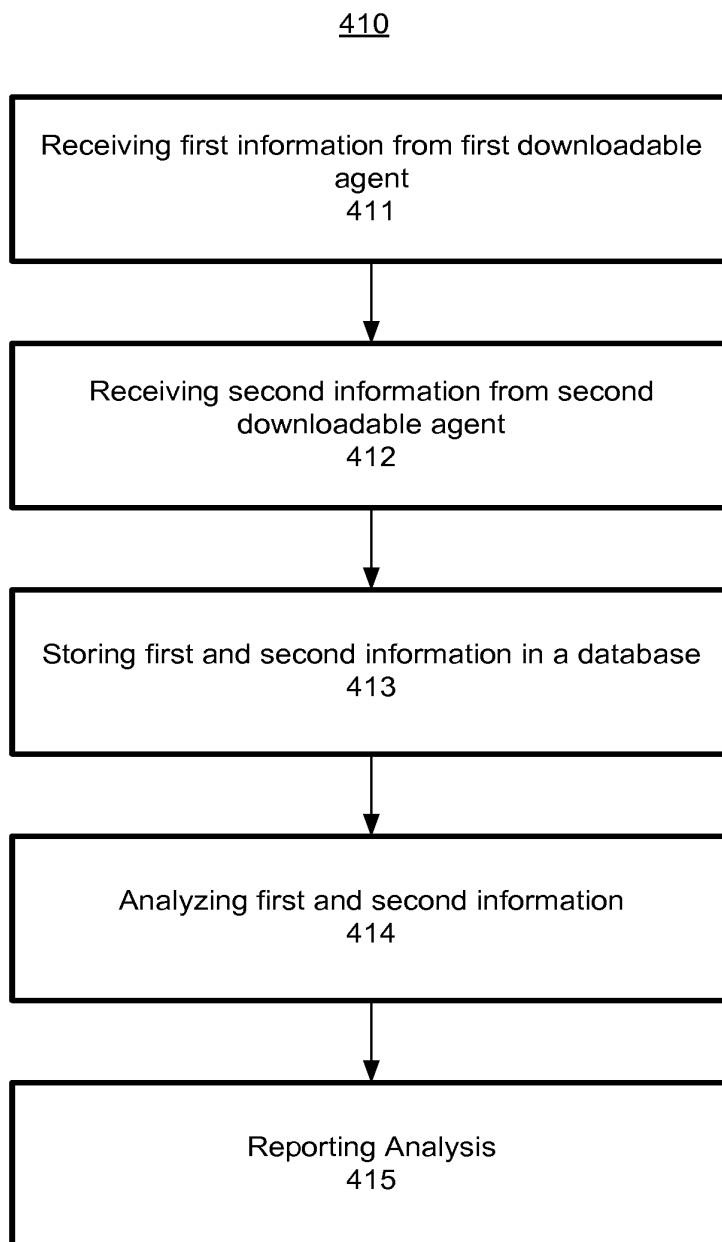


FIG. 3

**FIG. 4A**

**FIG. 4B**

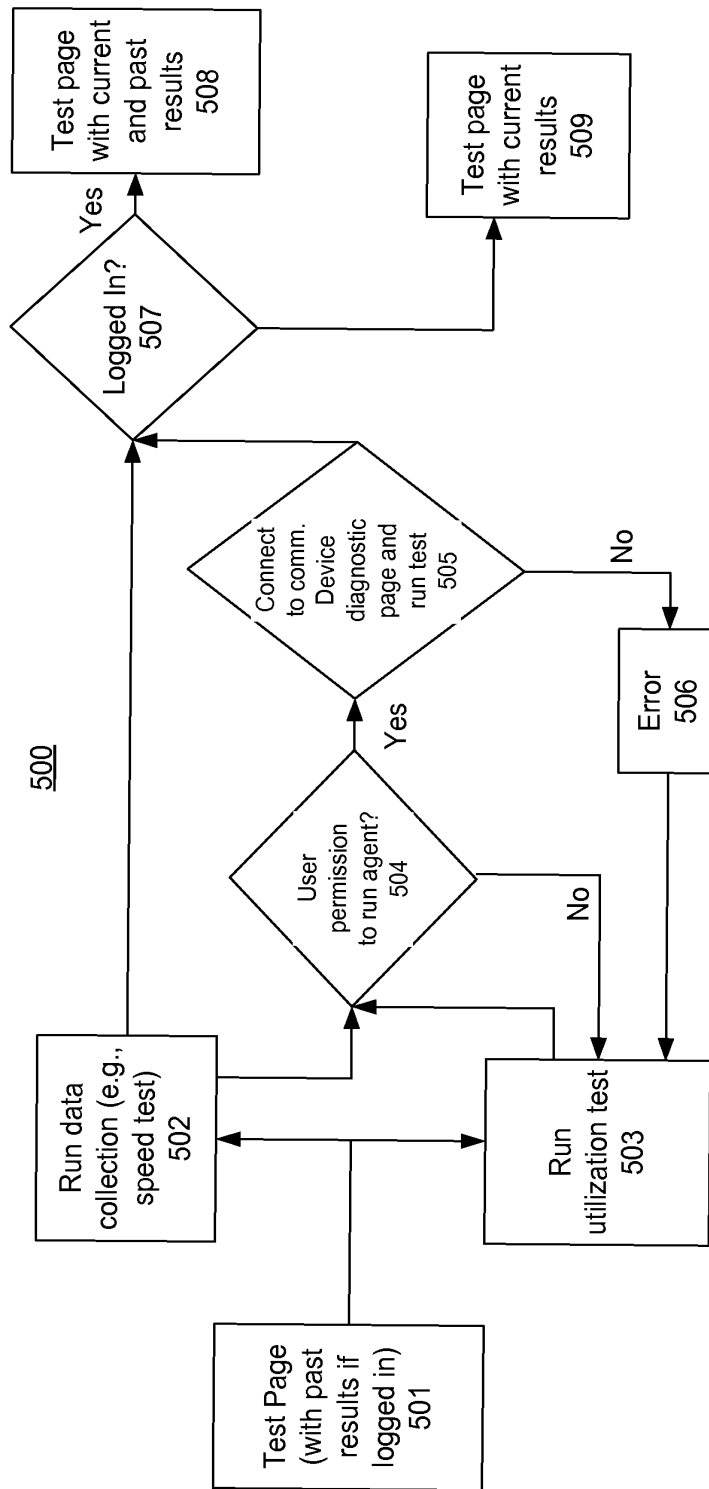


FIG. 5A

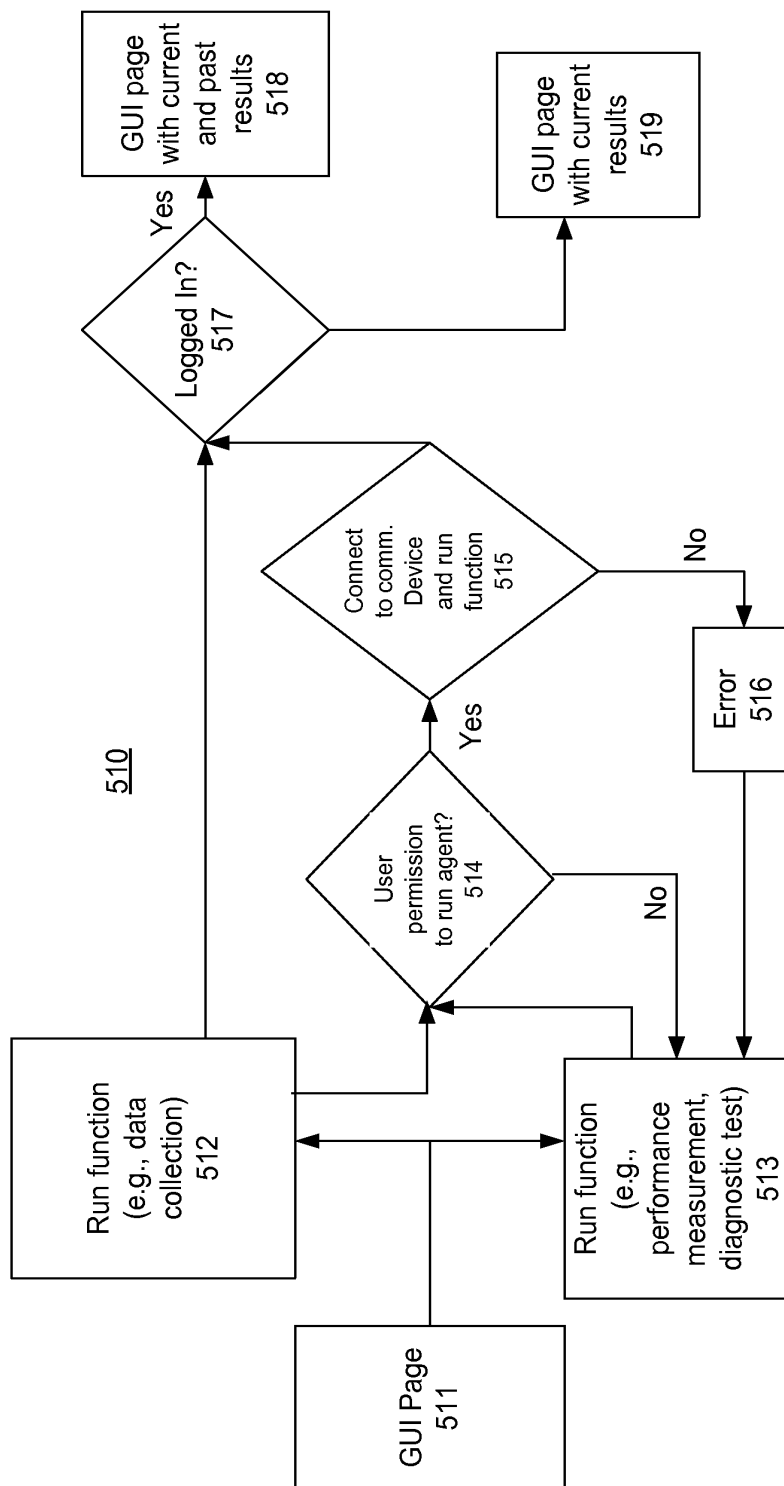


FIG. 5B

600

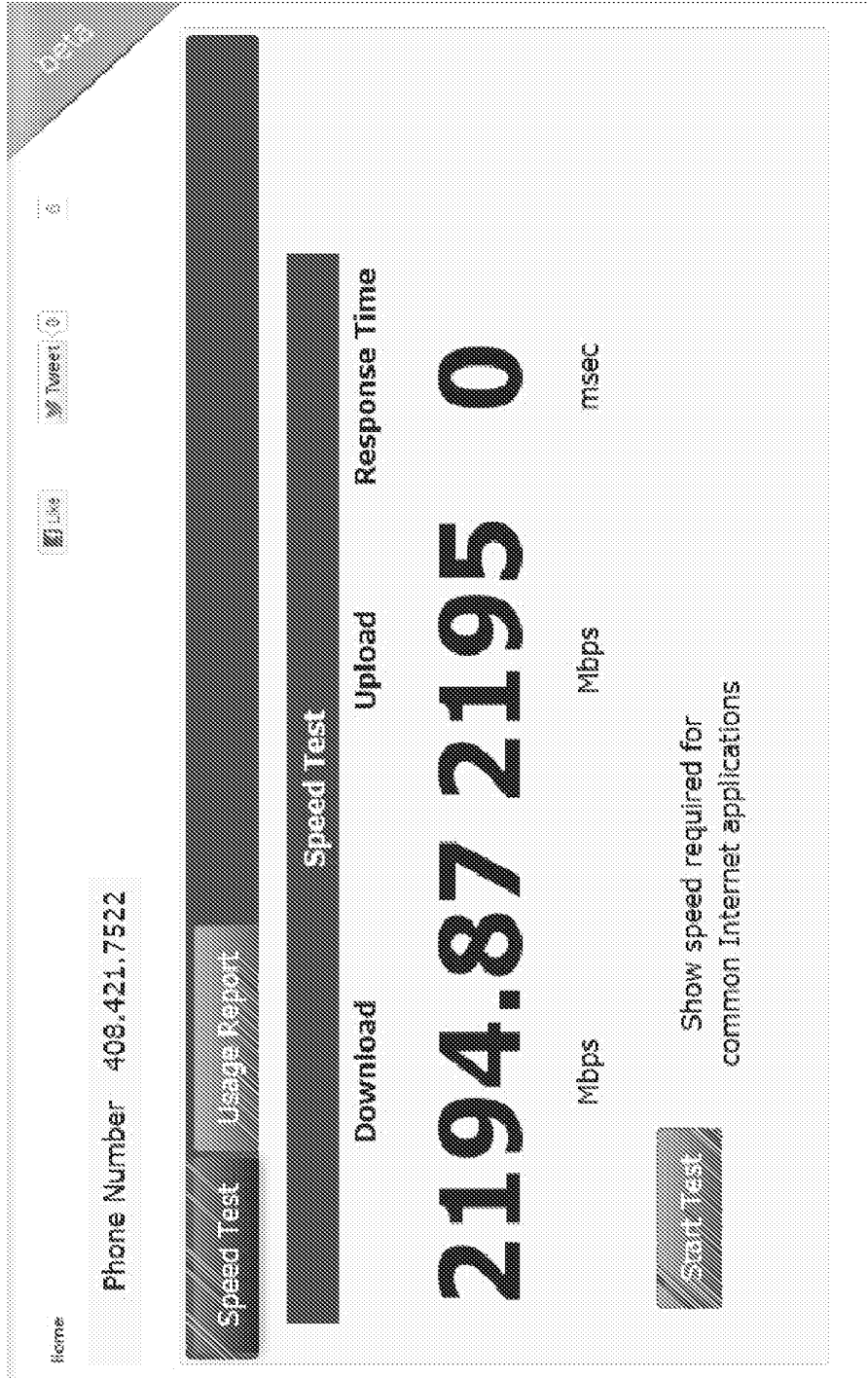


FIG. 6A

620

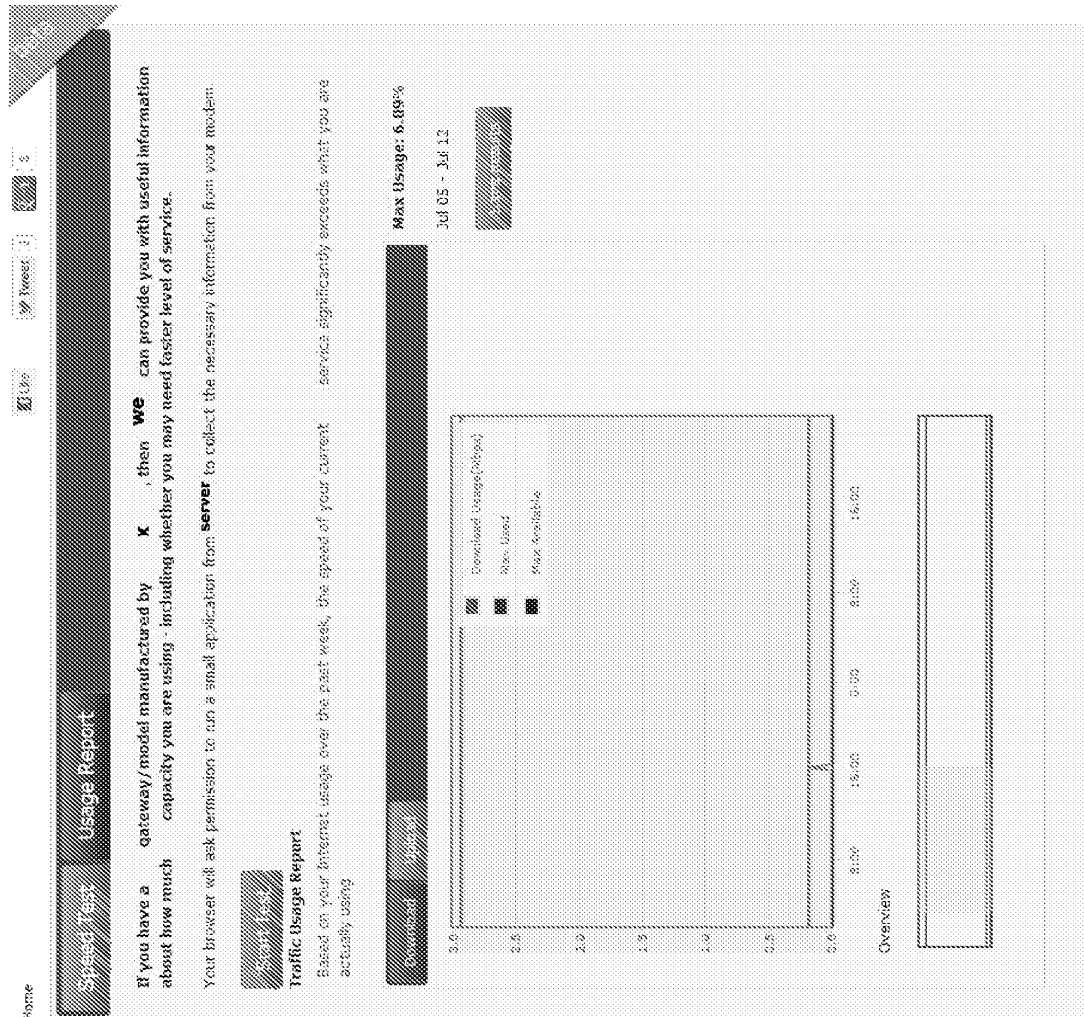


FIG. 6B

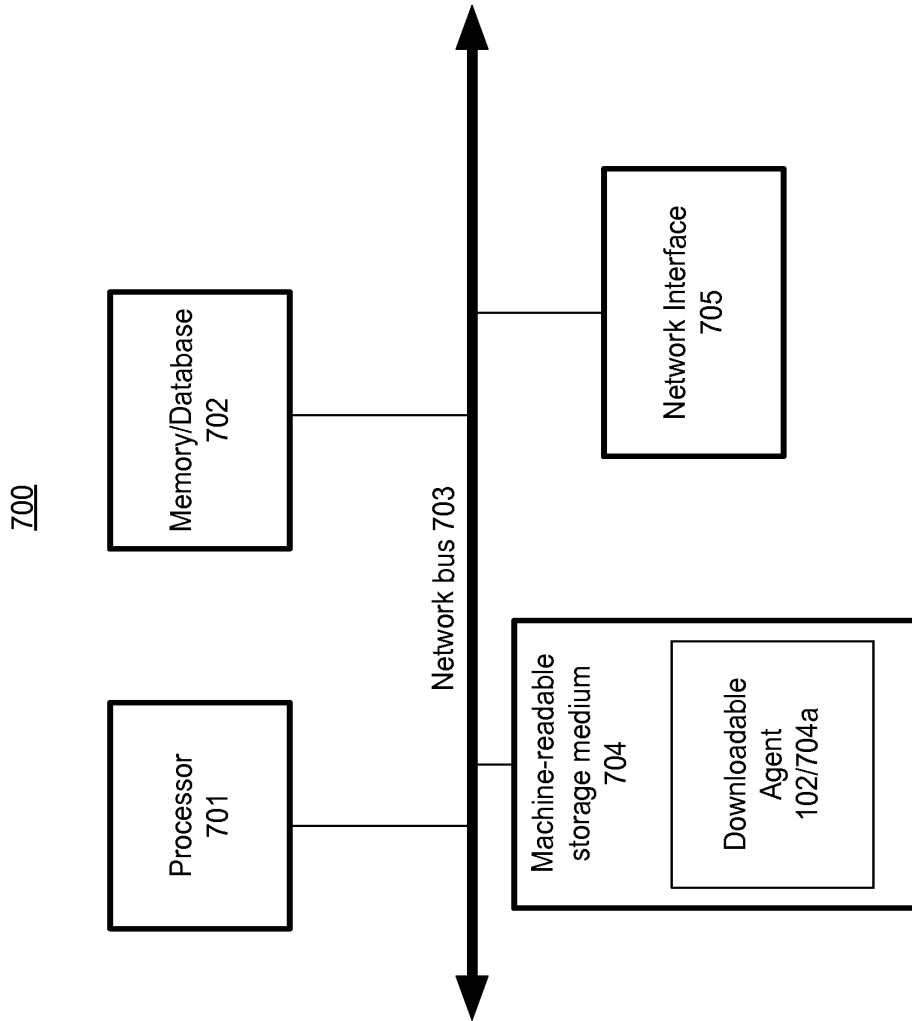


FIG. 7

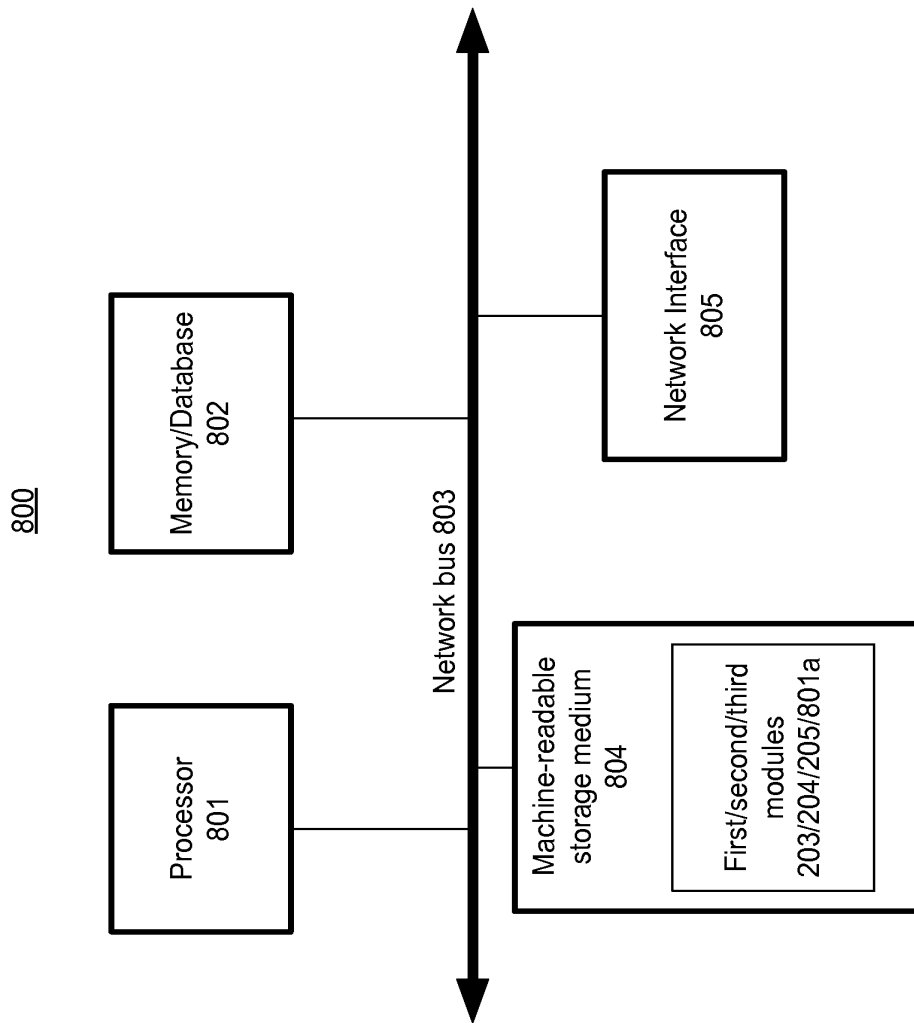


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/057152

A. CLASSIFICATION OF SUBJECT MATTER INV. H04L12/24 H04L12/26 ADD.		
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) H04L		
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) EPO-Internal, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/174421 A1 (ZHAO LING Z [US] ET AL) 21 November 2002 (2002-11-21) paragraph [0009] - paragraph [0010] paragraph [0031] paragraph [0052] - paragraph [0055] paragraph [0065] - paragraph [0084] paragraph [0109] - paragraph [0119] paragraph [0130] - paragraph [0143] paragraph [0176] - paragraph [0183] paragraph [0230] - paragraph [0266] figures 1,2	1-110
X	US 2012/096143 A1 (SUIT JOHN M [US]) 19 April 2012 (2012-04-19) paragraph [0005] paragraph [0029] - paragraph [0061] ----- -/--	1-110
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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 <p align="center">26 February 2013</p>	Date of mailing of the international search report <p align="center">05/03/2013</p>	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer <p align="center">Tous Fajardo, Juan</p>	

INTERNATIONAL SEARCH REPORT

International application No PCT/US2012/057152

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>WO 2012/091725 A1 (ADAPTIVE SPECTRUM & SIGNAL [US]; CHOW PETER [US]; RHEE WONJONG [US]; T) 5 July 2012 (2012-07-05) page 4, line 26 - line 28 page 6, line 27 - page 7, line 1 page 7, line 27 - page 9, line 10 page 12, line 17 - page 13, line 21 page 19, line 3 - line 23</p> <p align="center">-----</p>	1-100
X	<p>US 2009/207985 A1 (CIOFFI JOHN M [US] ET AL) 20 August 2009 (2009-08-20) paragraph [0042] paragraph [0047] - paragraph [0049] paragraph [0057] paragraph [0064] - paragraph [0065] paragraph [0068] paragraph [0071] paragraph [0100] paragraph [0106] - paragraph [0123] paragraph [0145] paragraph [0150] - paragraph [0179] paragraph [0204] paragraph [0209] paragraph [0211] figures 6B,7B</p> <p align="center">-----</p>	1-110

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

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2012/057152

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002174421	A1	21-11-2002	AU 2002248740 A1 15-10-2002
			EP 1490775 A1 29-12-2004
			US 2002174421 A1 21-11-2002
			WO 02079909 A2 10-10-2002
			WO 02080001 A1 10-10-2002
			WO 03009086 A2 30-01-2003

US 2012096143	A1	19-04-2012	NONE

WO 2012091725	A1	05-07-2012	NONE

US 2009207985	A1	20-08-2009	AT 520258 T 15-08-2011
			CN 101461253 A 17-06-2009
			CN 102170596 A 31-08-2011
			EP 2030454 A2 04-03-2009
			EP 2337371 A1 22-06-2011
			JP 2009540671 A 19-11-2009
			US 2009207985 A1 20-08-2009
			WO 2007146048 A2 21-12-2007

Form PCT/ISA/210 (patent family annex) (April 2005)

Sheet No. ...1....

Box No. VIII (iv) DECLARATION: INVENTORSHIP (only for the purposes of the designation of the United States of America)
The declaration must conform to the following standardized wording provided for in Section 214; see Notes to Boxes Nos. VIII, VIII (i) to (v)
(in general) and the specific Notes to Box No. VIII (iv). If this Box is not used, this sheet should not be included in the request.

Declaration of Inventorship (Rules 4.17(iv) and 51bis.1(a)(iv))
for the purposes of the designation of the United States of America;

I hereby declare that I believe I am the original, first and sole (if only one inventor is listed below) or joint (if more than one inventor
is listed below) inventor of the subject matter which is claimed and for which a patent is sought.

This declaration is directed to the international application of which it forms a part (if filing declaration with application).

This declaration is directed to international application No. PCT/US12/057152 (if furnishing declaration pursuant
to Rule 26ter).

I hereby declare that my residence, mailing address, and citizenship are as stated next to my name.

I hereby state that I have reviewed and understand the contents of the above-identified international application, including the claims
of said application. I have identified in the request of said application, in compliance with PCT Rule 4.10, any claim to foreign priority,
and I have identified below, under the heading "Prior Applications," by application number, country or Member of the World Trade
Organization, day, month and year of filing, any application for a patent or inventor's certificate filed in a country other than the United
States of America, including any PCT international application designating at least one country other than the United States of America,
having a filing date before that of the application on which foreign priority is claimed.

Prior Applications: US Provisional Patent Application No. 61/671,672 filed July 13, 2012

I hereby acknowledge the duty to disclose information that is known by me to be material to patentability as defined by
37 C.F.R. § 1.56, including for continuation-in-part applications, material information which became available between the filing date
of the prior application and the PCT international filing date of the continuation-in-part application.

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

Name: Leonardo Dagum

Residence: Redwood City, CA US
(city and either US state, if applicable, or country)

Mailing Address: 133 Woodsworth Avenue
Redwood City, CA 94062 US

Citizenship: US

Inventor's Signature: [Signature] Date: 11/15/2012
(The signature must be that of the inventor, not that of the agent)

Name: Phillip Bednatz

Residence: Palo Alto, CA US
(city and either US state, if applicable, or country)

Mailing Address: 731 Holly Oak
Palo Alto, CA 94303 US

Citizenship: US

Inventor's Signature: [Signature] Date: 11/15/12
(The signature must be that of the inventor, not that of the agent)

[X] This declaration is continued on the following sheet, "Continuation of Box No. VIII (iv)".

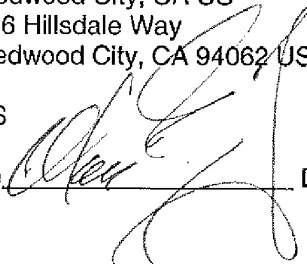
Box No. VIII (i) DECLARATION: IDENTITY OF THE INVENTOR

The declaration must conform to the standardized wording provided for in Section 211; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (i). If this Box is not used, this sheet should not be included in the request.

Declaration as to the identity of the inventor (Rules 4.17(i) and 51bis.1(a)(i)):

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This declaration is continued on the following sheet, "Continuation of Box No. VIII (j)".

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>	<i>Complete if Known</i>	
	Application Number	
	Filing Date	
	First Named Inventor	Dagum, Leonardo
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	Examiner Name	
Sheet 1 of 1	Attorney Docket No: 8241P073	

US PATENT DOCUMENTS					
Examiner Initial *	Cite No ¹	USP Document Number	Publication or Issue Date MM-DD-YYYY	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-2002/0174421	11-21-2002	ZHAO et al.	
		US-2012/0096143	04-19-2012	SUIT	
		US-2009/0207985	08-20-2009	CIOFFI et al.	

FOREIGN PATENT DOCUMENTS							
Examiner Initials*	Cite No ¹	Foreign Patent Document		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ²
		Country Code/Number/Kind Code (if known)					
		WO-2012/091725		07-05-2012	ADAPTIVE SPECTRUM AND SIGNAL ALIGNMENT, INC.		

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No ¹	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
		International Search Report and Written Opinion for International Patent Application No. PCT/US2012/057152 (Attorney Docket No. 8241P073PCT), mailed 3/5/2013.	

EXAMINER

DATE CONSIDERED

Based on PTO/SB/06A(09-06) - Substitute Disclosure Statement Form (PTO-1449) as modified by BSTZ 03/26/07
 * EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 809. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional) 2 Applicant is to place a check mark here if English language Translation is attached

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[Continued on next page]

(54) **Title:** MANAGEMENT CENTER FOR COMMUNICATION SYSTEM CUSTOMER PREMISES EQUIPMENT

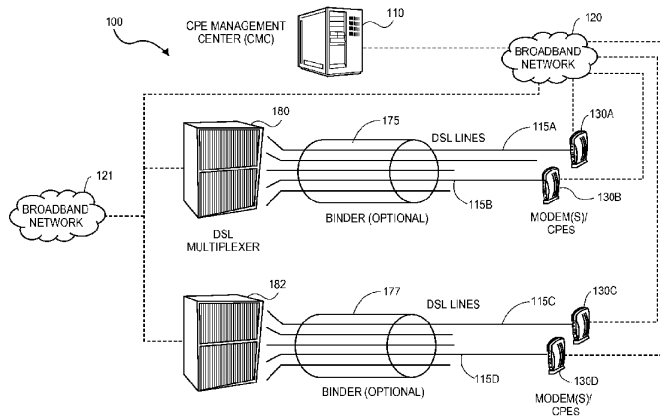


FIG. 1

- 110 CENTRE DE GESTION D'EQUIPEMENT CPE (CMC)
- 115B, 115D LIGNES DSL
- 120, 121 RESEAU A LARGE BANDE
- 130B, 130D UN OU PLUSIEURS MODEMS/EQUIPEMENTS CPE
- 175, 177 LIANT (FACULTATIF)
- 180, 182 MULTIPLEXEUR DSL

(57) **Abstract:** Described are systems and methods for a Digital Subscriber Line (DSL) customer premises equipment (CPE) Management Center (CMC). In one embodiment, the CMC includes a communications interface to receive information from the CPE device regarding operation of the CPE device. The received information is analyzed and a command signal generation module generates a corresponding command signal for transmission to the at least one CPE device to modify the CPE device operation based on the analysis results in a manner which either enhances CPE device performance, for example increasing data rate, or improves line stability, for example reducing CPE error rate.



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**MANAGEMENT CENTER FOR COMMUNICATION SYSTEM
CUSTOMER PREMISES EQUIPMENT**

TECHNICAL FIELD

The subject matter described herein relates generally to the field of communications systems, and in particular, a method and apparatus to manage customer premise equipment (CPE).

BACKGROUND

Many end user consumers including residential consumers and business consumers connect to the Internet by way of Digital Subscriber Line (DSL) technologies. With DSL technologies, a service provider provides an end user, or “customer” with access to a Broadband network via a twisted pair telephone line, referred to herein simply as a “line.” The use of such lines to deliver Broadband network content to an end user is beneficial because they have already been implemented throughout much of the world, and thus, Broadband network access requires minimal infrastructure build out between an end user’s location and the Broadband network interface.

Because the number of lines may be very great, lines service providers typically attempt to provision lines so that a certain minimal level of line performance and stability is achieved in a manner which will require little, if any, further consideration by the provider. Even where a provider might implement a more active line management program, a lack of insight into each end user’s experiences and demands coupled with the expense of needing to maintain a great number of lines may still result in a “set it to forget it” mentality on the part of a line provider or wholesaler which may ultimately dissatisfy an end user either with respect to perceived quality of service (QOS), etc.

Also, in some locations, a DSL services wholesaler provides DSL communication equipment to form an infrastructure for such services and DSL services resellers sell DSL services (e.g., “Internet access”) delivered over that infrastructure to individual end users. Because the DSL services wholesaler controls the equipment forming the

DSL infrastructure and the DSL services reseller maintains a services relationship with the consumers, conflicts exist between a DSL services wholesaler most interested in protecting the integrity of the infrastructure and a DSL services reseller desiring access and control of the equipment for the sake of managing service quality to their end users.

Whether the services are provided to the end customers by the wholesaler or a reseller service provider, the services to the end customers are typically monitored and configured by the DSL service providers management systems, which are in general operated by the wholesaler, and are located in the wholesaler's network (central office (CO), NMS, etc.). Any information from the end customer's equipment is therefore typically collected via the service provider equipment at the CO side, such as DSLAMs (DSL Access Multiplexers), network traffic routers, and gateways.

Furthermore, instructions, control and monitoring messages for controlling, collecting information, and configuring the end user/customer devices on the customer end, are also provided via equipment at the CO side. Such instructions and messages are communicated over information and communication channels provided between the customer side devices, and the service provider equipment. The customer side devices are also known as Customer Premises Equipment (CPE), and devices. An example of these communications channels are TR-69, Internet protocol (IP), Embedded Operational Channel (EOC), SNMP.

There are many instances, where certain information is not provided from the customer side to the service provider side. For example, there is limited bandwidth provided for the control communication channels between the customer devices and the service provider equipment, therefore limited information is exchanged between the customer devices and the service provider equipment. Furthermore, the customer devices are exposed to impairments on the CPE side, such as noise, interference (radio interference, impulse noise) etc., which may not be readily deduced from the service provider side. As another example, where an ILEC (Incumbent Local Exchange Carrier) operating a central office (CO) might implement line management at the CO side of the Line, a CLEC (Competitive Local Exchange Carrier) may assume the role of a third party with

respect to line management via the CPE side, particularly where the CLEC leases line capacity and may lack any access to the central office (CO) side.

There could also be limitations on the CO side for provisioning or configuring the DSL system. For example, there are limitations with respect to how information and settings are managed by certain types of DSLAMs. For example, the range of parameter settings within certain types of DSLAMs may not comply with established industry specifications, or the DSLAM Management Information Base (MIB) or certain parameters within the MIB might not be accessible. In other instances, the DSLAM MIB might not allow the range of certain parameters to be changed. These limitations would prevent provisioning, improving or optimizing the performance of DSL connections.

The present state of the art may benefit from embodiments of the present invention by providing an interface to the lines through which line performance may be enhanced and/or line problems diagnosed.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments are illustrated by way of example, and not by way of limitation, and can be more fully understood with reference to the following detailed description when considered in connection with the figures in which:

Figure 1 illustrates an exemplary system in which embodiments of a customer premises equipment (CPE) Management Center may operate;

Figure 2 illustrates exemplary functional modules of a CPE Management Center which embodiments may utilize;

Figure 3A is a flow diagram illustrating operation of a CPE Management Center in accordance with exemplary embodiments;

Figure 3B is a flow diagram illustrating modification of CPE operation, in accordance with an exemplary embodiment;

Figure 4 illustrates an exemplary CPE network in which embodiments of a CPE Management Center may operate;

Figure 5 illustrate exemplary components of a CPE which embodiments may utilize;
and

Figure 6 illustrates a diagrammatic representation of a machine in the form of a
computer system, in accordance with one embodiment.

DETAILED DESCRIPTION

Described herein is a DSL customer premises equipment (CPE) Management Center (CMC) and methods for implementing and operating a CMC. Generally, a CMC manages lines via the CPE side of a Line in an “end user-centric” manner. The CMC is to provide a means for Line management either directly to an end user of a CPE or to third party serving a plurality of end users as part of a consumer market. For example, where an ILEC (Incumbent Local Exchange Carrier) operating a central office (CO), might implement line management at the CO side of the Line, a CLEC (Competitive Local Exchange Carrier) may assume the role of this third party with respect to line management via the CPE side, particularly where the CLEC leases line capacity and may lack any access to the central office (CO) side. In such an embodiment, the CMC provides the CLEC an interface to the lines through which line performance may be enhanced and/or line problems diagnosed even where the management interface of a Digital Subscriber Line Access Multiplier (DSLAM) for various lines is not directly accessible. In other instances, an end user might contract line management services with the third party separately from the DSL provider.

In embodiments, the CMC management functions include: 1) collecting operational data characterizing CPE device operation on a particular line, and 2) providing analysis/diagnostics of the line based on at least the collected operational data, and/or 3) automatically modifying CPE device operation, again based at least on the collected operational data, to enhance line performance. Examples of diagnostics include identifying line problems, such as wiring defects. Examples of enhancing line performance include increasing the data rate of the line or stabilizing the line (e.g., reducing error rates).

As used herein, the terms “end user,” “subscriber,” and/or “customer” are used interchangeably and all refer to a person, business and/or organization to which communication services and/or equipment are provided by any of a variety of service provider(s). Further, the term “customer premises” refers to the location to which communication services are being provided by a service provider. As an example when the Public Switched Telephone Network (PSTN) used to provide DSL services, customer premises are located at, near and/or are associated with the network termination (NT) side of the telephone lines. Exemplary customer premises include a residence or an office building.

The term “service provider” refers to any of a variety of entities that provide, sell, provision, troubleshoot and/or maintain communication services and/or communication equipment. Exemplary service providers include a telephone operating company, a cable operating company, a wireless operating company, an internet service provider delivering services over its own communications infrastructure or the communications infrastructure of a another party, or any third party that diagnoses or improve broadband communication (DSL, DSL services, cable, etc.) performance.

In the following description, numerous specific details are set forth such as examples of specific systems, languages, components, etc., in order to provide a thorough understanding of the various embodiments. It will be apparent, however, to one skilled in the art that these specific details need not be employed to practice the disclosed embodiments. In other instances, well known materials or methods have not been described in detail in order to avoid unnecessarily obscuring the disclosed embodiments.

In addition to various hardware components depicted in the figures and described herein, embodiments further include various operations which are described below. The operations described in accordance with such embodiments may be performed by hardware components or may be embodied in machine-executable instructions, which may be used to cause a general-purpose or special-purpose processor programmed with the instructions to perform the operations. Alternatively, the operations may be performed by a combination of hardware and software, including software instructions

that perform the operations described herein via memory and one or more processors of a computing platform.

Embodiments also relate to a system or apparatus for performing the operations herein. The disclosed system or apparatus may be specially constructed for the required purposes, or it may comprise a general purpose computer selectively activated or reconfigured by a computer program stored in the computer. Such a computer program may be stored in a non-transitory computer readable storage medium, such as, but not limited to, any type of disk including floppy disks, optical disks, CD-ROMs, and magnetic-optical disks, read-only memories (ROMs), random access memories (RAMs), EPROMs, EEPROMs, magnetic or optical cards, or any type of media suitable for storing non-transitory electronic instructions, each coupled to a computer system bus. In one embodiment, a non-transitory computer readable storage medium having instructions stored thereon, causes one or more processors within a system to perform the methods and operations which are described herein. In another embodiment, the instructions to perform such methods and operations are stored upon a non-transitory computer readable medium for later execution.

Figure 1 illustrates architecture of an exemplary CMC system 100 in which embodiments may operate in compliance with the G.997.1 DSL management standard (also known as G.ploam), and one or more of the following DSL transmission standards: Asymmetric Digital Subscriber Line (ADSL) systems (one form of Digital Subscriber Line (DSL) systems), which may or may not include splitters, operate in compliance with the various applicable standards such as ADSL1 (G.992.1), ADSL-Lite (G.992.2), ADSL2 (G.992.3), ADSL2-Lite G.992.4, ADSL2+ (G.992.5) and the G.993.x emerging Very-high-speed Digital Subscriber Line or Very high-bitrate Digital Subscriber Line (VDSL) standards, as well as the G.991.1 and G.991.2 Single-Pair High-speed Digital Subscriber Line (SHDSL) standards.

The CMC system 100 includes multiple CPE devices 130A, 130B, 130C, and 130D, each of which corresponds to an end user location such as a customer's residence or business. In one embodiment, each of the CPE devices 130A-D are DSL modems located within a customer's home or business to which the customer's home or

business networked terminal devices are coupled. The CPE device could also be a broadband gateway, or a broadband modem, providing broadband connectivity to the customer premises.

As illustrated in Figure 1, the CMC system 100 further includes an access aggregation device 180, 182 coupled to the CPE devices 130A-D via one or more twisted pair lines 115A-D (e.g., POTS telephone lines and the like). Multiple twisted pair lines 115 associated with different customer's remote DSL terminals may travel through or be co-located within binders 175, 177. Figure 1 depicts the twisted pair lines 115A, 115B connecting CPE devices 130A and 130B as traversing the common binder 175 and twisted pair lines 115C, 115D connecting CPE devices 130C and 130D. One or more lines 115C, 115D could be connected to the same CPE. As an example, embodiments of the current invention include DSL bonding, and/or DSL vectoring, wherein multiple lines are connect to the same CPE device.

Each access aggregation device 180 and 182 has multiple physical ports to which the twisted pair lines 115A-D are connected. As depicted, CPE devices 130A, 130B connect with physical ports of access aggregation device 180 while CPE devices 130C, 130D connect with physical ports of access aggregation device 182. In one embodiment, each of the plurality of access aggregation devices 180, 182 are DSLAMs co-located at a physical CO location which may include other equipment operated by an ILEC, for example. Alternatively, the access aggregation device 180, 182 may be located remotely from each other and remotely from a CO location. Each access aggregation device 180, 182 is connected via a broadband link to a Broadband network, which is then in turn accessible to the various CPE devices 130A-D. The DSLAMs may connect to the broadband network 120 and/or a provider's private broadband network 121 in the operator's infrastructure, while the CMC connects to the CPE over the Internet via the broadband network 120.

The CMC system 100 further includes the CMC 110. In the exemplary embodiment depicted in Figure 1, the CMC 110 is communicatively coupled to the CPE devices 130A-D over a wide area network (WAN). For WAN embodiments, the CMC 110 is coupled to the CPE device through the broadband network 120. In an alternate

embodiment, the CMC 110 is connected to the CPE devices 130A-D directly or over a local area network (LAN) at the customer premises. As previously noted, CMC 110 may be operated by an independent entity for monitoring and controlling one or more CPE devices 130A-D as a controller, assisting end users of the CPE devices 130A-D. The CMC 110 may also be referred to as a Controller, Network Management Server (NMS), Element Management Service (EMS), or the like with the understanding that the control is exerted over the CPE device. For certain embodiments, for example, control by the CMC 110 is independent of management on the CO-side of the line.

Figure 2 depicts functional modules of the CMC 110, according to an embodiment of the invention. The CMC 110 includes a data collecting means such as the Data Collection module 210, an analyzing means, such as the Analysis module 220, and an instruction generating means, such the Instruction and Command Generation module 230. These functional modules of the CMC 130 may or may not all be in the same location and/or provided by the same equipment, and may instead be distributed in different locations and separately accessed. Each module of the CMC 110 may be implemented by one or more servers each having one or more programmable processors executing code and accessing the Data Storage Means 240 comprising memory as well as other non-transitory storage media (e.g., hard drives and the like). Figure 3A depicts a flow diagram of a CMC method 300 which is performed by the CMC 110, in accordance with an exemplary embodiment. Some of the blocks and/or operations listed in Figure 3A are optional in accordance with certain embodiments. The numbering of the blocks presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur.

CPE-based Line Information Collection

CMC method 300 begins at operation 310 with the data collection module 210 collecting information from the CPE device 130 (e.g., CPE DEVICE 130A). The data collection module 210 is to collect such data on a periodic basis, on-demand, in real-time or on any non-periodic basis. Whether the CMC 110 is communicatively coupled to the CPE device 130 through the broadband network 120 (e.g., for example the Internet) or is operating and connected locally on a CPE terminal or connected over the provider's network 121, the data collection module 210 is operable to receive

information regarding operation of the CPE device 130 from the CPE device 130 via one or more of: analog POTS, cellular data communications, wireless data communications, Broadband Forum TR-069, internet data communications (e.g., TCP/IP protocol or other means outside the normal internal data communication systems within a given DSL system), electronic mail communications such as SNMP, and a DSL communication channel such as the Operation, Administration, and Maintenance (OAM) and Embedded Operational Channel (EOC) specified by the G.997.1 or G.992.x standards for physical layer management for ADSL transmission systems.

As further illustrated in Figure 3A, the data collection module 210 is operable to also collect information from optional sources demarked by dashed lines. In some embodiments, the additional points of information collection are at least exclusive of the CO-end of a line and may further be particular to collection points present on the CPE-side of the line only. However, in some embodiments, the CMC 110 does collect information from the access aggregation device coupled to the CPE device 130 (e.g., a DSLAM 180 for CPE device 130A). In such an embodiment, sufficient access to the CO is made available to the CMC 110 so that operational data for a line may be collected by the data collection module 210 in addition to the operational data collected from the CPE DEVICE 130 and other CPE-side collection points. In some such embodiments, the access to the CO is limited in that CMC 110 is afforded no control over the DSLAM operation.

In an embodiment, the CMC 110 is coupled to a diagnostic and remedy guidance device 359 (“diagnostic device”) present on the CPE end of the line. Referring to Figure 4, which expands on the CMC system 100 by further illustrating CPE terminals coupled to the CPE device 130 (e.g. in a home network), the diagnostic and remedy guidance device 359 may be implemented as a set top box or integrated into another device (e.g., the CPE device 130 itself). In certain embodiments, the diagnostic and remedy guidance device 359 is operable to analyze a line performance (e.g., during showtime operation) for a predetermined operational performance signature indicative of a line condition and to provide guidance on mitigating such a condition. In other embodiments, the diagnostic and remedy guidance device 359 is operable to perform

single ended line tests (SELT), for example while an end user is not utilizing the line for access to the broadband network 120. The SELT performed by the diagnostic and remedy guidance device 359 may be any conventionally performed line test (e.g., line reflectance measurements, etc.), but rather than requiring a truck roll and technician intervention, the diagnostic and remedy guidance device 359 is operable to perform the measurements autonomously. As shown in Figure 3A, the data collection module 210 may access the diagnostic information determined by the diagnostic and remedy guidance device 359.

In an embodiment, the CMC 110 sources end user preferences from which the data collection module 210 acquires information provided by the end user of the CPE device 130. The user preferences may relate to, for example, desired data rates, quality of services for video, audio and data transmission, and time of day usage, and are typically tailored to the type of broadband network content being accessed via the CPE device 130 and/or the type of customer network coupled to the CPE DEVICE 130. The end user preference information may come from a database of user preferences 362 which aggregates user preference information entered by an end-user for each CPE device 130 being managed by the CMC 110, for example at the time a CMC account is established by an end user.

In an embodiment, the CMC 110 sources end user feedback 364 from which the data collection module 210 acquires information regarding an end user's contemporaneous experiences with the CPE device 130. For example, the data collection module 210 may access information provided by an end user of the CPE device 130 indicating that received content is pixilated, inadequately buffered, or the like. Depending on the embodiment, the end user feedback may be provided to the CMC 110 via an application device interface, such as the CMC user interface 472 further illustrated in Figure 4.

Further referring to Figure 4, in an embodiment, the CMC user interface 472 is coupled with the CMC 110 (i.e., hosted by the CMC 110 through the broadband network 120). In another embodiment, the CMC user interface 472 is hosted by the CPE device 130. For example, the CPE device 130 may include a web server which an end user may

access to provide feedback real-time. For such an embodiment, the CMC 110 may be executing on the CPE device 130 itself or on CPE terminal device as a LAN embodiment of the CMC system 100. Alternatively, the CMC user interface 272 is supported by a noise cancellation or signal conditioning device, for example implemented as a set top box 449, separate from the CPE device 130. The noise cancellation device or signal conditioning device 449 may comprise a filter bank utilizing filter coefficients generated via any filtering techniques known in the art, such as, but not limited to, DSL vectoring, DFE, GDFE, and the like. In other embodiments, the diagnostic and remedy guidance device 359 previously described or an ACS device 374 supports an application providing the end user interface 472. Similarly, a controller or input device of the multimedia/computing device 471 may also provide the end user interface 472 through which an end user indicates an instantaneous problem.

In an embodiment, the CMC 110 is coupled to an operational database 366 from which the data collection module 210 acquires stored operational data that is generated as a result of a CPE device's performance in the DSL communication system. Such stored operational data may have been collected over a period of time at some sample rate that minimizes performance reductions (e.g., 15 second intervals minutes apart over different times of day, etc.). The stored operational data accessed by the CMC 110 may be for the target line being managed and/or at least one other non-target line to improve inferences regarding the target line. In one such embodiment, the CMC 110 accesses the operational database 366 to collect operational data for a non-target line contained within a binder common to the target line being managed. For example, where the CMC 110 is to manage the line 115A, operational data stored for lines 115A and 115B, etc. may be accessed from the operational database 366.

In an embodiment, the CMC 110 is coupled to a Broadband network information database 368 from which the data collection module 210 accesses information regarding the type and performance of the Broadband network 120. For example, a CMC operator may provide physical inventory of the Broadband network 120 including characterization of a Broadband link in the Broadband network (e.g., the DSL line 115), a history of the broadband communication link's characterization, a location of the link within the Broadband network, and use of the communication link.

As further depicted in Figure 3A, the CMC 110 may be coupled to a Broadband network content delivery system 371, such as a set top box (e.g., multimedia/computing device 471 depicted in Figure 4) from which the data collection module 210 may determine information about the performance demands placed on the line via the CPE DEVICE 130. In such embodiments, any of motion picture subscription service parameters, streaming video service parameters, internet television service parameters, music subscription service parameters, network gaming or entertainment service parameters, or Voice over Internet Protocol (VoIP) telephony service parameters, may be collected.

In further embodiments, the CMC 110 sources a customer premises network higher-layer protocol information database 373 from which the data collection module 210 receives information such as, but not limited to, packet loss and TCP/IP network information. The network higher-layer protocol information database 373 may contain such information for each of the lines to be managed by the CMC 110. The CMC 110 may additionally source the ACS device 374 to access information relating to the customer premises network and/or usage of the line via the CPE device 130.

CPE-based Line Analysis

Returning to Figure 2, the CMC 110 includes an analyzing means, such as the analysis module 220 which is communicatively connected to the data collection module 220. As illustrated in Figure 3A, at operation 320, the analysis module 220 is to analyze the information received by the data collection module 210. Analysis of that information may be performed real time as information is received by the collection module 220, or may be performed periodically, or on demand, by accessing data collected by the data collection module 210 and stored in the data storage means 240. Analysis module 220 is to determine whether the instruction and command signal generation module 230 is to send instructions to one or more of the CPE devices 130 to enhance line performance and/or stability. The analysis module 220 is further to determine if the report generation module 250 is to issue a line diagnostics report conveying the analysis results to an end user and/or operator of the CMC 110.

In one embodiment, the analysis module 220 is to perform analysis at operation 320 based on collected information including one or more of: downstream attenuation, magnitude of channel response (Hlog) information, downstream bit, gain, and signal to noise ratio (SNR) table, quiet line noise table, impulse noise history, history of downstream code violations (CV) or upstream CV, history of downstream errored seconds (ES) or upstream ES, history of downstream forward error correction (FEC) or upstream FEC, history of retrains; history of bit swap or other real time adaptive features; history of fast retrains and/or SOS's, or line impedance. SOS relates to sudden and severe noise conditions, where a rapid rate adaptation (RRA) solution, known as SOS in the ITU-T standard, is a promising mitigation strategy to sustain the link and prevent the DSL modem to retrain. Since the CMC 110 is collecting data from potentially a plurality of sources, but at a minimum is collecting information from the CPE DEVICE 130, the line performance enhancement is CPE-centric.

Generally, line analysis may include line diagnostic functions performed at operation 320 including, without limitation: bad splice detection, bridged tap detection, impulse noise detection, split pair detection, identification or classification of noise and/or interference sources, Amateur Radio (HAM) detection, AM radio detection, HDSL detection, T1/E1 detection, high-power noise detection, unbalanced wiring detection, maximum data rate analysis, and forward error correction (FEC) analysis. Results of these diagnostics functions are optionally stored in the CMC storage means 240 for future or immediate reference.

Analysis of Line Quality & Stability

The analysis module 220 may employ a number of techniques with the information collected from the CPE-side of the line. For example, in one embodiment operation 320 entails analyzing line instability and/or quality based on the channel performance monitoring parameters and/or line performance monitoring parameters obtained from at least the CPE DEVICE 130. In a particular embodiment, line instability and/or quality is analyzed in method 300 based on parameter values obtained from the CPE-side of the line. For example, distributions of parameter values collected over time are evaluated. Both line instability and quality can be determined from evaluation of such distributions. For example, if the distribution for CV does not satisfy threshold

conditions, then the line is declared unstable. As another example, if the distribution of FEC does not satisfy threshold conditions, then the line is declared of poor quality. Thresholding expressions may also be constructed using combinations of rules with multiple parameters from the CPE-side. These expressions could depend on the vendor and/or system ID of the CPE device 130.

Information characterizing a line problem or failure may be recorded to the data storage means 240 (Figure 2). For example, the time/day of line problems can be recorded to provide statistical information about the times and days when such events are most likely to happen. This can be achieved for example by recording the intervals when CV or some other channel/line performance monitoring parameter exceeds a certain threshold. A failure may also be recorded, for example, if the parameter falls below the threshold.

Any conditions derived from parameters such as the above may also incorporate performance parameters such as data rate, maximum attainable bit rate (MABR) and margin. For example if MABR is used as the performance parameter for a specific line, collected MABR data for that line is compared to a neighborhood average for the given loop length. If the MABR data rates are lower than the average of those for neighboring lines by a predetermined margin, then the line is considered likely of being unstable. The average neighborhood MABR is obtained by: collecting MABR data in the neighborhood network of a line, taking the average or other statistical function of the MABR for lines which have similar loop lengths. This data can also be updated over time. The network neighborhood average shows the expected MABR for all the lines in a specific neighborhood, and if a line MABR drops below that average, it could be an indication of a line problem. Examples of the other statistical functions, besides the mean, could include “median” or “X percentage worst case value” being the MABR for which X percentage of the lines have lower MABR.

Analysis of Noise Type

In a further embodiment, the analysis module 220 is to identify a type of noise in the line based on the information received from the CPE device 130. For example, where stability or quality is determined to be poor, then a further decision is made as to the

type of noise/disturbance that is causing the poor line stability. The type of noise/disturbance may be compared to the noise at the CPE device 130 before a line failure and after a line failure including a so-called "SOS event" or an SRA event, where the modem in the DSL receiver remains operational, but reduces its data rate. SOS relates to sudden and severe noise conditions, where a rapid rate adaptation (RRA) solution, known as SOS in the ITU-T standard, is a promising mitigation strategy to sustain the link and prevent the DSL modem to retrain. SRA (Seamless Rate Adaptation) relates to slow to moderately varying noise cases, where rates are adaptively reduced. A significant difference between the measured noises indicates that the line failure occurred because of a substantial increase of the noise level. Comparable noise levels before and after the line failure indicate that causes other than an increase in the noise lead to the line failure. Notably, a major advantage of the CPE-centric management systems and methods described herein relates to noise analysis/mitigation because the CO-side (e.g., DSLAM) does not necessarily experience the same noise as the end user. For example, duration, timing, periodicity of noise, and characterization of noise is often particular to the end of the line from which it is measured.

A CPE-side noise measurement before the line failure is preferably made at least a few seconds before the line failure occurs. The noise measurement after the line failure should be made after the line has reinitialized (or after the SOS or SRA procedure to reduce data rate has concluded) and is in stable condition (e.g. signal to noise ratio (SNR) margin is stable, CV count is Low, etc.). Other embodiments may utilize any other of the many techniques known for evaluating the noise via the CPE-side of the line. In one embodiment, for example, the CPE device 130 reports the mean-square-error (MSE) of its decoder. Such error may correspond to a slicer's output, a trellis decoder's output, or a RS decoder output.

If it is found that the noise before and after the line failure is not significantly different, then it is determined that the line failure may be the result of a power loss, or the result of a severe impulse noise event (for example, a voltage surge on the line). In order to differentiate between power loss and impulse noise event, some additional checks can be performed. For example, a check if line failure is correlated with a loss-of-power

(LPR) failure reported by CPE device, a check if the CPE device is powered by a computer such as via a USB connection to the multimedia/computing device 471, a check if neighboring lines experience failures at the same or similar times indicating a severe impulse noise event, a check if CPE device 130 is in saturation, there's an increase of received signal power, activation of circuit protection logic, overflow bits or similar activated indications. If such exist, then it is likely a severe impulse noise event has occurred. Otherwise, stationary noise is declared. For either power loss or impulse noise events, the information characterizing the line failure can be recorded, for example, the time/day of the failure can be recorded to provide statistical information about the times, days when such events are most likely to happen.

In an embodiment, an impulse noise event duration is estimated by using channel or line performance monitoring parameters and recording the length of time over which these parameters exceed a certain threshold. The impulse noise width and period may also be estimated, if the intervals for measuring performance monitoring parameters are made short enough to be in the order of microseconds. Even if such short intervals are not possible, the repetitive impulse noise can still be approximately characterized based on the collected parameter values. For example, repetitive impulse noise may be characterized as level 1, if CV exceeds a first threshold for a first percentage of intervals, or may be characterized as level 2, if CV exceeds a second threshold for a second percentage of intervals.

The collected data in the various embodiments of the current invention, and used in the analysis embodiments include one or more of the following data, sources of information, and collected operational parameters: data rate data; Signal-to-Noise Ratio ("SNR") margin data; maximum attainable data rate data; aggregate transmitted power data; code violation count data; forward error corrections data; errored seconds data; errored minutes data; retrain counts data; channel attenuation data; noise power spectral density data; crosstalk coupling data; far-end crosstalk coupling data; near-end crosstalk coupling data; echo transfer function data; and data pertaining to crosstalk between the DSL modem pair and a second DSL modem pair operating on a neighboring DSL line.

The collected data in the various embodiments of the current invention, and used in the analysis embodiments, may further include one or more of the following: any stored list of events including DSL physical layer anomalies, defects and faults together with the event time stamps that has led to SOS activation; SOS activation times, durations and average data rate loss; any stored list of events including DSL physical layer anomalies, defects and faults together with the event time stamps that has led to a fast retrain, a failed retrain or a full retrain; INM (Impulse noise monitoring) histograms and impulse noise statistics; echo transfer function or un-cancelled echo PSD; retransmission statistics including the number of retransmitted blocks, number of successfully retransmitted blocks; total number of blocks; average, minimum and maximum throughput.

Diagnosis of Line Conditions

In embodiments, line conditions, such as problems like wiring defects, causing line instability or poor quality are diagnosed at operation 320 by analysis of information collected by the CMC 110 over time. Since the CMC 110 is collecting data from potentially a plurality of sources, but at a minimum is collecting information from the CPE DEVICE 130, the line wiring diagnostics are CPE-centric.

Generally, at operation 320, the analysis module 220 may employ one or more techniques to detect line problems with the information collected from the CPE-side of the line. Because the embodiments described herein use the information collected from the line, for example, during showtime, line wiring conditions/defects may identified without disruption to the end user's DSL service.

In one embodiment, at operation 320 line performance metrics are generated, based on the received information, and then evaluated against a predetermined condition indicative of a line problem, such as a wiring defect. There are many known types of wiring defects in DSL systems. For example in some countries the in-house DSL wiring often includes a redundant third wire that was used for ringing a telephone bell several decades ago. The third-wire is not used any more, but the existence of such third wire in DSL systems creates an unbalanced impedance. Often, a parameter such as the bit distribution of a DSL line with a line problem, such as a wiring defect, may

have abrupt changes and therefore it is possible to differentiate a line with a wiring defect from a typical line by quantifying the variations across frequency bins (tones), and comparing against predetermined thresholds. Generally, when a metric passes the threshold, whether exceeding or falling below the threshold, the line parameter may be considered to have rapid variations.

A reference database accessible to the analysis module 220 (e.g., provided by storage means 240) may include a plurality of a line problems (e.g., wiring defects), each line problem associated with one or more reference metrics. At operation 320, reference information is compared the one or more performance metrics derived from the CPE information to identify the line problem, such as a wiring defect. These performance metrics may be the average sum of changes in the parameter values across all or preselected number of tones. The performance metrics may also be the number of tones over which the parameter has changed. Alternatively, the performance metric could also be the sum of absolute values of changes, or their power, across all or preselected number of tones.

In another embodiment, the performance metric is average noise change in the DSL signal. Quiet-Line-Noise (QLN) or Mean Square Error (MSE) per tone may also be utilized, or the noise may be estimated indirectly from SNR, HLOG and PSD. For example, $MSE(n) = PSD(n) + Hlog(n) - SNR(n)$, where n is the frequency tone index. QLN is the measured noise when the modem is neither active nor training. However, the noise may change significantly with time. This noise at later times during operation is referred to herein as MSE noise (Mean-Square-Error noise) or MSE function.

The above metrics can be applied to other DSL line parameters (such as bit distribution, Hlog (Hlin), SNR and measured noise). Hlog (Hlin) and SNR per tone samples are already reported parameters similar to the bit distribution, which then could be used in the analysis. The calculated detection metrics are compared against a pre-chosen threshold.

If any of the metrics are above (or in some embodiments below) their corresponding threshold, the line is considered to have a wiring defect. In another embodiment, a

combination, for example a Boolean or logical combination of the values of the above metrics are compared against a single threshold.

Instruction and Command Signal Generation

As further illustrated in Figure 3A, following the analysis operation 320, a command or instruction signal is sent from the CMC 110 to the CPE device 130 at operation 340, to modify the CPE device operation, and/or a report of the analysis is issued at operation 350. As denoted by the return arrow between operation 340 and operation 310, command signal generation may dynamically modify the CPE device operation in response to changes in the received information.

In an embodiment, the command or instruction signals are communicated over information and communication channels provided between the CPE devices, and the CMC 110. An example of these communications channels are TR-69, Internet protocol (IP), Embedded Operational Channel (EOC), and SNMP.

The signal generation operation 340 is performed by the instruction and command signal generation module 230 (Figure 2). The instruction and command signal generation module 230 is configured to accept a parameter value generated by the analysis module 220 and, at operation 340, generate a signal for use by the CPE device 130 to modify its operation so as to enhance line performance, improve stability, or reduce errors in the modem. The instruction and command signal generation module 230 may or may not be part of the analysis module 220 and/or be implemented in the same hardware, such as a computer system. Instruction and command signal generation module 230 constitutes a means for regulating one or more parameter values in the CPE device 130.

In a particular embodiment, the nature of the analysis results dictates whether a report is issued (e.g., by report generation module 250), the CPE device operation modified via instructions issued to the CPE (e.g., by instruction and command signal generation module 230), or both. For example, diagnosis of certain line problems may result in no generation of an instruction command or signal at operation 340. If the results of the

analysis indicated that there is no need to make any changes to the CPE configuration or settings then no command or signal is generated.

Where an instruction and command signal is issued to the CPE device 130 at operation 340, the signal may include, without limitation: a minimum INP override instruction; a target INP change instruction; a Maximum delay override instruction; a target delay change instruction; a channel initialization policy override instruction; an instruction to turn off specific downstream tones; an instruction to change transmit power over specific downstream tones; an instruction to force a CPE initiated re-training at a scheduled time; an instruction to Lower the maxR (representing the maximum rate); an instruction to change maximum data rate; or an instruction to change target margin. For example, one or more of the following physical layer parameters, could be set by the instruction and command signal: a Maximum Nominal Power Spectral Density (“MAXNOMPSD”); a Maximum Nominal Aggregate Transmitted Power (“MAXNOMATP”); a Gain (“gi”); a Bit loading (“bi”); a Power-Cut-Back (“PCB”); a Maximum Received Power (“MAXRXPWR”); a Power Spectral Density Mask (“PSDMASK”); a Preferred Band (“PREFBAND”); a Target Signal-to-Noise Ratio Margin (“TARSNRM”); a Minimum Signal-to-Noise Ratio Margin (“MINSNRM”); a Maximum Signal-to-Noise Ratio Margin (“MAXSNRM”); a frequency-dependent Bit-Cap (“BCAP”); a frequency-dependent Target Signal-to-Noise Ratio Margin (“TSNRM”); a Transmit Spectrum Shaping (“TSSi”); a specification of bands affected by radio frequency interference; a Carrier Mask (“CARMASK”); a per band preference band indication; a per tone bit cap; a per tone TARSNRM; a minimum data rate; and a maximum data rate.

In an embodiment, the command signal issued to the CPE device 130 at operation 340 modifies the CPE device operation within a channel or line parameter value guard band established by the CO. For example, where a CO establishes a line profile, minimum or maximum values for a given channel or line parameter may also be established. In that case, the command signal issued to the CPE device 130 at operation 340 may modify the CO-established line profile, as constrained within the minimum and maximum values. As such, the CPE-centric management functions performed by the

CMC 110 may be balanced with a CO operator's need to maintain some control over the infrastructure.

Figure 3B is a flow diagram illustrating CO-constrained modification of CPE operation, in accordance with an exemplary embodiment. Some of the blocks and/or operations listed in Figure 3B are optional in accordance with certain embodiments. The numbering of the blocks presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur. As shown in Figure 3B, a CPE operation modification method 355 begins at operation 360 with the CMC 110 determining one or more line parameter values associated with a CO-imposed line constraint. Such parameters value constraints, may for example be included in data collected from the CO at operation 310 of Figure 3A (e.g., pertaining to operational settings of the DSLAM 180).

In many instances, the range of values (minimum and/or maximum) for a given operational command or line parameter specified by the operator at the CO side may represent values which cause a non-optimum performance of the line or even in some cases cause instability. This is because operators typically assign the same line profile to all lines within their network. Operators prefer this simple approach, especially when dealing with hundreds of thousands of lines, further because segments of their network could also have been leased to resellers. However, each line could be experiencing different conditions and impairments. For example, in an environment with strong impulse noises, a very low margin setting for a line could cause the lines to become unstable. A proper setting in such cases would be to increase the minimum margin to a larger value. In yet other instances, the DSLAM MIB might not allow the range of certain parameters to be changed. These limitations would prevent provisioning, improving or optimizing the performance of DSL connections, when such limitations exist.

In such cases, at operation 370, the analysis module 220, determines to what extent one or more limits or range of line parameter values may be changed within the CO-imposed constraints. For example, the diagnostic and analysis techniques described elsewhere herein for the line analysis operation 320 may resolve a first set of line

parameter values and at operation 370 that first set of line parameter values is limited by the CO-imposed constraints. Alternatively, a constrained optimization routine may be performed at operation 370 to incorporate predetermined CO-imposed constraints into the analysis operation 320 to arrive at one or more modified parameter values, limits, or range of values, in view of CO-imposed line constraints. If the results of the analysis indicated that there is no need to make any changes to the CPE configuration or settings then no command or signal is generated, and the method 360 returns to operations 310 or 350 to collect more data as part of ongoing line management and/or issues a report of the analysis cycle.

When the analysis results indicate that existing settings need to be overwritten, if there are no CO-imposed constraints instruction signals are generated for overriding the settings with the new values at operation 370. For example, the instruction generation means (e.g., module 230) overwrites, or otherwise changes the limits or the range of line parameter values by setting the parameter values or their limits on the CPE side, and on the CPE device. Where the instruction generation is further based on CO-constraints, the analysis may also trigger generation of instruction signal at operation 375 for reconciliation of the settings. For example a CO-imposed upper limit may be retained, while a lower limit is increased. An example would be for margin control, where an upper margin limit is kept the same, however the minimum margin is increased, to provide more protection against unexpected noise sources such as impulse noise. Such a setting could for example enable stabilizing the line, or improving the performance of the line when such a change is not possible on the CO side. In another example, one change at operation 375 includes limiting the range of parameters, within the existing range already pre-assigned on the line. In this example embodiment, the original range is set at the CO side, and the new range is being set at the CPE side, and the new range is not the same as the original range. The lower limit is higher than the existing minimum limit, and the upper limit is lower than the existing maximum limit. With limiting the range, the new range could assist with either improving the performance of the line or reducing or eliminating the instability of the line.

Standard parameter settings may also only have a lower limit or only a higher limit. For example, in standard implementations Impulse Noise Protection (INP) parameter is

assigned a minimum INP (MIN INP), value but no maximum INP value. This lower value is normally set at the DSLAM by the line operator. In practice, modems would train to overcome impulse noise, and at times when hit by large impulse noise, the INP value is set to a very large value, which could impair the performance of the DSL connection. Since the DSLAM and the standards do not support an upper limit for INP, this impairment could not be overcome. Embodiments of present invention enable overwriting and setting the upper limit at the CPE side (e.g., at operation 370), by setting an upper limit for the INP. The override setting could be stored by the management center. The new range limits could be stored in the data storage means 240, or at the CPE if such a storage capability is available. The new limit would cap the maximum levels, therefore very large INP values would be avoided.

In addition to the examples provided above, one or more of the following DSL physical layer parameters controlling the operation of the DSL line, could similarly be set by the instruction generating means: SOS triggering controls including controls on SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error. Fast retrain triggering controls including controls on duration of LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error. Full retrain triggering controls including controls on duration LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error. Retransmission controls including MIN and MAX INP for different types of impulse noises (e.g., Repetitive Electrical Impulse Noise (REIN) or Single Isolated Impulse Noise (SHINE)), MIN and MAX delay, FEC overhead ratio within a retransmission block, MAX throughout loss.

Command and control signals may be sent at operation 340 (or 370 and 375) to interfaces controlling the CPE device configuration and settings. Issued command or instruction signals are communicated over information and communication channels provided between the CPE device 130 and the CMC 110. An example of these communications channels are TR-69, Internet protocol (IP), Embedded Operational Channel (EOC), and SNMP. The CPE device 130 may be provided an interface similar to interfaces currently utilized on the CO side (e.g., those for controlling the settings and configurations via the DSLAM, such as the Q interface). The embodiments herein,

such as the physical layer control parameters and the instructions of the examples above, define settings of a CPE interface which may be implemented in either a standardized or vendor-specific manner to directly change and control the configuration and settings of the CPE device 130.

In another embodiment, the CPE devices 130 do not belong to, are not owned by, or otherwise associated with, the same wholesaler or operator networks. For example, CPE devices 130 A-B, could belong to a first wholesaler or operator, and the CPE devices 130 C-D, could belong to a second wholesaler or operator. Similarly, the CPE devices 130 might not belong to the same reseller networks. Furthermore, the binders 175 and 177 could be the same binder and the DSL lines 115-A-D could all be passing through the same binder. Therefore, the CPE devices 130 A-B, and the CPE devices 130 C-D could be sharing the same binder. Lines which share the same binder could experience crosstalk from the other lines in the binder. The crosstalk could include Near-End crosstalk (NEXT) or Far-End crosstalk (FEXT). Furthermore, the lines sharing the same path could be exposed to similar sources of external interference, such as Radio Frequency (RF) interference. When the lines are operated by the same operator or Wholesaler, DSM (Dynamic Spectrum Management) techniques, such as those discussed in the DSM standards (such as the Dynamic Spectrum Management Technical Report (2007), ATIS-PP-0600007) could be used to optimize the performance of the DSL lines in the presence of crosstalk and interference, such as the aforementioned NEXT, FEXT, and RF interference. However, if the lines are operated by different operators, the DSM techniques could not be fully applied, since they are installed at the operator side, and require information from all lines (such as crosstalk information), whereas each operator would only have access to information and data pertaining to DSL lines within their own network, and won't have access to information from lines operated by another operator.

Embodiments of the present invention collect information and operational data and parameters from the CPE side. Although the CPEs may belong to different networks operated by different operators, in embodiments of the present invention, it is possible to collect information from the CPE side, store and process it in one common location, at the CPE Management Center CMC. The CMC would provide the means for

collecting and analyzing information from the CPEs belonging to different operators, because the CMC is not tied to any of the networks of the multitude of operators. Furthermore, using the collection means in the data collection embodiments of the present invention, the CMC can collect information from the CPE devices independent of the particular network the DSL lines operate on and modify the various CPE devices to achieve performance goals.

Analysis Report Generation

At operation 350, analysis report is automatically compiled and issued by the report generation module 250 (Figure 2) to either an end user of the CPE device 130 or to an operator of the CMC 110. The report may be issued via any of the means described in reference to modes of data collection. In one embodiment, the report is issued via a application interface supported by the CMC 110 (e.g., via CMC user interface 172). The application interface may be a graphical user interface (GUI) and/or a Northbound Application Programming Interface (NAPI) via which the performance enhancement or analysis results are accessible.

Report generation may occur in response to an event, such as, but not limited to identification of a line condition change or a passage of a predetermined amount of time since issuance of a previous report. In certain circumstances an analysis report may be issued in addition to a modification of the CPE device operation. In such a case, the analysis report may include a description of the modifications to the CPE device operation.

In the case for diagnosis of a line problem, the reporting function may for example report the presence of a wiring defect, or absence of a wiring defect if a test condition was not true. "Severity" of the problem may also be reported at operation 350. Similarly, any analysis result characterizing the line quality, line stability, line noise type as described herein may be output via an interface of the CMC 110.

Depending on the diagnosis, one or more corrective actions may be provided in the analysis report. For example, instructions to contact an ILEC to request removal of a

bridged tap may be issued, or instructions to seek a contractor for removal of a third wire on the customer premises may be issued.

In embodiments where no operational instruction is issued to the CPE device 130, the CMC need only include a data collection module communicatively coupled to a CPE device, to receive information from the CPE device regarding CPE device operation, an analysis module coupled to the data collection module to analyze the received information for a predetermined operational performance signature indicative of a line problem, and a report generation module coupled to the analysis module to automatically compile or generate a report of the analysis results.

As previously described, the analysis module may obtain and evaluate channel performance monitoring parameters, line performance monitoring parameters, or distributions of the parameters over time, to analyze whether any line instability exists.

A diagnostics application interface may be further coupled to the analysis module to provide a predetermined set of corrective actions associated with the line problem.

Also as previously described, the information received from the CPE device may be operational data generated by the CPE device while in showtime and even where no command to change the CPE device operation is issued to the CPE device, the report generation module may issue the report to a DSL system operator or an end user of the CPE device in response to an event. Exemplary events include identification of a line condition change or a passage of a predetermined amount of time since issuance of a previous report.

In a particular embodiment, the analysis module is to analyze the received information by generating one or more performance metrics, based on the received information, and evaluate the one or metrics against the predetermined condition indicative of the line problem. As previously described, the one or more performance metrics may be any of: an average bit change across a plurality of tones in a DSL signal transmitted on the line, total bit change across a plurality of tones in the DSL signal transmitted on the line, a number of tones which experience at least two bits absolute change compared to

a previous tone, average noise change in the DSL signal, wherein noise change is obtained from one of Hlog, Hlin, Signal-to-Noise Ratio (SNR), Quiet-Line-Noise (QLN), Mean Square Error (MSE) per tone, or a calculation based on one of SNR, Hlog, or Power Spectral Density (PSD).

Even where no command to change the CPE device operation is issued to the CPE device, the data collection module may nevertheless base analysis activities based on t information collected from a plurality of sources remote from the CPE device, including one or more of: a diagnostic device, a DSL multiplexer, an end user preference database, end user feedback, an end user-specified Broadband network information table, a Broadband network content delivery system, a home network protocol interface, or an ACS device.

CPE Device

In certain embodiments described herein, the CPE DEVICE 130 includes provisions for communication with the CMC 110 (e.g., Data collection module 210 and Instruction and command signal generation module 230). An exemplary CPE DEVICE 530 depicted in Figure 5, includes a chipset 535 supporting remotely programmable firmware 540 via a remote programming interface 536 through which the CMC 110 may access the CPE device 130 via the Transceiver Unit (TU)/modem 520. The CMC 110 may set the CPE device 530 to report the various operational data parameters described herein when generated by the CPE DEVICE 530 during showtime even if such parameters are not reported under existing standards. Similarly, the remotely programmable firmware 540 may support modification of the CPE device operation in response to receiving an instruction signal from the CMC 110. As such, any of the instruction signal commands issued at operation 340 may be implemented by the CPE device 530.

Figure 6 illustrates a diagrammatic representation of a machine 600 in the exemplary form of a computer system, in accordance with one embodiment, within which a set of instructions, for causing the machine 600 to perform any one or more of the methodologies discussed herein, may be executed. In alternative embodiments, the machine may be connected (e.g., networked) to other machines in a Local Area

Network (LAN), an intranet, an extranet, or the Internet. The machine may operate in the capacity of a server or a client machine in a client-server network environment, or as a peer machine in a peer-to-peer (or distributed) network environment or as a server or series of servers within an on-demand service environment, including an on-demand environment providing database storage services. Certain embodiments of the machine may be in the form of a personal computer (PC), a tablet PC, a set top box (STB), a Personal Digital Assistant (PDA), a cellular telephone, a web appliance, a server, a network router, switch or bridge, computing system, or any machine capable of executing a set of instructions (sequential or otherwise) that specify actions to be taken by that machine. Further, while only a single machine is illustrated, the term “machine” shall also be taken to include any collection of machines (e.g., computers) that individually or jointly execute a set (or multiple sets) of instructions to perform any one or more of the methodologies discussed herein.

The exemplary computer system 600 includes a processor 602, a main memory 604 (e.g., read-only memory (ROM), flash memory, dynamic random access memory (DRAM) such as synchronous DRAM (SDRAM) or Rambus DRAM (RDRAM), etc., static memory such as flash memory, static random access memory (SRAM), volatile but high-data rate RAM, etc.), and a secondary memory 618 (e.g., a persistent storage device including hard disk drives and persistent data base implementations), which communicate with each other via a bus 630. Main memory 604 includes information and instructions and software program components necessary for performing and executing the functions with respect to the various embodiments of the CMC 110 described herein.

Processor 602 represents one or more general-purpose processing devices such as a microprocessor, central processing unit, or the like. More particularly, the processor 602 may be a complex instruction set computing (CISC) microprocessor, reduced instruction set computing (RISC) microprocessor, very long instruction word (VLIW) microprocessor, processor implementing other instruction sets, or processors implementing a combination of instruction sets. Processor 602 may also be one or more special-purpose processing devices such as an application specific integrated circuit (ASIC), a field programmable gate array (FPGA), a digital signal processor (DSP),

network processor, or the like. Processor 602 is configured to execute the processing logic 626 for performing the operations and functionality which is discussed herein.

The computer system 600 may further include a network interface card 608. The computer system 600 also may include a user interface 610 (such as a video display unit, a liquid crystal display (LCD), or a cathode ray tube (CRT)), an alphanumeric input device 612 (e.g., a keyboard), a cursor control device 614 (e.g., a mouse), and a signal generation device 616 (e.g., an integrated speaker). The computer system 600 may further include peripheral device 636 (e.g., wireless or wired communication devices, memory devices, storage devices, audio processing devices, video processing devices, etc.).

The secondary memory 618 may include a non-transitory machine-readable storage medium (or more specifically a non-transitory machine-accessible storage medium) 631 on which is stored one or more sets of instructions (e.g., software 622) embodying any one or more of the methodologies or functions described herein. Software 622 may also reside, or alternatively reside within main memory 604, and may further reside completely or at least partially within the processor 602 during execution thereof by the computer system 600, the main memory 604 and the processor 602 also constituting machine-readable storage media. The software 622 may further be transmitted or received over a network 620 via the network interface card 608.

While the subject matter disclosed herein has been described by way of example and in terms of the specific embodiments, it is to be understood that the claimed embodiments are not limited to the explicitly enumerated embodiments disclosed. To the contrary, the disclosure is intended to cover various modifications and similar arrangements as would be apparent to those skilled in the art. Therefore, the scope of the appended claims should be accorded the broadest interpretation so as to encompass all such modifications and similar arrangements. It is to be understood that the above description is intended to be illustrative, and not restrictive. Many other embodiments will be apparent to those of skill in the art upon reading and understanding the above description. The scope of the disclosed subject matter is therefore to be determined in

reference to the appended claims, along with the full scope of equivalents to which such claims are entitled.

CLAIMS

1. A DSL customer premises equipment (CPE) Management Center (CMC) coupled to a Broadband network, the CMC comprising:

a data collection module, communicatively coupled to at least one DSL CPE device, to receive information from the CPE device regarding operation of the CPE device;

an analysis module coupled to the data collection module to analyze the received information; and

a command signal generation module coupled to the analysis module to receive analysis results and to generate a corresponding command signal for transmission to the at least one CPE device to modify the CPE device operation based on the analysis results.

2. The CMC of claim 1, wherein the data collection module is to gather information from a plurality comprising one or more of: a DSL multiplexer, a diagnostic and remedy guidance device, an end user preference database, an end user customer feedback interface, an operational database, an end user Broadband network information database, a Broadband network content delivery system, a customer premises network higher-layer protocol information database, or an ACS device.

3. The CMC of claim 1, further comprising an application device interface, through which end user feedback is provided, coupled with at least one of the CMC, the CPE device, a noise cancellation device, a signal conditioning device, a diagnostic and remedy guidance device, and a controller or input device by which the user can indicate an instantaneous problem, or an ACS device.

4. The CMC of claim 1, wherein the data collection module is further to collect information defining line parameter constraints within which the CPE device is required to operate, wherein the analysis module is to analyze the received information to determine how to modify the CPE device within the line parameter constraints, and wherein the command signal generation module is to issue a command to the CPE

device by changing line parameter values, limits, or a range of line parameter values within the line parameter constraints.

5. The CMC of claim 1, wherein the data collection module is communicatively coupled to a plurality of CPE devices, a first of the plurality associated with a first wholesaler or operator network and a second of the plurality associated with a second wholesaler or operator network, and wherein the command signal generation module is to modify operation of a CPE device of both the first and second wholesaler or operator networks.

6. The CMC of claim 1, wherein the CMC reports modifications to the CPE device operation or analysis results concerning the line to a CMC operator or to an end user of the CPE device.

7. The CMC of claim 1, wherein the command signal is further based on information provided by the CMC operator and analyzed by the analysis module, wherein the information comprises:

- a physical inventory of the Broadband network including characterization of a Broadband link in the Broadband network,
- a history of the broadband link's characterization, and
- a location and use of the broadband link.

8. The CMC of claim 1, wherein the command signal is further based on information provided by the end user and analyzed by the analysis module, wherein said information comprises at least one of:

- the end user's use and preference of Broadband network services and quality, including at least one of desired data rates, quality of services for video, audio and data transmission, and
- time of day usage preferences.

9. The CMC of claim 1, wherein the command signal is further based on information provided by a content delivery service, wherein said information comprises at least one of: motion picture subscription service parameters, streaming video service parameters,

internet television service parameters, music subscription service parameters, network gaming or entertainment service parameters, or Voice over Internet Protocol (VoIP) telephony service parameters.

10. The CMC of claim 1, wherein the plurality of sources communicate with the CMC by way of one or more of the following:

analog POTS, cellular data communications, wireless data communications, Broadband Forum TR-069, IP protocol data communications, electronic mail communications, and a DSL communication channel selected from the group consisting of: Operation, Administration, and Maintenance (OAM) and Embedded Operational Channel (EOC).

11. The CMC of claim 1, wherein the command signal generation module generates the command signal to dynamically modify the CPE device operation in response to changes in the received information.

12. The CMC of claim 1, wherein the received information comprises at least one of:

Downstream attenuation;
Hlog information;
Downstream bit, gain, and SNR table;
Quiet line noise table;
Impulse noise history;
History of CV, downstream or upstream;
History of ES, downstream or upstream;
History of FEC, downstream or upstream;
History of retrains;
History of bit swap or other real time adaptive features;
History of fast retrains and/or SOS's;
Impedance;
DSL physical layer anomalies, defects and faults together with the event time stamps that has led to SOS activation, a fast retrain, a full retrain or a failed retrain;
SOS activation times, durations and average data rate loss;
INM (Impulse noise monitoring) histograms and impulse noise statistics;

echo transfer function or un-cancelled echo PSD; or retransmission statistics.

13. The CMC of claim 12, wherein the analysis module is further to identify a type of noise in the line based on the received information.

14. The CMC of claim 1, wherein the command signal comprises at least one of:

a minimum INP override instruction;

a target INP change instruction;

a Maximum delay override instruction;

a target delay change instruction;

a channel initialization policy override instruction;

an instruction to turn off specific downstream tones;

an instruction to change transmit power over specific downstream tones;

an instruction to force a CPE initiated re-training at a scheduled time;

an instruction to Lower the maxR;

an instruction to change maximum data rate;

an instruction to change target margin;

SOS triggering controls including controls on SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error;

fast retrain triggering controls including controls on duration of LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error;

full retrain triggering controls including controls on duration LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error; or

retransmission controls including MIN and MAX INP for different types of impulse noises (REIN or SHINE), MIN and MAX delay, FEC overhead ratio within a retransmission block, MAX throughout loss.

15. The CMC of claim 14, wherein command signal generation module is to modify the CPE device operation by changing limits or a range of line parameter values pre-assigned to the line at a CO side.

16. A method of managing digital subscriber line (DSL) customer premises equipment (CPE), the method comprising:

collecting information from a CPE device regarding operation of the CPE device through a Broadband network coupled to the digital subscriber line;
analyzing the received information; and
generating a command signal for transmission to the CPE device to modify the CPE device operation based on the analysis results.

17. The method of claim 16, wherein collecting the information further comprises gathering operation information from a plurality of sources, wherein the plurality of sources comprises one or more of: a DSL multiplexer, a diagnostic and remedy guidance device, an end user preference database, an end user customer feedback interface, an operational database, an end user Broadband network information database, a Broadband network content delivery system, a customer premises network higher-layer protocol information database, or an ACS device.

18. The method of claim 16, further comprising:

collect information defining line parameter constraints within which the CPE device is required to operate; and
wherein analyzing the received information further comprises determining how to modify the CPE device within the line parameter constraints, and
wherein generating the command signal generation module further comprises issuing a command to the CPE device which changes line parameter values, limits, or a range of line parameter values within the line parameter constraints.

19. The method of claim 16, wherein collecting information from a CPE device further comprises collecting information from a plurality of CPE devices, a first of the plurality associated with a first wholesaler or operator network and a second of the plurality associated with a second wholesaler or operator network, and wherein generating a command signal for transmission modifies operation of a CPE device from both the first and the second wholesaler or operator networks.

20. The method of claim 16, wherein the command signal is to change limits or a range of line parameter values pre-assigned on the line at a CO side.

21. The method of claim 16, wherein the received information comprises at least one of:

- Downstream attenuation;
- Hlog information;
- Downstream bit, gain, and SNR table;
- Quiet line noise table;
- Impulse noise history;
- History of CV, downstream or upstream;
- History of ES, downstream or upstream;
- History of FEC, downstream or upstream;
- History of retrains;
- History of bit swap or other real time adaptive features;
- History of fast retrains and/or SOS's; or
- Impedance;

DSL physical layer anomalies, defects and faults together with the event time stamps that has led to SOS activation, a fast retrain, a full retrain or a failed retrain;

- SOS activation times, durations and average data rate loss;
- INM (Impulse noise monitoring) histograms and impulse noise statistics;
- echo transfer function or un-cancelled echo PSD; or
- retransmission statistics; and

wherein the command signal comprises at least one of:

- a minimum INP override instruction;
- a target INP change instruction;
- a Maximum delay override instruction;
- a target delay change instruction;
- a channel initialization policy override instruction;
- an instruction to turn off specific downstream tones;
- an instruction to change transmit power over specific downstream tones;
- an instruction to force a CPE initiated re-training at a scheduled time;
- an instruction to Lower the maxR;

an instruction to change maximum data rate;

an instruction to change target margin;

SOS triggering controls including controls on SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error;

fast retrain triggering controls including controls on duration of LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error;

full retrain triggering controls including controls on duration LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error; or

retransmission controls including MIN and MAX INP for different types of impulse noises (REIN or SHINE), MIN and MAX delay, FEC overhead ratio within a retransmission block, MAX throughout loss.

22. A computer readable storage media, comprising instruction stored thereon, which when executed by a processing system cause the system to perform the method of claim 16.

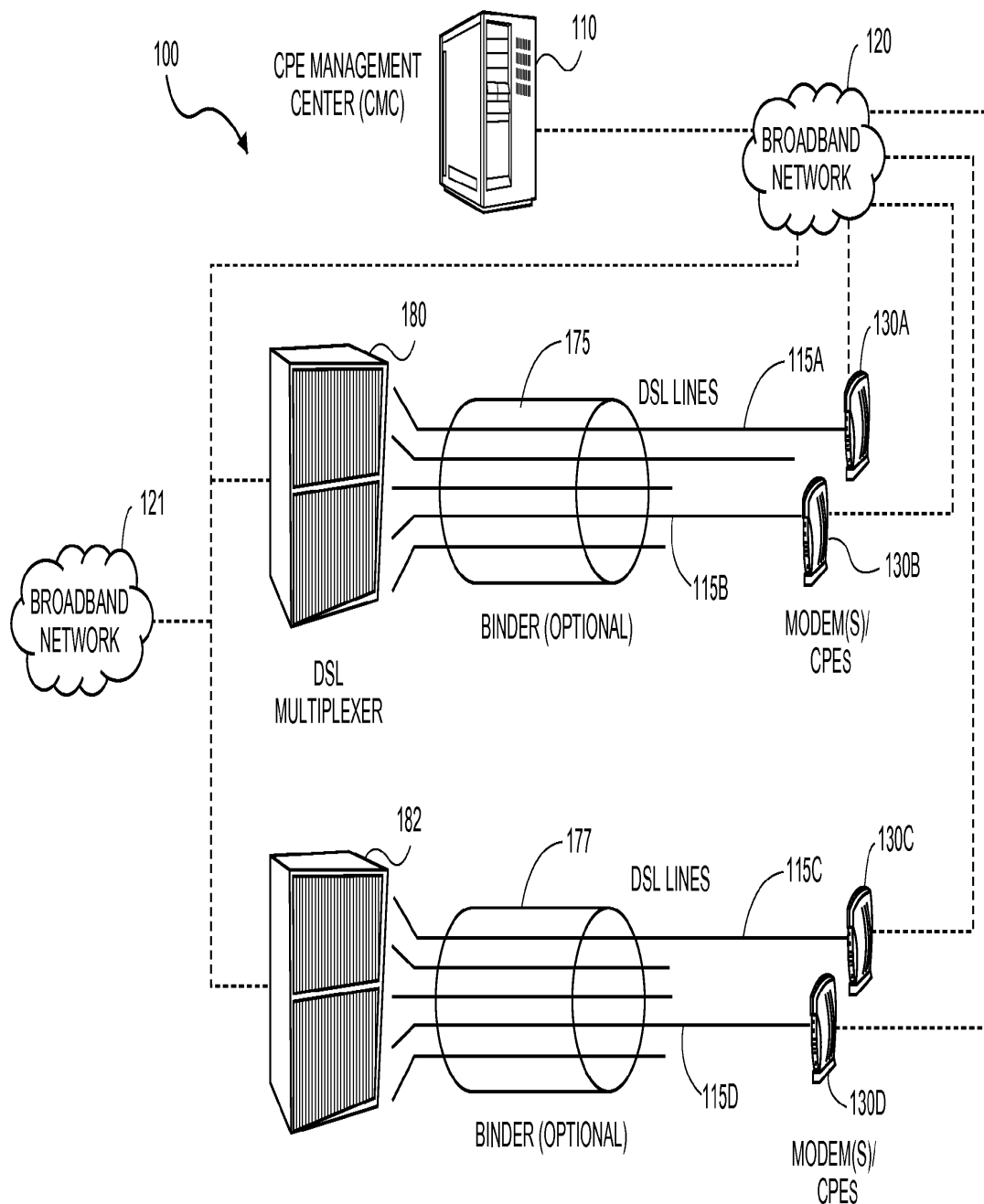


FIG. 1

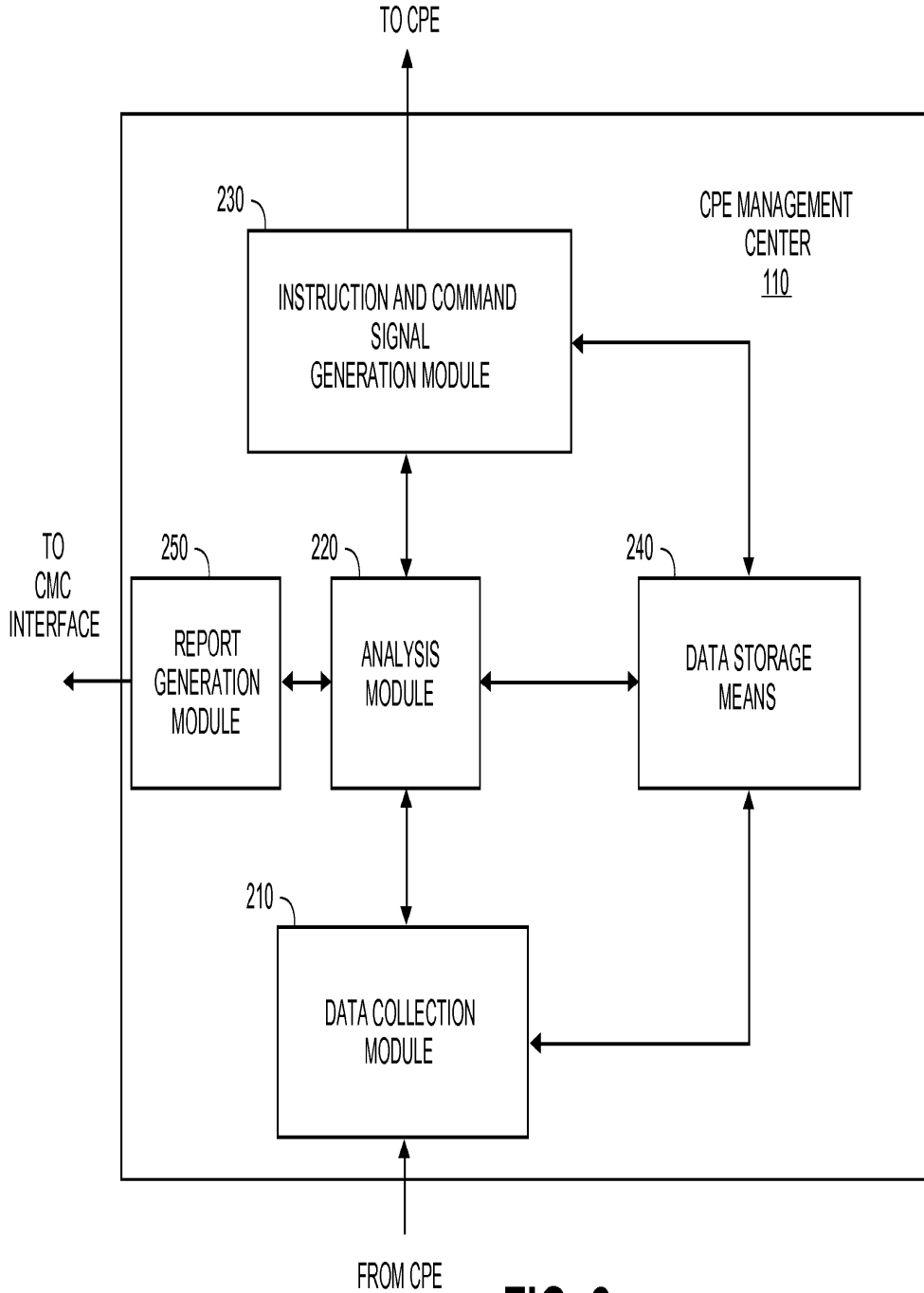


FIG. 2

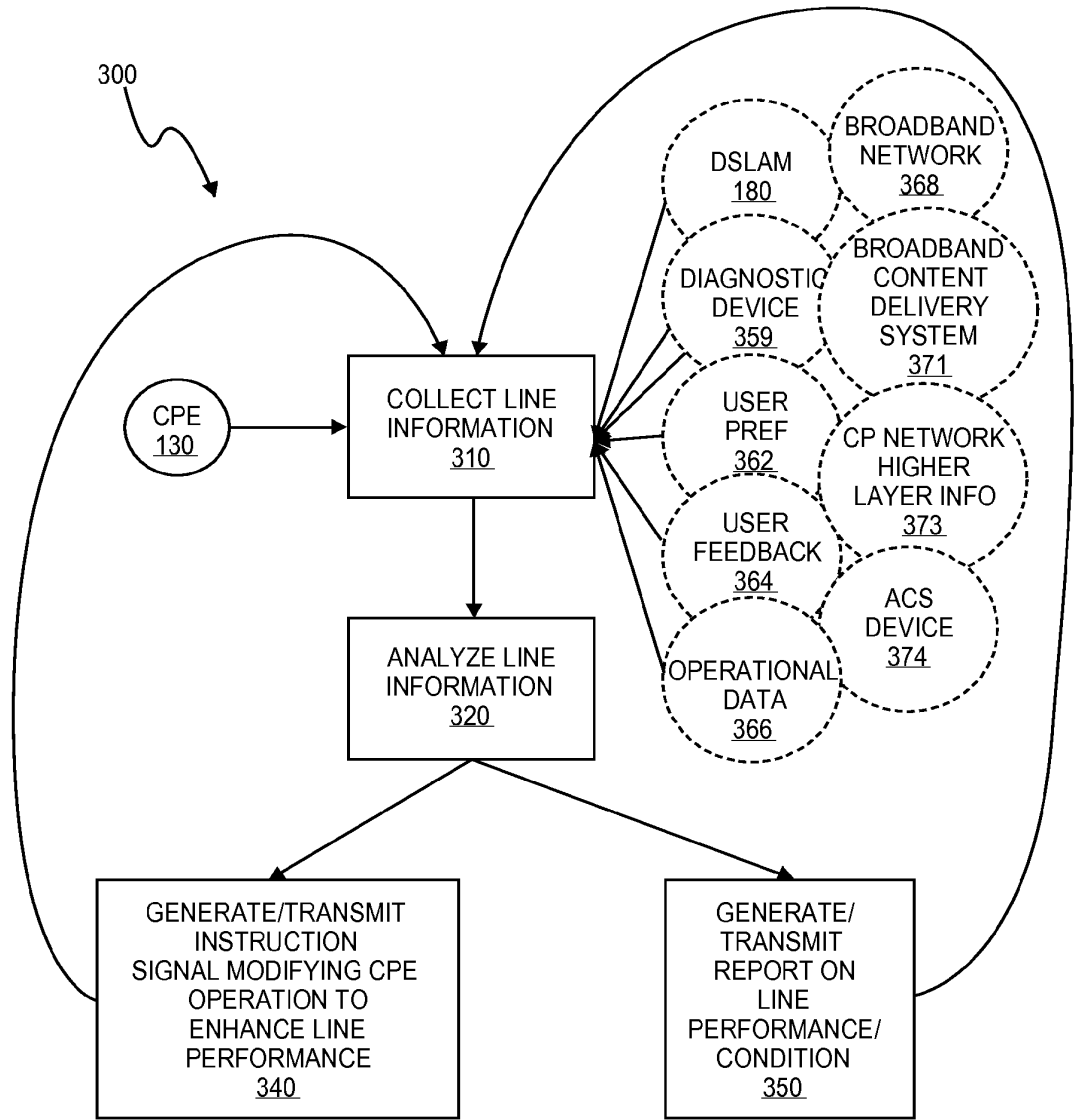


FIG. 3A

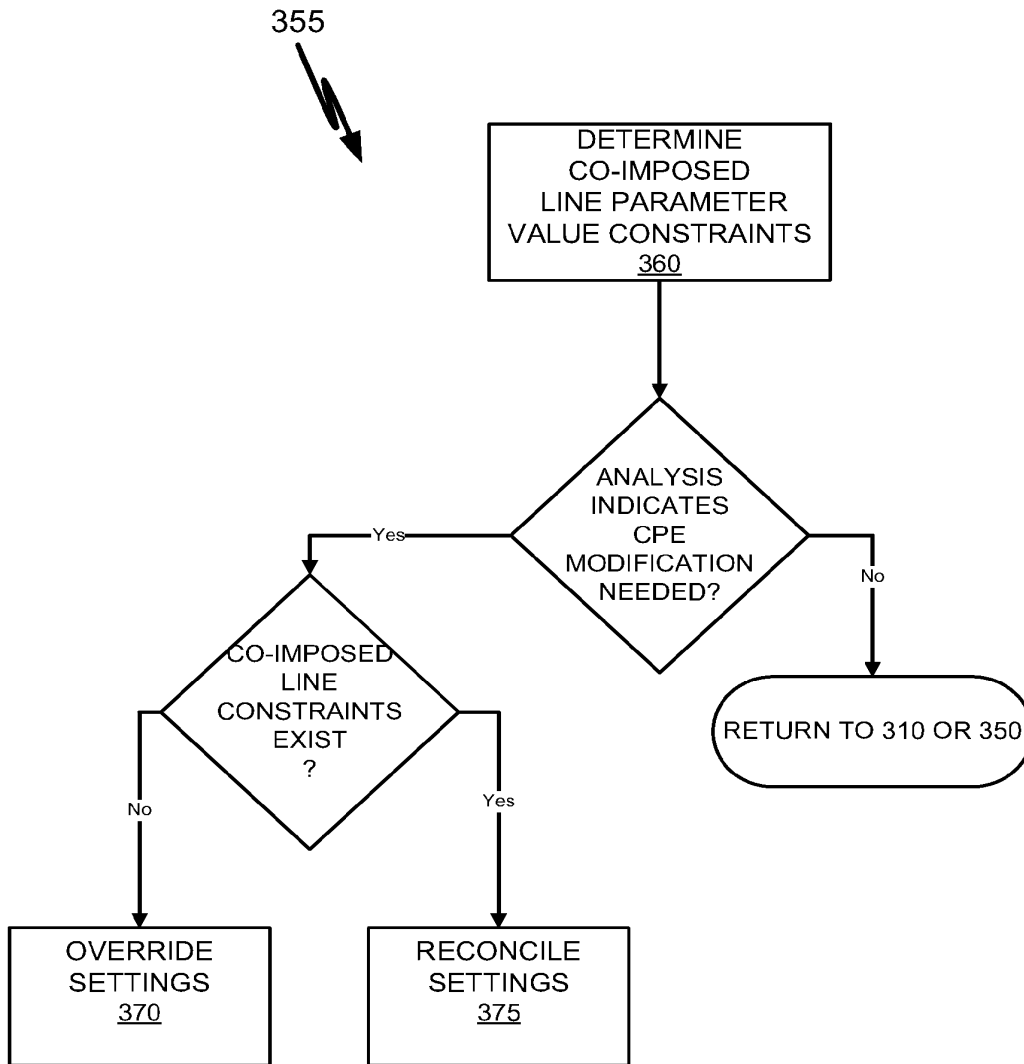


FIG. 3B

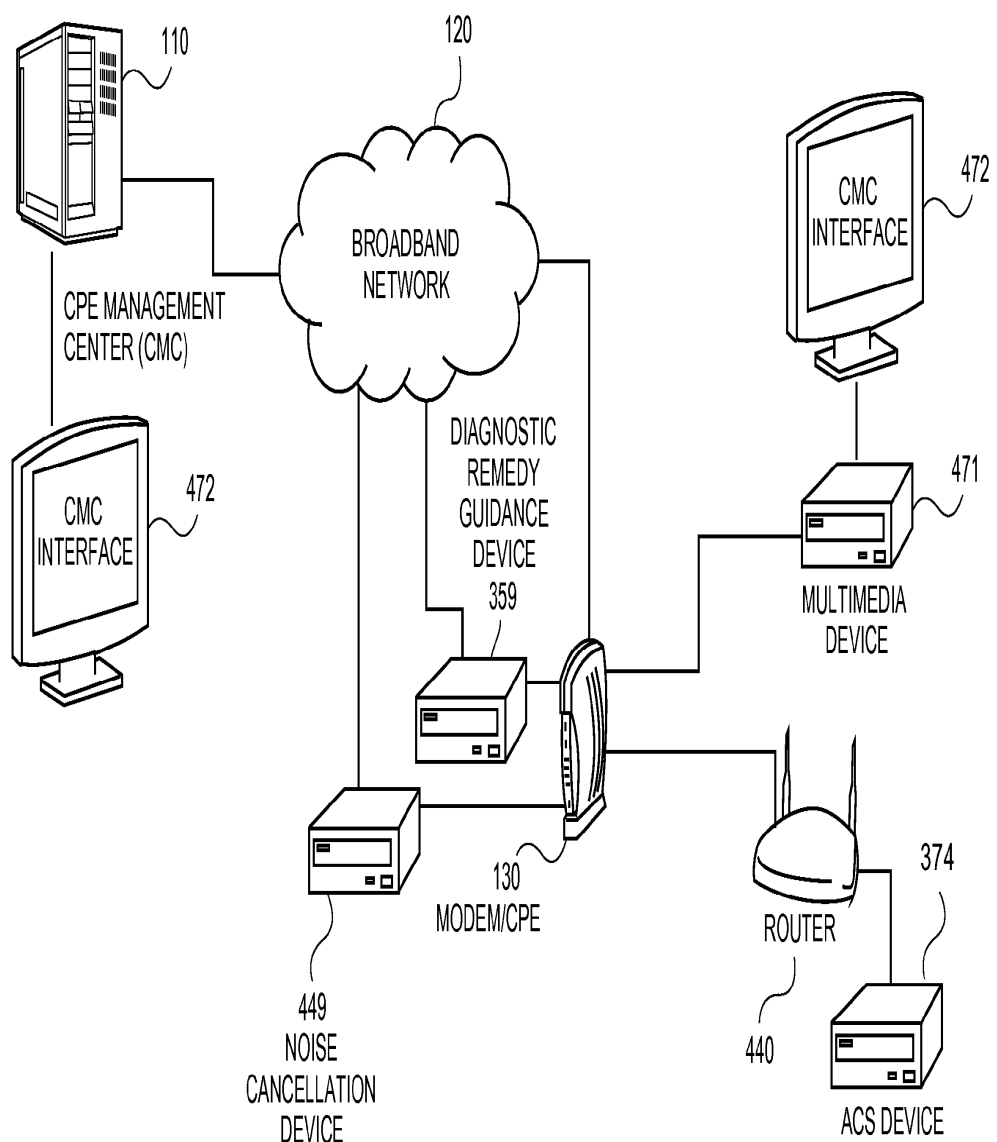


FIG. 4

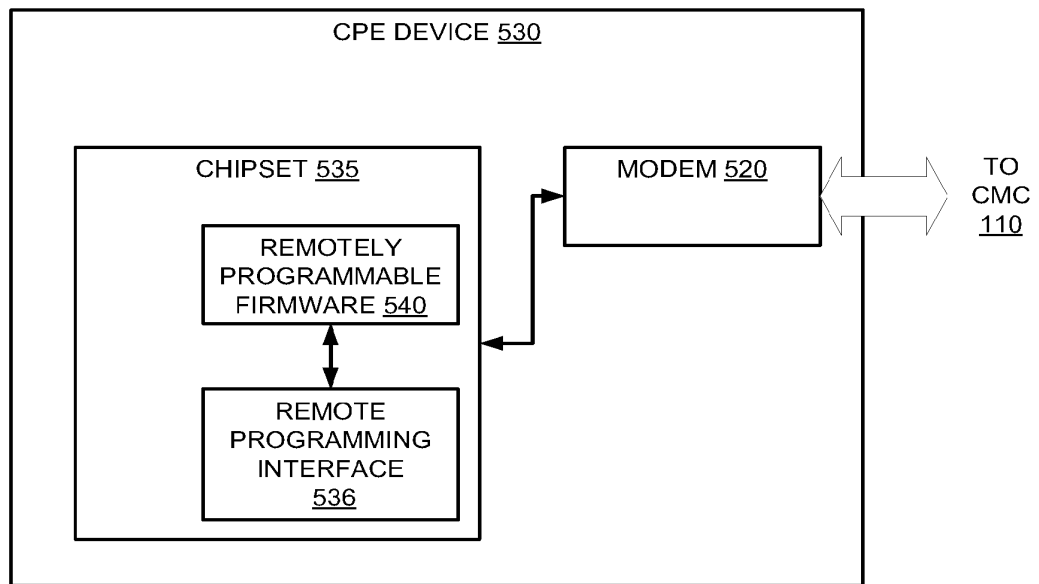


FIG. 5

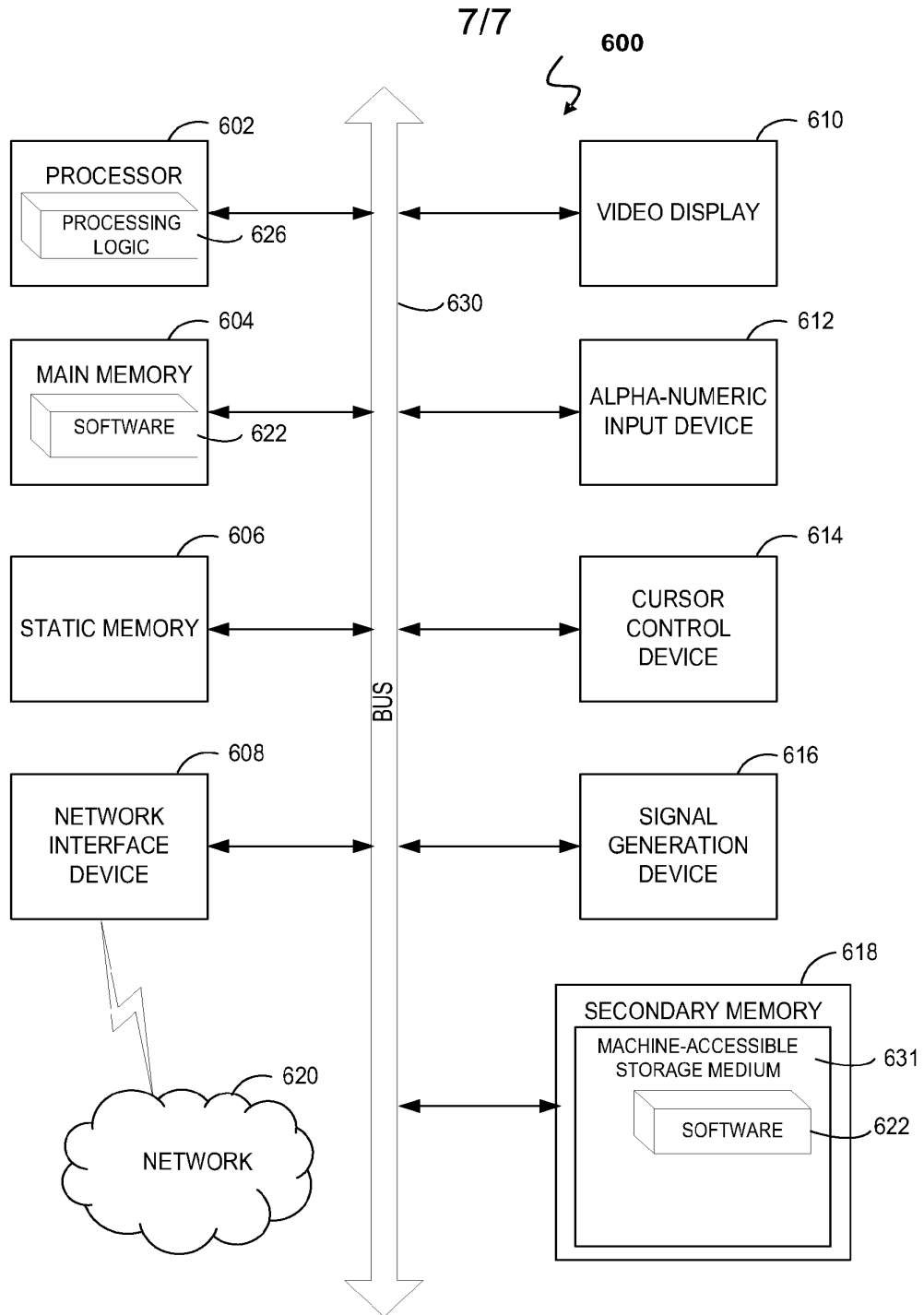


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/062604

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04M11/06 H04L12/28 H04L12/24 H04M3/30
ADD.

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

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, COMPENDEX, INSPEC, IBM-TDB, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2006/120513 A1 (ADAPTIVE SPECTRUM & SIGNAL [US]; CIOFFI JOHN M [US]; RHEE WONJONG [US]) 16 November 2006 (2006-11-16) page 20 - page 21; figure 4a -----	1-22
X	US 2006/280235 A1 (RHEE WONJONG [US] ET AL) 14 December 2006 (2006-12-14) paragraph [0048] - paragraph [0057]; figure 2 -----	1-22
X	US 2009/028170 A1 (JIANG BAOFENG [US] ET AL) 29 January 2009 (2009-01-29) paragraph [0011] - paragraph [0024] -----	1-22

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 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

25 November 2011

Date of mailing of the international search report

01/12/2011

Name and mailing address of the ISA/
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Hardelin, Thierry

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2010/062604

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006120513 A1	16-11-2006	AU 2006245450 A1 BR PI0608974 A2 CA 2608329 A1 EP 1886480 A1 JP 2008545288 A US 2007036340 A1 WO 2006120513 A1	16-11-2006 17-02-2010 16-11-2006 13-02-2008 11-12-2008 15-02-2007 16-11-2006
US 2006280235 A1	14-12-2006	AU 2006256483 A1 CA 2611387 A1 CN 101233742 A EP 1911256 A1 JP 2008546340 A US 2006280235 A1 WO 2006131794 A1	14-12-2006 14-12-2006 30-07-2008 16-04-2008 18-12-2008 14-12-2006 14-12-2006
US 2009028170 A1	29-01-2009	NONE	

Form PCT/ISA/210 (patent family annex) (April 2005)

PATENT COOPERATION TREATY

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From the INTERNATIONAL SEARCHING AUTHORITY

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY, OR THE DECLARATION

To:
Mughal, Usman A.
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
1279 Oakmead Parkway
Sunnyvale CA 94085-4040
ETATS-UNIS D'AMERIQUE

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SUNNYVALE
MAR 07 2013

(PCT Rule 44.1)

Applicant's or agent's file reference 8241 P073PCTD	BLAKELY SOKOLOFF TAYLOR ZAFMAN	Date of mailing (day/month/year) 5 March 2013 (05-03-2013)
International application No. PCT/US2012/057152	International filing date (day/month/year) 25 September 2012 (25-09-2012)	FOR FURTHER ACTION See paragraphs 1 and 4 below
Applicant ADAPTIVE SPECTRUM AND SIGNAL ALIGNMENT, INC.		

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 PCT Applicant's Guide, International Phase, paragraphs 9.004 - 9.011.

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 any 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 any 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**

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. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.


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 before completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

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.

For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the *PCT Applicant's Guide*, National Chapters.

Entered into FIP
By: *[Signature]*

Name and mailing address of the International Searching Authority  European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040 Fax: (+31-70) 340-3016	Authorized officer PETTERSSON, Hans Tel: +49 (0)30 25901-740	RECEIVED MAR 07 2013 FIP DEPT.
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 8241P073PCTD	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/US2012/057152	International filing date (day/month/year) 25/09/2012	(Earliest) Priority Date (day/month/year) 13/07/2012
Applicant ADAPTIVE SPECTRUM AND SIGNAL ALIGNMENT, INC.		

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 4 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 43.6bis(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/US2012/057152

A. CLASSIFICATION OF SUBJECT MATTER
 INV. H04L12/24 H04L12/26
 ADD.
 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)
 H04L
 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)
 EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/174421 A1 (ZHAO LING Z [US] ET AL) 21 November 2002 (2002-11-21) paragraph [0009] - paragraph [0010] paragraph [0031] paragraph [0052] - paragraph [0055] paragraph [0065] - paragraph [0084] paragraph [0109] - paragraph [0119] paragraph [0130] - paragraph [0143] paragraph [0176] - paragraph [0183] paragraph [0230] - paragraph [0266] figures 1,2	1-110
X	----- US 2012/096143 A1 (SUIT JOHN M [US]) 19 April 2012 (2012-04-19) paragraph [0005] paragraph [0029] - paragraph [0061] ----- -/--	1-110

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	*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
E earlier application or patent but published on or after the international filing date	*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
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)	*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
O document referring to an oral disclosure, use, exhibition or other means	*Z* document member of the same patent family
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 26 February 2013	Date of mailing of the international search report 05/03/2013
---	--

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Tous Fajardo, Juan
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1

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/057152

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2012/091725 A1 (ADAPTIVE SPECTRUM & SIGNAL [US]; CHOW PETER [US]; RHEE WONJONG [US]; T) 5 July 2012 (2012-07-05) page 4, line 26 - line 28 page 6, line 27 - page 7, line 1 page 7, line 27 - page 9, line 10 page 12, line 17 - page 13, line 21 page 19, line 3 - line 23 -----	1-100
X	US 2009/207985 A1 (CIOFFI JOHN M [US] ET AL) 20 August 2009 (2009-08-20) paragraph [0042] paragraph [0047] - paragraph [0049] paragraph [0057] paragraph [0064] - paragraph [0065] paragraph [0068] paragraph [0071] paragraph [0100] paragraph [0106] - paragraph [0123] paragraph [0145] paragraph [0150] - paragraph [0179] paragraph [0204] paragraph [0209] paragraph [0211] figures 6B,7B -----	1-110

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2012/057152

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002174421	A1	21-11-2002	AU 2002248740 A1 15-10-2002
			EP 1490775 A1 29-12-2004
			US 2002174421 A1 21-11-2002
			WO 02079909 A2 10-10-2002
			WO 02080001 A1 10-10-2002
			WO 03009086 A2 30-01-2003

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WO 2012091725	A1	05-07-2012	NONE

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			CN 101461253 A 17-06-2009
			CN 102170596 A 31-08-2011
			EP 2030454 A2 04-03-2009
			EP 2337371 A1 22-06-2011
			JP 2009540671 A 19-11-2009
			US 2009207985 A1 20-08-2009
			WO 2007146048 A2 21-12-2007

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference see form PCT/ISA/220	FOR FURTHER ACTION See paragraph 2 below	
International application No. PCT/US2012/057152	International filing date (day/month/year) 25.09.2012	Priority date (day/month/year) 13.07.2012
International Patent Classification (IPC) or both national classification and IPC INV. H04L12/24 H04L12/26		
Applicant ADAPTIVE SPECTRUM AND SIGNAL ALIGNMENT, INC.		

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 and 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 usually 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.

Name and mailing address of the ISA:  European Patent Office Gitschiner Str. 103 D-10958 Berlin Tel. +49 30 25901 - 0 Fax: +49 30 25901 - 840	Date of completion of this opinion see form PCT/ISA/210	Authorized Officer Tous Fajardo, Juan Telephone No. +49 30 25901-489
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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2012/057152

Box No. I Basis of the 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 43bis.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:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	<u>1-110</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-110</u>
Industrial applicability (IA)	Yes: Claims	<u>1-110</u>
	No: Claims	

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2012/057152

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- 1 Reference is made to the following documents:
 - D1 US 2002/174421 A1 (ZHAO LING Z [US] ET AL) 21 November 2002 (2002-11-21)
 - D2 US 2012/096143 A1 (SUIT JOHN M [US]) 19 April 2012 (2012-04-19)
 - D3 WO 2012/091725 A1 (ADAPTIVE SPECTRUM & SIGNAL [US]; CHOW PETER [US]; RHEE WONJONG [US]; T) 5 July 2012 (2012-07-05)
 - D4 US 2009/207985 A1 (CIOFFI JOHN M [US] ET AL) 20 August 2009 (2009-08-20)
- 2 The present application does not meet the criteria of Article 33(2) PCT, because the subject-matter of claims 1, 20 and 21 is not new.
 - 2.1 D1 discloses a method performed by a downloadable agent, the method comprising:

collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and transmitting the WAN performance information to a machine (see paragraphs [0009], [0010], [0031] or [0052]; see also figures 1 and 2), wherein the machine is operable to:

store the WAN performance information in a database associated with the machine (see paragraphs [0074]-[0076]; see also figure 7),
analyze the WAN performance information to generate an analysis result (see paragraphs [0130]-[0131] or [0176]-[0183]; see also figure 7); and
report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider (see [0176]-[0183]; see also figure 7).

The subject-matter of claim 1 is therefore not new (Article 33(2) PCT).
 - 2.2 Machine readable storage medium claim 20 and system claim 21 correspond to method claim 1. The subject-matter of claims 20 and 21 is therefore not new (Article 33(2) PCT).

- 3 The present application does not meet the criteria of Article 33(2) PCT, because the subject-matter of claims 41, 75 and 76 is not new.
- 3.1 D2 discloses a method comprising:
receiving first information from a first downloadable agent (see paragraphs [0030] and [0033]-[0035]);
receiving second information from a second downloadable agent (see paragraphs [0030] and [0033]-[0035]);
storing the first and second information in a database (see paragraph [0038]);
analyzing the first and second information with reference to data already stored in the database (see paragraphs [0039] or [0043]); and
reporting the analyzed first and second information to a management entity (see paragraph [0061]).
- The subject-matter of claim 41 is therefore not new (Article 33(2) PCT).
- 3.2 Machine readable storage medium claim 75 and system claim 76 correspond to method claim 41. The subject-matter of claims 75 and 76 is therefore not new (Article 33(2) PCT).
- 4 The present application does not meet the criteria of Article 33(2) PCT, because the subject-matter of claims 88 and 110 is not new.
- 4.1 D2 discloses method performed by a downloadable agent on a processor, the method comprising:
collecting first information related to performance of a network device associated with the downloadable agent (see paragraphs [0030] and [0033]-[0035]);
sending the first information to a machine, wherein the first information is stored in a database coupled to the machine (see paragraphs [0030] and [0033]-[0035]), and wherein the machine is operable to:
receive second information from another downloadable agent (see paragraphs [0030] and [0033]-[0035]); and
analyze the first and second information with reference to data already stored in the database (see paragraphs [0039] or [0043]); and
receiving a report of the analyzed first and second information (see paragraphs [0039], [0043] and [0061]).
- The subject-matter of claim 88 is therefore not new (Article 33(2) PCT).
- 4.2 Machine readable storage medium claim 110 corresponds to method claim 88. The subject-matter of claim 110 is therefore not new (Article 33(2) PCT).

- 5 Dependent claims 2-19, 22-40, 42-74, 77-87 and 89-109 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, see documents D1-D4 and their citations in the search report.

Re Item VIII

Certain observations on the international application (clarity)

- 1 Although claims 1, 20, 21, 41, 75, 76, 88 and 110 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and/or in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.
- 2 The application does not meet the requirements of Article 6 PCT, because claims 6 and 7, and 9 and 109, respectively, are not concise (they claim the same subject-matter).
- 3 The application does not meet the requirements of Article 6 PCT, because claim 76 is not clear. This claim makes reference to method claims 38 to 59. However, claims 38 to 40 relate to a system, not to a method.

Possible steps after receipt of the international search report (ISR) and written opinion of the International Searching Authority (WO-ISA)

General information	For all international applications filed on or after 01/01/2004 the competent ISA will establish an ISR. It is accompanied by the WO-ISA. Unlike the former written opinion of the IPEA (Rule 66.2 PCT), the WO-ISA is not meant to be responded to, but to be taken into consideration for further procedural steps. This document explains about the possibilities.
Amending claims under Art. 19 PCT	Within 2 months after the date of mailing of the ISR and the WO-ISA the applicant may file amended claims under Art. 19 PCT directly with the International Bureau of WIPO. The PCT reform of 2004 did not change this procedure. For further information please see Rule 46 PCT as well as form PCT/ISA/220 and the corresponding Notes to form PCT/ISA/220.
Filing a demand for international preliminary examination	<p>In principle, the WO-ISA will be considered as the written opinion of the IPEA. This should, in many cases, make it unnecessary to file a demand for international preliminary examination. If the applicant nevertheless wishes to file a demand this must be done before expiry of 3 months after the date of mailing of the ISR/ WO-ISA or 22 months after priority date, whichever expires later (Rule 54bis PCT). Amendments under Art. 34 PCT can be filed with the IPEA as before, normally at the same time as filing the demand (Rule 66.1 (b) PCT).</p> <p>If a demand for international preliminary examination is filed and no comments/amendments have been received the WO-ISA will be transformed by the IPEA into an IPRP (International Preliminary Report on Patentability) which would merely reflect the content of the WO-ISA. The demand can still be withdrawn (Art. 37 PCT).</p>
Filing informal comments	After receipt of the ISR/WO-ISA the applicant may file informal comments on the WO-ISA directly with the International Bureau of WIPO. These will be communicated to the designated Offices together with the IPRP (International Preliminary Report on Patentability) at 30 months from the priority date. Please also refer to the next box.
End of the international phase	At the end of the international phase the International Bureau of WIPO will transform the WO-ISA or, if a demand was filed, the written opinion of the IPEA into the IPRP, which will then be transmitted together with possible informal comments to the designated Offices. The IPRP replaces the former IPEA (international preliminary examination report).
Relevant PCT Rules and more information	Rule 43 PCT, Rule 43bis PCT, Rule 44 PCT, Rule 44bis PCT, PCT Newsletter 12/2003, OJ 11/2003, OJ 12/2003

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
First Named Inventor/Applicant Name:	Leonardo Dagum			
Filer:	Gregory D. Caldwell/Lisa Bennett			
Attorney Docket Number:	8241P073			
Filed as Large Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
National Stage Fee	1631	1	280	280
Natl Stage Search Fee - Report provided	1642	1	480	480
National Stage Exam - all other cases	1633	1	720	720
Pages:				
Claims:				
Claims in excess of 20	1615	53	80	4240
Independent claims in excess of 3	1614	1	420	420
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				6140

Electronic Acknowledgement Receipt

EFS ID:	21189341
Application Number:	14414436
International Application Number:	PCT/US2012/057152
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	8791
Filer:	Gregory D. Caldwell/Lisa Bennett
Filer Authorized By:	Gregory D. Caldwell
Attorney Docket Number:	8241P073
Receipt Date:	12-JAN-2015
Filing Date:	
Time Stamp:	20:40:04
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$6140
RAM confirmation Number	7412
Deposit Account	022666
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. 1.492 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)
 Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)
 Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	8241P073_1390.pdf	44216 4719f536b7a2b0489e8e3342e3e3a5377d042b3a	no	3

Warnings:

Information:

2	Documents submitted with 371 Applications	8241P073PCT_PCTPub.pdf	3192701 a22dd649462a633add83ed055c617b7f26b75ba	no	80
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Warnings:

Information:

3	Oath or Declaration filed	8241P073PCT_DEC.pdf	99284 91af045f7ad4a5714976f3805f8b1483e8de6cdd	no	2
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Warnings:

Information:

4	Power of Attorney	8241P073PCT_POA.pdf	55325 53c0cb3590eee9a14e1ec9e55af0c6cac920ea4	no	1
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Warnings:

Information:

5		8241P073_PreAmend.pdf	65405 7ba57b9cd931333267f3733043fc876c3ead0e9dd	yes	21
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Multipart Description/PDF files in .zip description

Document Description	Start	End
Preliminary Amendment	1	1
Specification	2	2
Claims	3	19
Applicant Arguments/Remarks Made in an Amendment	20	21

Warnings:

Information:

6	Application Data Sheet	8241P073_ADS.pdf	1743898	no	6
			cdbabab504cc22c6d4e230e1c6039725d78989e5		
Warnings:					
Information:					
7		8241P073_IDS_1449_As_Filed.pdf	127076	yes	2
			02b5f2c3e0aade54f84724a3793b1cc05592cbd5		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Transmittal Letter		1	1	
	Information Disclosure Statement (IDS) Form (SB08)		2	2	
Warnings:					
Information:					
8	Foreign Reference	WO2012091725A1.pdf	2100658	no	48
			797d5f7490f73bc88bb95b05a8a7d6a3d2bbe2d		
Warnings:					
Information:					
9	Other Reference-Patent/App/Search documents	8241P073PCT_ISR_WO_030513.pdf	606089	no	12
			a7922311dd1a646cf412913db65c094611fc54b4		
Warnings:					
Information:					
10	Fee Worksheet (SB06)	fee-info.pdf	38789	no	2
			0c54d949b7bba795eaa7ef65fea7c238dea2b298		
Warnings:					
Information:					
Total Files Size (in bytes):			8073441		

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.

PCT

Power of Attorney

(for an international application filed under the Patent Cooperation Treaty)
(PCT Rule 90.4)

The undersigned applicant(s) (Names should be indicated as they appear in the Request Form (PCT/RO/101):

- | | |
|---------------------------|-----|
| 1. DAGUM Leonardo | 7. |
| 2. BEDNARZ Philip | 8. |
| 3. GOLDBURG Marc | 9. |
| 4. TEHRANI Ardavan Maleki | 10. |
| 5. RHEE Wonjong | 11. |
| 6. | 12. |

hereby appoints (appoint) the following person as: agent common representative

Name and Address

(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

Usman A. Mughal, Reg. No. 62887; Usman A. Mughal, Reg. No. 62,887; Gregory D. Caldwell, Reg. No. 39,692;
Spencer K. Hunter, Reg. No. 67,337; James M. Howard, Reg. No. 56,377; Vincent H. Anderson, Reg. No. 54,692

Blakely Sokoloff Taylor and Zafman LLP
1279 Oakmead Parkway
Sunnyvale, CA 94086
United States of America

to represent the undersigned before

- all the competent International Authorities
 the International Searching Authority only
 the Authority specified for supplementary search only
(please indicate the Authority(ies) specified for supplementary search)
 the International Preliminary Examining Authority only

in connection with the international application identified below:



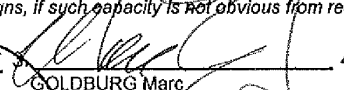
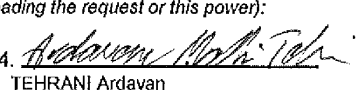
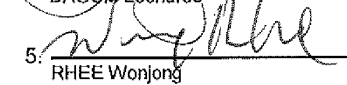
Title of the Invention: METHOD AND SYSTEM FOR PERFORMANCE ANALYSIS OF A COMMUNICATION SYSTEM, DEVICE, OR LINK USING A DOWNLOADABLE AGENT

Applicant's or agent's file reference: 8241P073PCT

International application number (if already available): PCT/US2012/057152

filed with the following Office United States of America (US) as receiving Office and to make or receive payments on behalf of the undersigned.

Signature of the applicant(s) (where there are several applicants, each of them must sign next to each signature, indicate the name of the person sign and the capacity in which the person signs, if such capacity is not obvious from reading the request or this power):

1.  DAGUM Leonardo	2.  BEDNARZ Philip	3.  GOLDBURG Marc	4.  TEHRANI Ardavan
5.  RHEE Wonjong	6. _____	7. _____	8. _____
9. _____	10. _____	11. _____	12. _____

Date: 11/15/2012

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Leonardo Dagum et al.

Application No.:

Filed:

For: METHOD AND SYSTEM FOR
USING A DOWNLOADABLE
AGENT FOR A COMMUNICATION
SYSTEM, DEVICE, OR LINK

Examiner:

Art Group:

Confirmation No.:

Mail Stop PCT

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

Prior to examination, please amend the above-referenced application as follows.

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

Amendments to the Claims begin on page **3** of this paper.

Remarks/Arguments begin on page **20** of this paper.

Conclusion begins on page **21** of this paper.

Amendments to the Specification:

Please add the following heading and new paragraph at page 1, after the title of the application:

CROSS-REFERENCE TO RELATED APPLICATIONS

[0000] This application is the U.S. National Phase of International Application No. PCT/US2012/057152, filed September 25, 2012, and claims the benefit of U.S. Provisional Application No. 61/671,672, filed July 13, 2012, the disclosures of both of which are incorporated herein by reference in their entirety for all purposes.

Amendments to the Claims:

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

Listing of Claims:

1. (Original) A method performed by a downloadable agent, the method comprising:
 - collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
 - transmitting the WAN performance information to a machine, wherein the machine is operable to:
 - store the WAN performance information in a database associated with the machine,
 - analyze the WAN performance information to generate an analysis result; and
 - report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.
2. (Original) The method of claim 1, wherein the other device is a router.
3. (Original) The method of claim 1, wherein the machine is operable to store the WAN performance information with an associated timestamp.
4. (Original) The method of claim 1 wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.
5. (Original) The method of claim 4 further comprises transmitting by the downloadable agent the LAN performance data to the machine.

6. (Original) The method of claim 1, wherein the downloadable agent is executable in a virtual machine on the computing device.
7. (Canceled)
8. (Original) The method of claim 1 further comprises receiving the analysis result, wherein receiving the analysis result comprises at least one of:
 - receiving statistical analysis including throughput;
 - receiving availability of higher bandwidth for operating a DSL service;
 - receiving service product information for improving DSL service performance; or
 - receiving utilization information for optimizing a consumers DSL service cost.
9. (Original) The method of claim 1, wherein the WAN performance information includes at least one of:
 - topological information,
 - geographical information,
 - throughput,
 - latency,
 - jitter,
 - packet loss,
 - time,
 - type of communication device,
 - device network identification,
 - manufacturer and model of equipment,
 - equipment characteristics,
 - firmware,
 - user's network usage pattern,
 - user's provisioned WAN service,

RF characteristics including at least one of: signal power, frequency bands and mode of operation,
environment statistics, or
data on operation of communication devices.

10. (Original) The method of claim 1 further comprises:

sending an on-demand change request associated with at least one of:
throughput, or latency.

11. (Original) The method of claim 1, wherein the machine is a server that resides in a cloud.

12. (Original) The method of claim 1, wherein the computing device is one of:

tablet computing device;
a personal computer;
a gaming console;
an access point (AP);
a base station;
a wireless smartphone device;
a wireless LAN device;
an access gateway;
a router;
a performance enhancement device;
a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;

an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; and
internet enabled cameras.

13. (Original) The method of claim 1, wherein the downloadable agent is executable on an Internet browser.
14. (Original) The method of claim 1, wherein the downloadable agent is accessible remotely via the Internet.
15. (Original) The method of claim 1 further comprises periodically sending collected WAN performance information to the machine.
16. (Original) The method of claim 1 further comprises waiting for a predetermined condition or threshold to be satisfied before sending collected WAN performance information to the machine.

17. (Original) The method of claim 16, where the predetermined condition or threshold is at least one of:
- a function of a type of data collected, or
 - limit or threshold on a performance level associated with the collected data.
18. (Original) The method of claim 1, wherein the machine is operable to collect WAN performance information by polling or scheduled based system.
19. (Original) The method of claim 1 further comprises collecting data from at least one of:
- National Weather Service;
 - radio station; or
 - operator.
20. (Canceled)
21. (Original) A system comprising:
- a database; and
 - a server coupled to the database, the server operable to:
 - receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
 - store the WAN performance information in the database associated with the server,
 - analyze the WAN performance information to generate an analysis result;
 - and
 - report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

22. (Original) The system of claim 21, wherein the server resides in a cloud.
23. (Original) The system of claim 21, wherein the server is operable to store the WAN performance information with an associated timestamp.
24. (Original) The system of claim 21, wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.
25. (Original) The system of claim 24, wherein the server is operable to receive from the downloadable agent the LAN performance data.
26. (Original) The system of claim 25, wherein the server comprises:
a first module for collecting the WAN performance information;
a second module for performing statistical analysis using the first WAN performance information; and
a third module for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider..
27. (Original) The system of claim 26, wherein the modules that receive the instruction and command from the third module are accessible by internet.
28. (Original) The system of claim 26, wherein the server comprises:
a management interface for communicating with the downloadable agent via internet.
29. (Original) The system of claim 26, wherein the server comprises:
a user interface module for providing access and for displaying information associated with the first, second, third modules.

30. (Original) The system of claim 21, wherein the server is operable to compute throughput of DSL connection by collecting current performance metrics associated with DSL service.
31. (Original) The system of claim 30, wherein the server to perform throughput computation with reference to a website.
32. (Original) The system of claim 31, wherein the throughput computation comprises probing a network.
33. (Original) The system of claim 21, wherein the downloadable agent is executable in a virtual machine on the computing device.
34. (Original) The system of claim 21, wherein the downloadable agent is dynamically downloaded to the computing device.
35. (Original) The system of claim 21, wherein the server is operable to report the analysis result by performing at least one of:
 sending statistical analysis including throughput;
 sending availability of higher bandwidth for operating a DSL service;
 sending service product information for improving DSL service performance; or
 sending utilization information for optimizing a consumers DSL service cost.
36. (Original) The system of claim 21, wherein the WAN performance information includes at least one of:
 topological information,
 geographical information,
 time,
 throughput,

latency,
jitter,
packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency bands
and mode of operation,
environment statistics, or
data on operation of communication devices.

37. (Original) The system of claim 21, wherein the server is operable to receive an on-demand change request associated with at least one of: throughput, or latency.

38. (Original) The system of claim 21, wherein the computing device is one of:
tablet computing device;
an access point (AP);
a base station;
a wireless smartphone device;
a wireless LAN device;
an access gateway;
a router,
a performance enhancement device;
a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;

an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; and
internet enabled cameras.

39. (Original) The system of claim 21, wherein the server is operable to provide a marketplace of ideas for the communication devices for trading bandwidth for media services.

40. (Original) The system of claim 21, wherein the server is operable to collect WAN performance information by polling or scheduled based system.

41. (Original) A method comprising:

receiving first information from a first downloadable agent;
receiving second information from a second downloadable agent;
storing the first and second information in a database;
analyzing the first and second information with reference to data already
stored in the database; and
reporting the analyzed first and second information to a management
entity.

42. (Original) The method of claim 41, wherein the first and second information are time stamped.
43. (Original) The method of claim 41, wherein the first and second agents are executable on multiple computing machines.
44. (Original) The method of claim 41, wherein the first downloadable agent is communicatively coupled to a first LAN device.
45. (Original) The method of claim 44, wherein the first downloadable agent is operable to collect information from multiple computing entities coupled to the first LAN device.
46. (Original) The method of claim 44, wherein the second downloadable agent is communicatively coupled to a second LAN device.
47. (Original) The method of claim 46, wherein the second downloadable agent is operable to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.
48. (Original) The method of claim 47, wherein the first and second LAN devices comprise at least one of:
an access point (AP);

a base station;
a wireless smartphone device;
a wireless LAN device;
a router
an access gateway;
a performance enhancement device;
a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE)
modem;
a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;

wearable device; and
internet enabled cameras.

49. (Original) The method of claim 41, wherein the first and second downloadable agents execute on devices coupled to the same LAN.

50. (Original) The method of claim 41, wherein the first and second downloadable agents execute on devices coupled to distinct LANs.

51. (Original) The method of claim 50 further comprises:
processing data from the distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by corresponding first or second downloadable agents.

52. (Original) The method of claim 50 further comprises:
processing data from the distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN.

53. (Canceled)

54. (Original) The method of claim 41 further comprises:
determining control information for a DSL operator, the control information according to the analyzed first and second information; and
recommending the DSL operator with the control information to improve performance of a DSL service.

55. (Original) The method of claim 54, wherein the control information includes at least one or more of signals or commands related to:

power,
spectrum control,
margin, data rate,
latency/delay, or
coding.

56. (Original) The method of claim 54, wherein the control information relates to on-demand change in performance of the DSL service.

57. (Original) The method of claim 56, wherein the on-demand change is associated with at least one of:

throughput,
latency,
packet loss, or
jitter.

58. (Original) The method of claim 41, wherein reporting comprises at least one of:
providing statistical analysis including throughput;
providing availability of higher bandwidth for operating a DSL service;
providing service product information for improving DSL service performance; or
providing utilization information for optimizing a consumers DSL service cost.

59. (Original) The method of claim 41, wherein receiving the first and second information is via Internet.

60. (Original) The method of claim 41, wherein the first and second information includes at least one of:

topological information,
geographical information,
time,

throughput,
latency,
jitter,
packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency bands
and mode of operation,
environment statistics, or
data on operation of communication devices.

61. (Original) The method of claim 41, wherein analyzing the first information with reference to the second information comprises at least one of:
- performing statistical analysis including throughput;
 - determining availability of higher bandwidth for operating a DSL service;
 - determining service product information for improving DSL service performance;
 - determining utilization information for optimizing a consumers DSL service cost; or
 - grouping data in the database according to at least one of geographical location, services type, service provider, or time.

62. – 87. (Canceled)

88. (Original) A method performed by a downloadable agent on a processor, the method comprising:
- collecting first information related to performance of a network device

associated with the downloadable agent;

sending the first information to a machine, wherein the first information is stored in a database coupled to the machine, and wherein the machine is operable to:

receive second information from another downloadable agent; and
analyze the first and second information with reference to data already stored in the database; and
receiving a report of the analyzed first and second information.

89. (Original) The method of claim 88, wherein the first and second information is time stamped.

90. – 96. (Canceled)

97. (Original) The method of claim 88, wherein the first and second information include at least one of:

topological information,
geographical information,
time,
throughput,
latency,
jitter,
packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency bands and mode of operation,

environment statistics, or
data on operation of communication devices.

98. (Original) The method of claim 88 further comprises:
 sending an on-demand change request associated with at least one of:
 throughput, or latency.
99. (Original) The method of claim 88, wherein receiving the report comprises at
least one of:
 receiving statistical analysis including throughput;
 receiving availability of higher bandwidth for operating a DSL service;
 receiving service product information for improving DSL service
performance; or
 receiving utilization information for optimizing a consumers DSL service
cost.
100. (Original) The method of claim 88, wherein the machine is operable to:
 process data from distinct LANs separately to produce analyses and
 recommendations for each LAN, among the distinct LANs, according to
 measurements made by respective downloadable agents coupled to respective
 distinct LANs.
101. (Original) The method of claim 88, wherein the machine is operable to:
 process data from distinct LANs jointly to produce analyses and
 recommendations for each LAN, among the distinct LANs, according to data
 reported from each LAN for which analyses and recommendations are being
 created and from other LANs different from that LAN.
102. (Canceled)
103. (Original) The method of claim 88, wherein the downloadable agent is
executable on an Internet browser.

104. (Original) The method of claim 88, wherein the downloadable agent is accessible remotely via the Internet.
105. (Original) The method of claim 88 further comprises periodically sending collected first information to the machine.
106. (Original) The method of claim 88 further comprises waiting for a predetermined condition or threshold to be satisfied before sending the first information to the machine.
107. (Original) The method of claim 106, where the predetermined condition or threshold is at least one of:
a function of a type of data collected, or
limit or threshold on a performance level associated with the collected data.
108. (Original) The method of claim 88, wherein the machine is operable the first information by polling or scheduled based system.
109. (Original) The method of claim 1 further comprises collecting data from at least one of:
National Weather Service;
radio station; or
operator.
110. (Canceled)

REMARKS

With the Preliminary Amendment, the specification has been amended to include a priority claim. Claims 7, 20, 53, 62-87, 90-96, 102, and 110 have been canceled. No new matter has been added.

CONCLUSION

The Examiner is respectfully requested to contact the undersigned by telephone if such contact would further the examination of the present application.

Please charge any shortages and credit any overcharges to our Deposit Account number 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN, LLP

Date: January 12, 2015

/Gregory D. Caldwell/

Gregory D. Caldwell
Reg. No. 39,926
Attorney for Applicants

1279 Oakmead Parkway
Sunnyvale, CA 94085-4040
(503) 439-8778

I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.

January 12, 2015

Date

/Lisa Bennett/

Lisa Bennett

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	8241P073
		Application Number	
Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1					<input type="button" value="Remove"/>
Applicant Authority		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117	
				<input type="radio"/> Party of Interest under 35 U.S.C. 118	
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Leonardo		Dagum		
Residence Information (Select One)					
		<input checked="" type="radio"/> US Residency		<input type="radio"/> Non US Residency	
				<input type="radio"/> Active US Military Service	
City	Redwood City	State/Province	CA	Country of Residence i	US
Citizenship under 37 CFR 1.41(b) i		US			
Mailing Address of Applicant:					
Address 1	133 Woodsworth Avenue				
Address 2					
City	Redwood City	State/Province	CA		
Postal Code	94062	Country i	US		
Applicant 2					<input type="button" value="Remove"/>
Applicant Authority		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117	
				<input type="radio"/> Party of Interest under 35 U.S.C. 118	
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Philip		Bednarz		
Residence Information (Select One)					
		<input checked="" type="radio"/> US Residency		<input type="radio"/> Non US Residency	
				<input type="radio"/> Active US Military Service	
City	Palo Alto	State/Province	CA	Country of Residence i	US
Citizenship under 37 CFR 1.41(b) i		US			
Mailing Address of Applicant:					
Address 1	731 Holly Oak				
Address 2					
City	Palo Alto	State/Province	CA		
Postal Code	94303	Country i	US		
Applicant 3					<input type="button" value="Remove"/>
Applicant Authority		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117	
				<input type="radio"/> Party of Interest under 35 U.S.C. 118	
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Marc		Goldburg		
Residence Information (Select One)					
		<input checked="" type="radio"/> US Residency		<input type="radio"/> Non US Residency	
				<input type="radio"/> Active US Military Service	
City	Redwood City	State/Province	CA	Country of Residence i	US

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	8241P073	
		Application Number		
Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
Citizenship under 37 CFR 1.41(b) i	US			
Mailing Address of Applicant:				
Address 1	226 Hillsdale Way			
Address 2				
City	Redwood City	State/Province	CA	
Postal Code	94062	Country ⁱ	US	
Applicant 4				<input type="button" value="Remove"/>
Applicant Authority	<input checked="" type="radio"/> Inventor	<input type="radio"/> Legal Representative under 35 U.S.C. 117	<input type="radio"/> Party of Interest under 35 U.S.C. 118	
Prefix	Given Name	Middle Name	Family Name	Suffix
	Ardavan	Maleki	Tehrani	
Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service				
City	Menlo Park	State/Province	CA	Country of Residence ⁱ
				US
Citizenship under 37 CFR 1.41(b) i	US			
Mailing Address of Applicant:				
Address 1	350 Sharon Park Drive, R-24			
Address 2				
City	Menlo Park	State/Province	CA	
Postal Code	94025	Country ⁱ	US	
Applicant 5				<input type="button" value="Remove"/>
Applicant Authority	<input checked="" type="radio"/> Inventor	<input type="radio"/> Legal Representative under 35 U.S.C. 117	<input type="radio"/> Party of Interest under 35 U.S.C. 118	
Prefix	Given Name	Middle Name	Family Name	Suffix
	Wonjong		Rhee	
Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service				
City	San Francisco	State/Province	CA	Country of Residence ⁱ
				US
Citizenship under 37 CFR 1.41(b) i	KR			
Mailing Address of Applicant:				
Address 1	235 Berry Street, Apt. 606			
Address 2				
City	San Francisco	State/Province	CA	
Postal Code	94158	Country ⁱ	US	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.				<input type="button" value="Add"/>

Correspondence Information:

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For further information see 37 CFR 1.33(a).

An Address is being provided for the correspondence information of this application.

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	8241P073
		Application Number	
Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK		
Email Address	MAIL@BSTZ.com	<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

Application Information:

Title of the Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK		
Attorney Docket Number	8241P073	Small Entity Status Claimed	<input type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	11	Suggested Figure for Publication (if any)	

Publication Information:

<input type="checkbox"/> Request Early Publication (Fee required at time of Request 37 CFR 1.219)
<input type="checkbox"/> Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.			
Please Select One:	<input checked="" type="radio"/> Customer Number	<input type="radio"/> US Patent Practitioner	<input type="radio"/> Limited Recognition (37 CFR 11.9)
Customer Number	08791		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.			
Prior Application Status	Pending	<input type="button" value="Remove"/>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	a 371 of international	PCT/US2012/057152	2012-09-25
Prior Application Status	Expired	<input type="button" value="Remove"/>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
PCT/US2012/057152	non provisional of	61671672	2012-07-13

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	8241P073
	Application Number	
Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK	

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

<input type="button" value="Remove"/>			
Application Number	Country ⁱ	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			<input checked="" type="radio"/> Yes <input type="radio"/> No

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

<input type="button" value="Remove"/>			
Assignee 1			
If the Assignee is an Organization check here. <input checked="" type="checkbox"/>			
Organization Name	Adaptive Spectrum and Signal Alignment, Inc.		
Mailing Address Information:			
Address 1	333 Twin Dolphin Drive		
Address 2			
City	Redwood City	State/Province	CA
Country ⁱ	US	Postal Code	94065-1417
Phone Number		Fax Number	
Email Address			
Additional Assignee Data may be generated within this form by selecting the Add button.			
<input type="button" value="Add"/>			

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/Gregory D. Caldwell/		Date (YYYY-MM-DD)	2015-01-12
First Name	Gregory D.	Last Name	Caldwell	Registration Number
				39926

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	8241P073
		Application Number	
Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK		

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application No.	
	Filing Date	
	First Inventor	Leonardo Dagum, et al.
	Art Unit	
	Examiner Name	
	Attorney Docket No.	8241P073

DUTY OF DISCLOSURE STATEMENT

In accordance with the duty of disclosure, enclosed is a copy of an Information Disclosure Statement (IDS) Citation Form PTO/SB/08 or PTO-1449, together with copies of the documents cited on that form, except for copies not required to be submitted (e.g., copies of U.S. patents and U.S. published patent applications need not be enclosed). This IDS and IDS Citation Form are being submitted concurrently with the US National Stage Application of PCT. It is respectfully requested that the cited references be considered and that the enclosed copy of PTO/SB/08 be initialed by the Examiner to indicate such consideration and a copy thereof returned to applicant(s).

The submission of this Information Disclosure Statement is not to be construed as a representation that a search has been made in the subject application and is not to be construed as an admission that the information cited in this statement is material to patentability.

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).
- OR**
- None
- The IDS Filing Fee in the amount of \$180.00 as set forth in 37 CFR 1.17(p) has been submitted herewith.
- It is requested that any requisite fees be debited from Deposit Account 02-2666.

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 signature.

Signature	/Gregory D. Caldwell/	Date (MM-DD-YYYY)	01-12-2015
Name/Print	Gregory D. Caldwell	Registration Number	39,926

I hereby certify that this correspondence is being submitted electronically via EFS Web on the date shown below.

/Lisa Bennett/

Lisa Bennett

Date 01-12-15

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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PCT

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OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

MUGHAL, Usman A.
Blakely, Sokoloff, Taylor & Zafman
1279 Oakmead Parkway
Sunnyvale, California 94085-4040
ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year) 18 November 2013 (18.11.2013)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 8241P073PCTD	
International application No. PCT/US2012/057152	International filing date (day/month/year) 25 September 2012 (25.09.2012)

1. The following indications appeared on record concerning:

the applicant the inventor the agent the common representative

Name and Address MUGHAL, Usman A. Blakely, Sokoloff, Taylor & Zafman 1279 Oakmead Parkway Sunnyvale, California 94085-4040 United States of America	State of Nationality	State of Residence
	Telephone No. (408) 720-8300	
	Facsimile No. (408) 720-8383	
	E-mail address intel_foreign_docs@bstz.com	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

the person the name the address the nationality the residence

Name and Address MUGHAL, Usman A. Blakely, Sokoloff, Taylor & Zafman 1279 Oakmead Parkway Sunnyvale, California 94085-4040 United States of America	State of Nationality	State of Residence
	Telephone No. (408) 720-8300	
	Facsimile No. (408) 720-8383	
	E-mail address mail@bstz.com <input checked="" type="checkbox"/> Notifications by e-mail authorized	

3. Further observations, if necessary:
Please note the change of e-mail address.

4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the International Preliminary Examining Authority
<input type="checkbox"/> the International Searching Authority	<input type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the Authority(ies) specified for supplementary search	<input type="checkbox"/> the elected Offices concerned
	<input type="checkbox"/> other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Barras Alexandra e-mail pt07.pct@wipo.int Telephone No. +41 22 338 74 07
Facsimile No. +41 22 338 90 30	

ADVANCE E-MAIL

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

MUGHAL, Usman A.
Blakely, Sokoloff, Taylor & Zafman
1279 Oakmead Parkway
Sunnyvale, California 94085-4040
ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year) 09 January 2013 (09.01.2013)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 8241P073PCTD	
International application No. PCT/US2012/057152	International filing date (day/month/year) 25 September 2012 (25.09.2012)

1. The following indications appeared on record concerning:

the applicant the inventor the agent the common representative

Name and Address	State of Nationality	State of Residence
	Telephone No.	
	Facsimile No.	
	E-mail address	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

the person the name the address the nationality the residence

Name and Address RHEE, Wonjong 235 Berry Street, Apt 606 San Francisco, CA 94158 United States of America	State of Nationality KR	State of Residence US
	Telephone No.	
	Facsimile No.	
	E-mail address <input type="checkbox"/> Notifications by e-mail authorized	

3. Further observations, if necessary:
The person identified in Box 2 has been added as applicant and inventor for all designated States.

4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the International Preliminary Examining Authority
<input checked="" type="checkbox"/> the International Searching Authority	<input type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the Authority(ies) specified for supplementary search	<input type="checkbox"/> the elected Offices concerned
	<input type="checkbox"/> other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Feuillassier Anne e-mail pt07.pct@wipo.int Telephone No. +41 22 338 74 07
Facsimile No. +41 22 338 90 90	

ADVANCE E-MAIL

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

MUGHAL, Usman A.
Blakely, Sokoloff, Taylor & Zafman
1279 Oakmead Parkway
Sunnyvale, California 94085-4040
ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year) 09 January 2013 (09.01.2013)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 8241P073PCTD	
International application No. PCT/US2012/057152	International filing date (day/month/year) 25 September 2012 (25.09.2012)

1. The following indications appeared on record concerning:

the applicant the inventor the agent the common representative

Name and Address	State of Nationality	State of Residence
	Telephone No.	
	Facsimile No.	
	E-mail address	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

the person the name the address the nationality the residence

Name and Address ADAPTIVE SPECTRUM AND SIGNAL ALIGNMENT, INC. 333 Twin Dolphin Drive Redwood City, CA 94065-1417 United States of America	State of Nationality US	State of Residence US
	Telephone No.	
	Facsimile No.	
	E-mail address <input type="checkbox"/> Notifications by e-mail authorized	

3. Further observations, if necessary:
The person identified in Box 2 has been added as applicant for all designated States.

4. A copy of this notification has been sent to:

the receiving Office the International Preliminary Examining Authority
 the International Searching Authority the designated Offices concerned
 the Authority(ies) specified for supplementary search the elected Offices concerned
 other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Feuillassier Anne e-mail pt07.pct@wipo.int Telephone No. +41 22 338 74 07
---	--

Facsimile No. +41 22 338 90 90
Form PCT/IB/306 (January 2009)

I/JCJFSC2Z9K50

Box No. VIII (iv) **DECLARATION: INVENTORSHIP** (only for the purposes of the designation of the United States of America)
The declaration must conform to the following standardized wording provided for in Section 214; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (iv). If this Box is not used, this sheet should not be included in the request.

**Declaration of inventorship (Rules 4.17(iv) and 51bis.1(a)(iv))
for the purposes of the designation of the United States of America;**

I hereby declare that I believe I am the original, first and sole (if only one inventor is listed below) or joint (if more than one inventor is listed below) inventor of the subject matter which is claimed and for which a patent is sought.

This declaration is directed to the international application of which it forms a part (if filing declaration with application).

This declaration is directed to international application No. PCT/US12/057152 (if furnishing declaration pursuant to Rule 26ter).

I hereby declare that my residence, mailing address, and citizenship are as stated next to my name.

I hereby state that I have reviewed and understand the contents of the above-identified international application, including the claims of said application. I have identified in the request of said application, in compliance with PCT Rule 4.10, any claim to foreign priority, and I have identified below, under the heading "Prior Applications," by application number, country or Member of the World Trade Organization, day, month and year of filing, any application for a patent or inventor's certificate filed in a country other than the United States of America, including any PCT international application designating at least one country other than the United States of America, having a filing date before that of the application on which foreign priority is claimed.

Prior Applications: US Provisional Patent Application No. 61/671,672 filed July 13, 2012

I hereby acknowledge the duty to disclose information that is known by me to be material to patentability as defined by 37 C.F.R. § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the PCT international filing date of the continuation-in-part application.

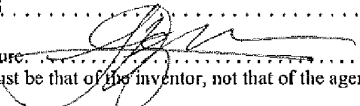
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment,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

Name: Leonardo Dagum

Residence: Redwood City, CA, US
(city and either US state, if applicable, or country)

Mailing Address: 133 Woodsworth Avenue
Redwood City, CA 94062 US

Citizenship: US

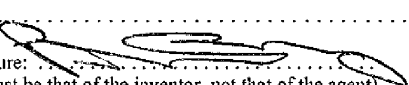
Inventor's Signature:  Date: 11/15/2012

Name: Phillip Bednatz

Residence: Palo Alto, CA US
(city and either US state, if applicable, or country)

Mailing Address: 731 Holly Oak
Palo Alto, CA 94303 US

Citizenship: US

Inventor's Signature:  Date: 11/15/12

This declaration is continued on the following sheet, "Continuation of Box No. VIII (iv)".

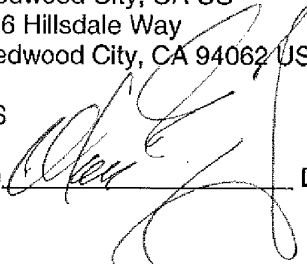
Box No. VIII (i) DECLARATION: IDENTITY OF THE INVENTOR

The declaration must conform to the standardized wording provided for in Section 211; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (i). If this Box is not used, this sheet should not be included in the request.

Declaration as to the identity of the inventor (Rules 4.17(i) and 51bis.1(a)(i)):

Name: Marc Goldberg
Residence: Redwood City, CA US
Mailing Address: 226 Hillsdale Way
Redwood City, CA 94062 US

Citizenship: US

Inventor's Signature  Date: 11/16/2012

Name: Ardavan Maleki Tehrani
Residence: Menlo Park, CA US
Mailing Address: 350 Sharon Park Drive R-24
Menlo Park, CA 94025 US

Citizenship: US

Inventor's Signature  Date: 11/15/2012

Name: Wonjong Rhee
Residence: San Francisco, CA US
Mailing Address: 235 Berry Street, Apt. 606
San Francisco, CA 94158 US

Citizenship: Republic of Korea

Inventor's Signature  Date: 11/15/2012

This declaration is continued on the following sheet, "Continuation of Box No. VIII (i)".

PCT REQUESTOriginal (for **SUBMISSION**)

0	For receiving Office use only	
0-1	International Application No.	PCT/US12/57152
0-2	International Filing Date	25 SEPT 2012 25.09.2012
0-3	Name of receiving Office and "PCT International Application"	PCT INTERNATIONAL APPLICATION RO/US
0-4	Form PCT/RO/101 PCT Request	
0-4-1	Prepared Using	PCT-SAFE [EASY mode] Version 3.51.054.230 MT/FOP 20120401/0.20.5.19
0-5	Petition	
	The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	United States Patent and Trademark Office (USPTO) (RO/US)
0-7	Applicant's or agent's file reference	8241P073PCTD
I	Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
II	Applicant	
II-1	This person is	Applicant and inventor
II-2	Applicant for	All designated States
II-4	Name (LAST, First)	DAGUM, Leonardo
II-5	Address	133 Woodsworth Avenue Redwood City, California 94062 United States of America
II-6	State of nationality	CA
II-7	State of residence	US
III-1	Applicant and/or inventor	
III-1-1	This person is	Applicant and inventor
III-1-2	Applicant for	All designated States
III-1-4	Name (LAST, First)	BEDNARZ, Philip
III-1-5	Address	731 Holly Oak Palo Alto, California 94303 United States of America
III-1-6	State of nationality	US
III-1-7	State of residence	US

PCT REQUESTOriginal (for **SUBMISSION**)

III-2	Applicant and/or inventor	
III-2-1	This person is	Applicant and inventor
III-2-2	Applicant for	All designated States
III-2-4	Name (LAST, First)	GOLDBURG, Marc
III-2-5	Address	226 Hillsdale Way Redwood City, California 94062 United States of America
III-2-6	State of nationality	US
III-2-7	State of residence	US
III-3	Applicant and/or inventor	
III-3-1	This person is	Applicant and inventor
III-3-2	Applicant for	All designated States
III-3-4	Name (LAST, First)	MALEKI, Ardavan
III-3-5	Address	350 Sharon Park Drive R-24 Menlo Park, California 94025 United States of America
III-3-6	State of nationality	US
III-3-7	State of residence	US
IV-1	Agent or common representative; or address for correspondence	
	The person identified below is hereby/ has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	Agent
IV-1-1	Name (LAST, First)	MUGHAL, Usman A.
IV-1-2	Address	Blakely, Sokoloff, Taylor & Zafman 1279 Oakmead Parkway Sunnyvale, California 94085-4040 United States of America
IV-1-3	Telephone No.	(408) 720-8300
IV-1-4	Facsimile No.	(408) 720-8383
IV-1-5	e-mail	Intel_Foreign_Docs@BSTZ.com
IV-1-5(a))	E-mail authorization The receiving Office, the International Searching Authority, the International Bureau and the International Preliminary Examining Authority are authorized to use this e-mail address, if the Office or Authority so wishes, to send notifications issued in respect of this international application:	as advance copies followed by paper notifications
IV-1-6	Agent's registration No.	62887
IV-2	Additional agent(s)	
IV-2-1	Name(s)	additional agent(s) with same address as first named agent CALDWELL, Gregory, D. (39962); HOWARD, James (56, 377)

PCT REQUESTOriginal (for **SUBMISSION**)

V	DESIGNATIONS	
V-1	The filing of this request constitutes under Rule 4.9(a), the designation of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.	
VI-1	Priority claim of earlier national application	
VI-1-1	Filing date	13 July 2012 (13.07.2012)
VI-1-2	Number	61/671,672
VI-1-3	Country	US
VI-2	Priority document request	
	The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s):	VI-1
VI-3	Incorporation by reference :	
	where an element of the international application referred to in Article 11(1)(iii)(d) or (e) or a part of the description, claims or drawings referred to in Rule 20.5(a) is not otherwise contained in this international application but is completely contained in an earlier application whose priority is claimed on the date on which one or more elements referred to in Article 11(1)(iii) were first received by the receiving Office, that element or part is, subject to confirmation under Rule 20.6, incorporated by reference in this international application for the purposes of Rule 20.6.	
VII-1	International Searching Authority Chosen	European Patent Office (EPO) (ISA/EP)
VIII	Declarations	Number of declarations
VIII-1	Declaration as to the identity of the inventor	—
VIII-2	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	—
VIII-3	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	—
VIII-4	Declaration of inventorship (only for the purposes of the designation of the United States of America)	—
VIII-5	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	—

PCT REQUESTOriginal (for **SUBMISSION**)

IX	Check list	Number of sheets	Electronic file(s) attached
IX-1	Request (including declaration sheets)	4	✓
IX-2	Description	40	–
IX-3	Claims	24	–
IX-4	Abstract	1	✓
IX-5	Drawings	11	–
IX-7	TOTAL	80	
	Accompanying Items	Paper document(s) attached	Electronic file(s) attached
IX-8	Fee calculation sheet	✓	–
IX-18	PCT-SAFE physical media	–	✓
IX-20	Figure of the drawings which should accompany the abstract	1	
IX-21	Language of filing of the international application	English	
X-1	Signature of applicant, agent or common representative	/Mughal, Usman A./	
X-1-1	Name (LAST, First)	MUGHAL, Usman A.	
X-1-2	Name of signatory		
X-1-3	Capacity (if such capacity is not obvious from reading the request)		

FOR RECEIVING OFFICE USE ONLY

25.09.12

10-1	Date of actual receipt of the purported international application	25 SEPT 2012
10-2	Drawings:	
10-2-1	Received	
10-2-2	Not received	
10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application	
10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	ISA/EP
10-6	Transmittal of search copy delayed until search fee is paid	

FOR INTERNATIONAL BUREAU USE ONLY

11-1	Date of receipt of the record copy by the International Bureau	
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ADVANCE E-MAIL

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

MUGHAL, Usman A.
Blakely, Sokoloff, Taylor & Zafman
1279 Oakmead Parkway
Sunnyvale, California 94085-4040
ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year) 09 January 2013 (09.01.2013)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 8241P073PCTD	
International application No. PCT/US2012/057152	International filing date (day/month/year) 25 September 2012 (25.09.2012)

1. The following indications appeared on record concerning:

the applicant the inventor the agent the common representative

Name and Address MALEKI, Ardavan 350 Sharon Park Drive R-24 Menlo Park, California 94025 United States of America	State of Nationality US	State of Residence US
	Telephone No.	
	Facsimile No.	
	E-mail address	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

the person the name the address the nationality the residence

Name and Address TEHRANI, Ardavan Maleki 350 Sharon Park Drive R-24 Menlo Park, California 94025 United States of America	State of Nationality US	State of Residence US
	Telephone No.	
	Facsimile No.	
	E-mail address <input type="checkbox"/> Notifications by e-mail authorized	

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the International Preliminary Examining Authority
<input checked="" type="checkbox"/> the International Searching Authority	<input type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the Authority(ies) specified for supplementary search	<input type="checkbox"/> the elected Offices concerned
	<input type="checkbox"/> other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Feuillassier Anne e-mail pt07.pct@wipo.int Telephone No. +41 22 338 74 07
Facsimile No. +41 22 338 90 90	

492109

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

October 03, 2012

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE.

APPLICATION NUMBER: 61/671,672

FILING DATE: July 13, 2012

RELATED PCT APPLICATION NUMBER: PCT/US12/57152

THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS US61/671,672



Certified by

David J. Kayes

Under Secretary of Commerce
for Intellectual Property
and Director of the United States
Patent and Trademark Office

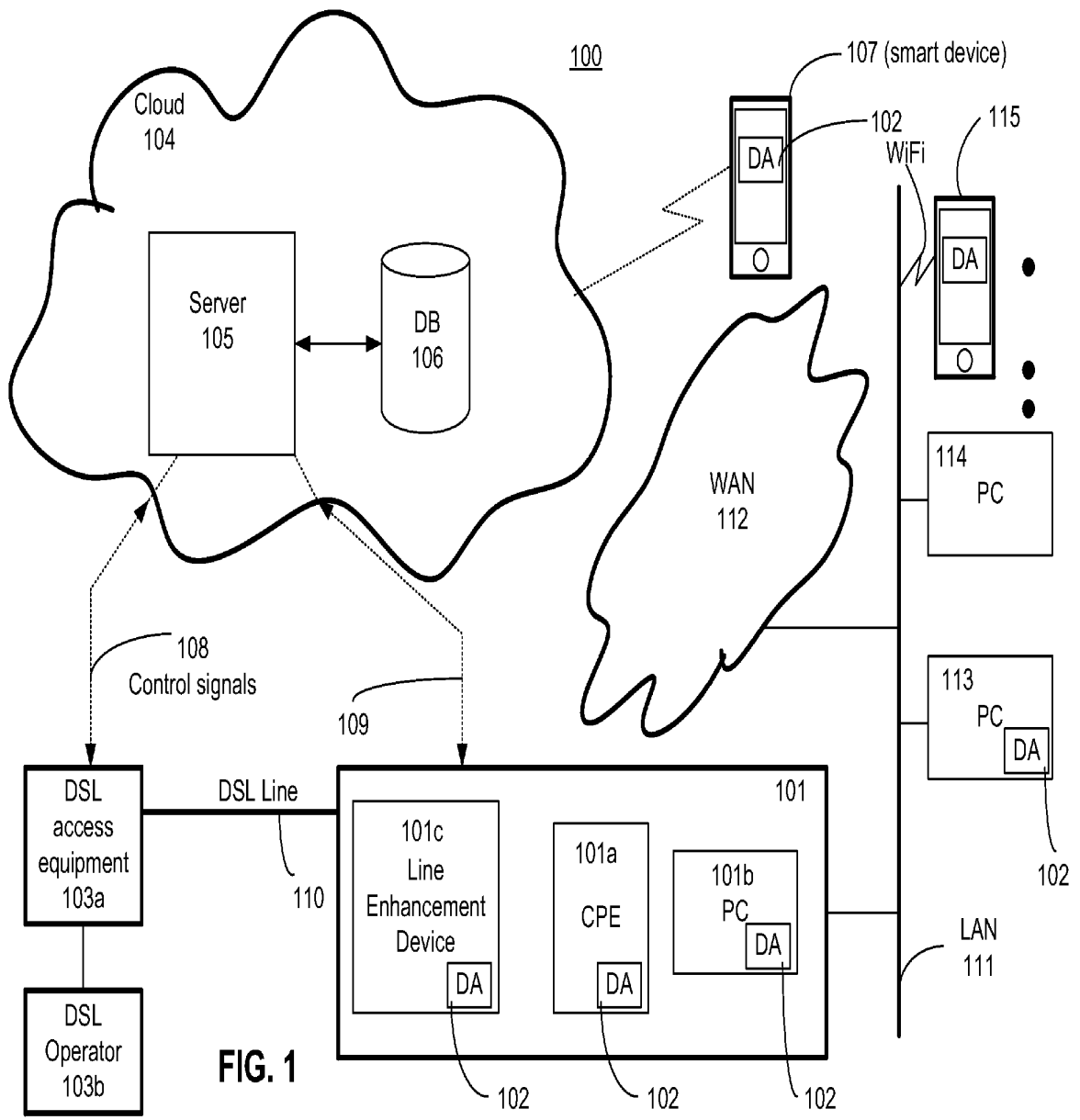


FIG. 1

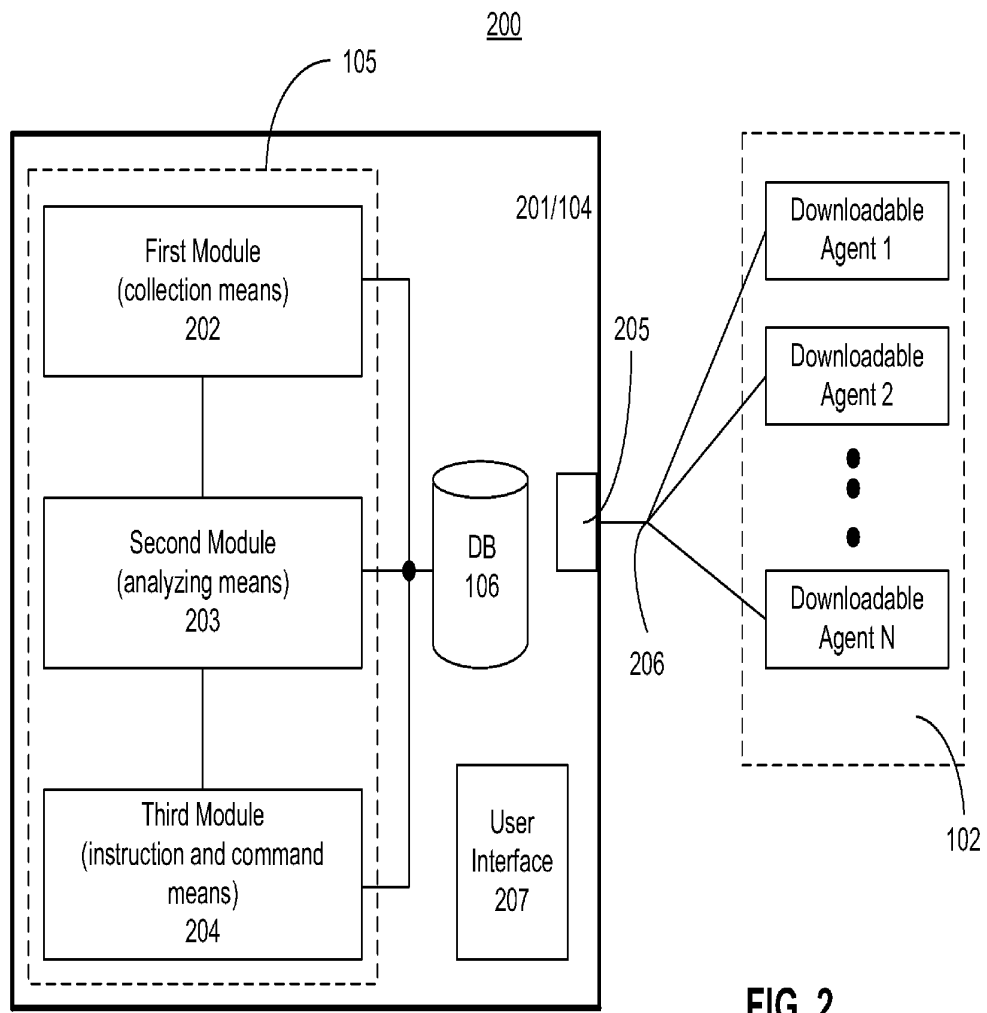


FIG. 2

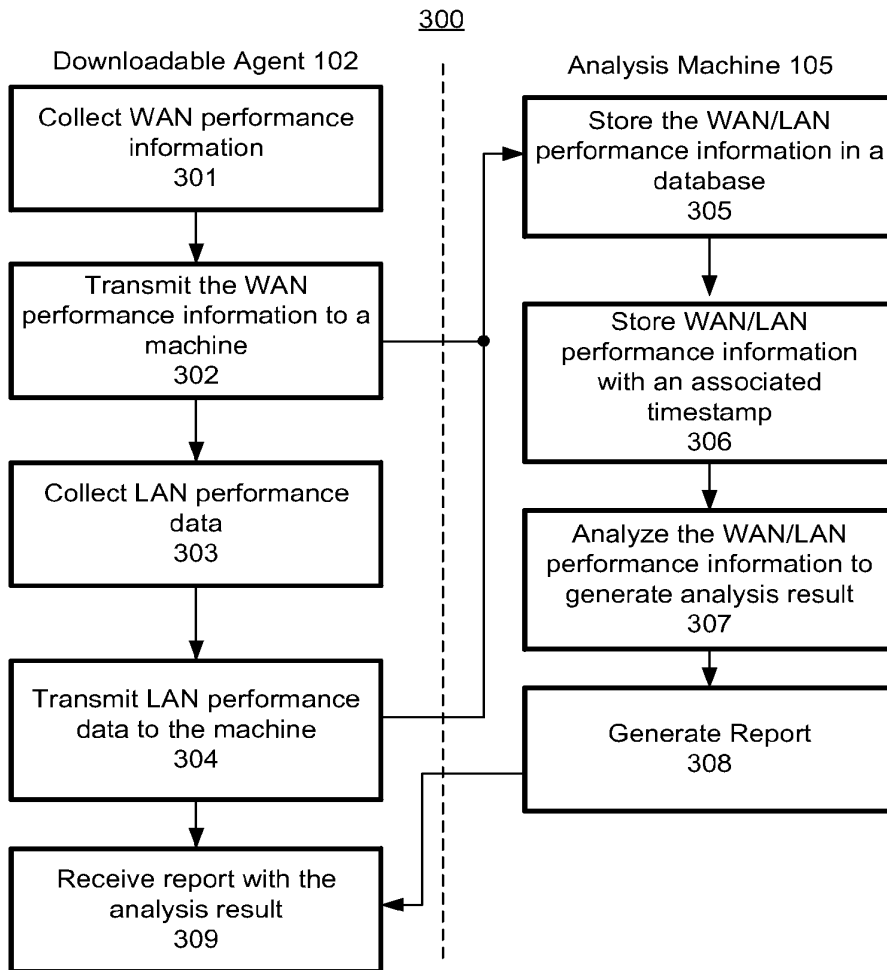


FIG. 3

400

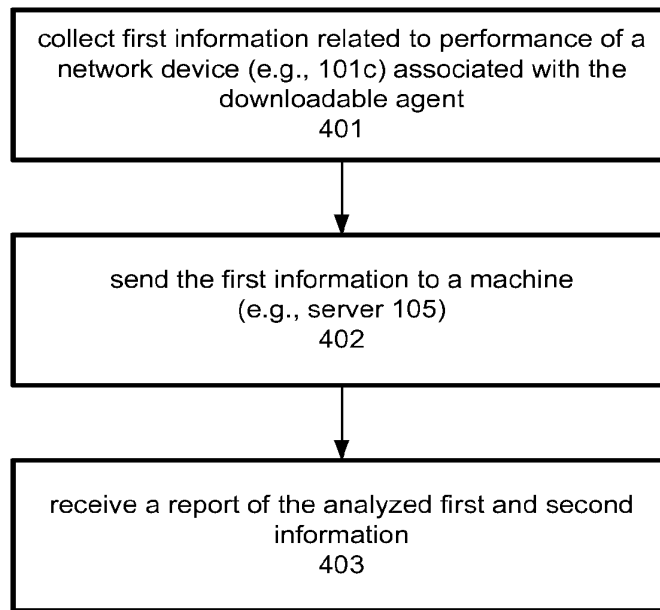


FIG. 4A

410

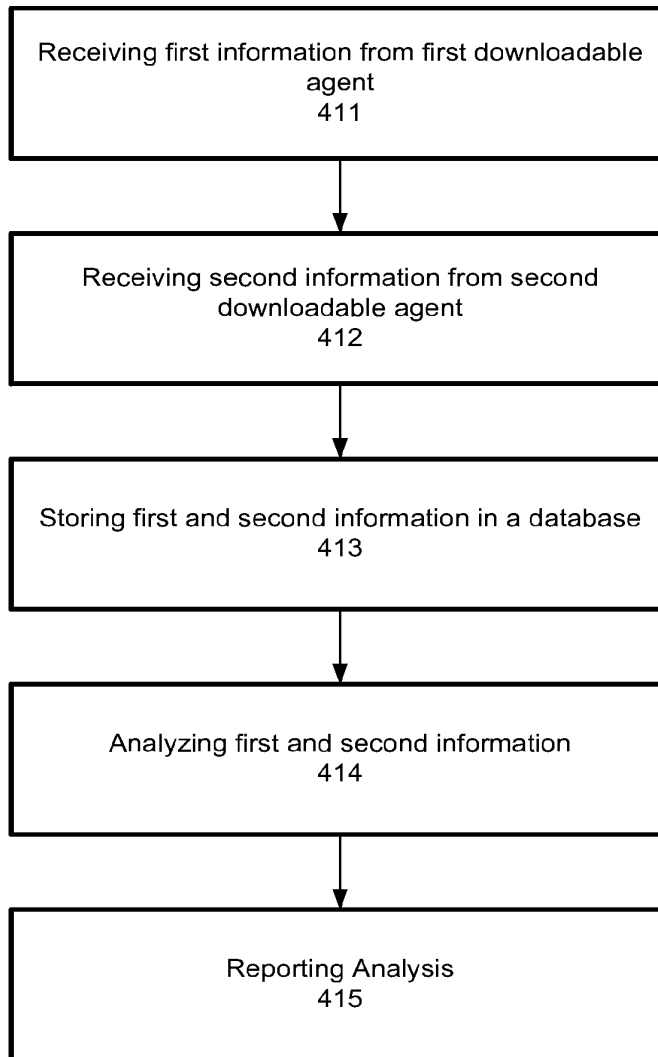


FIG. 4B

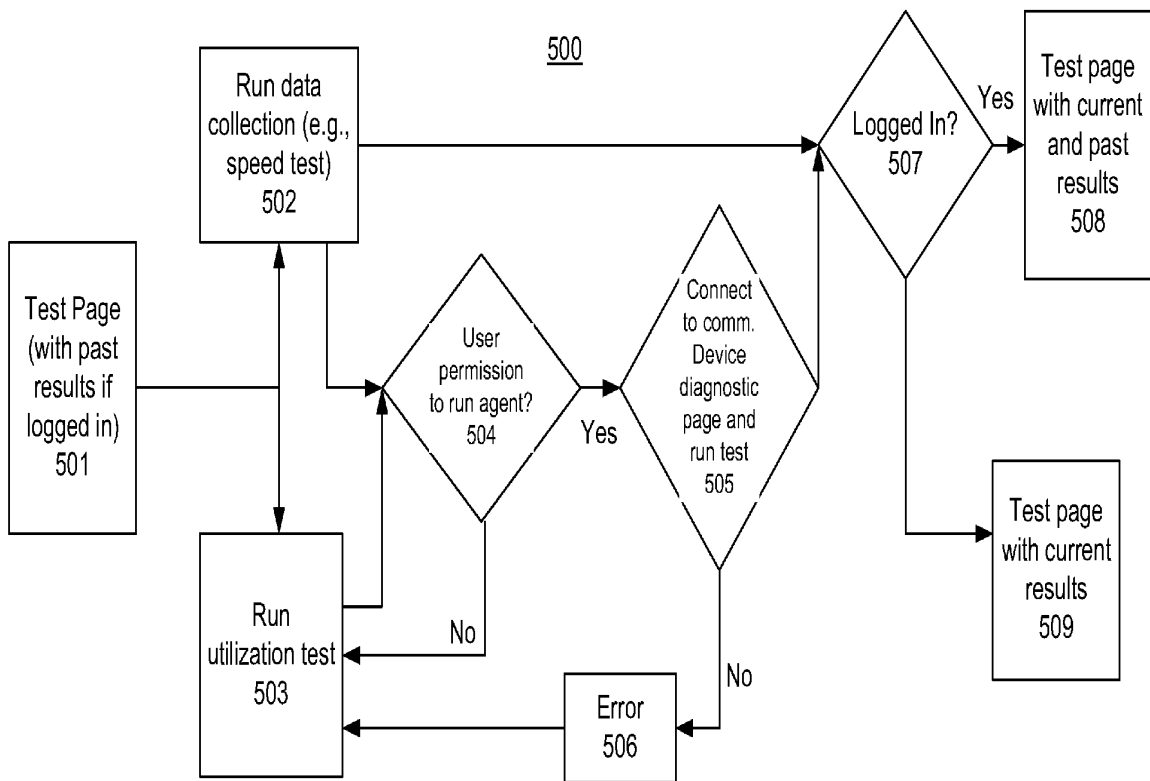


FIG. 5A

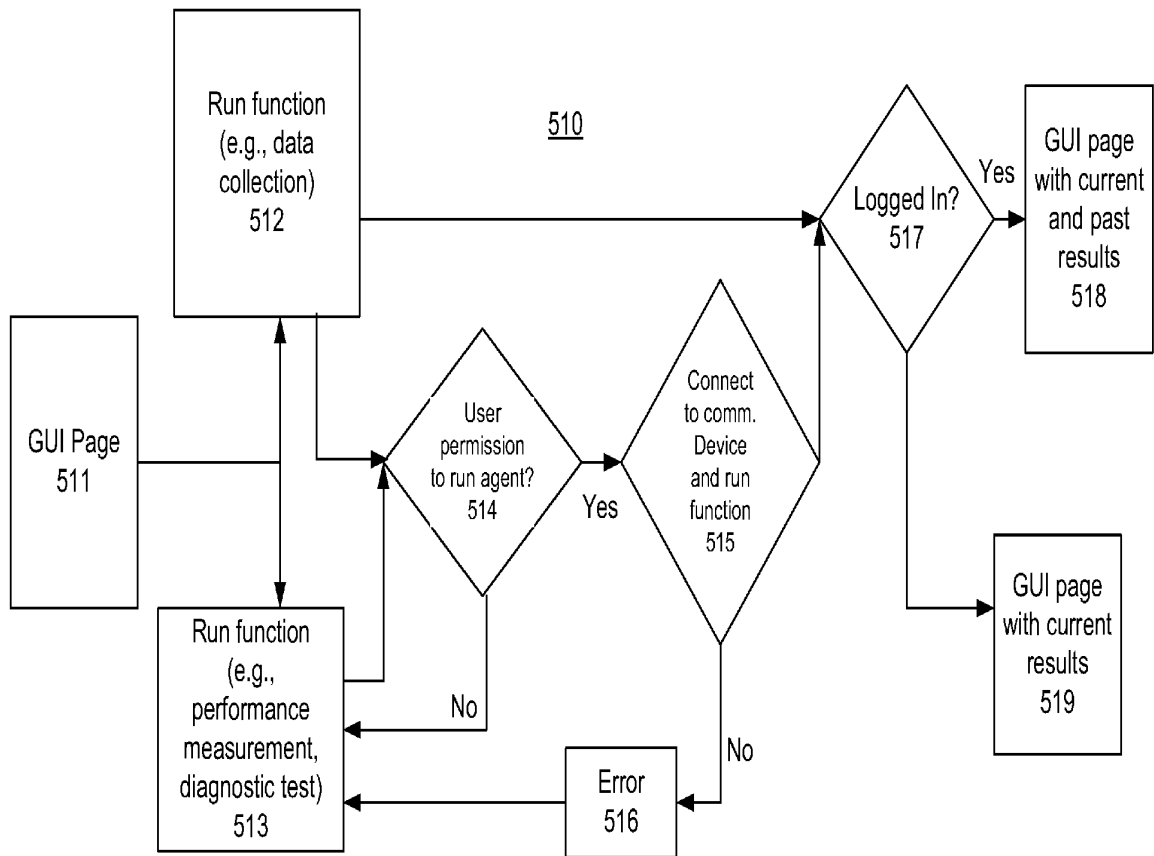


FIG. 5B

Home Like Tweet 0

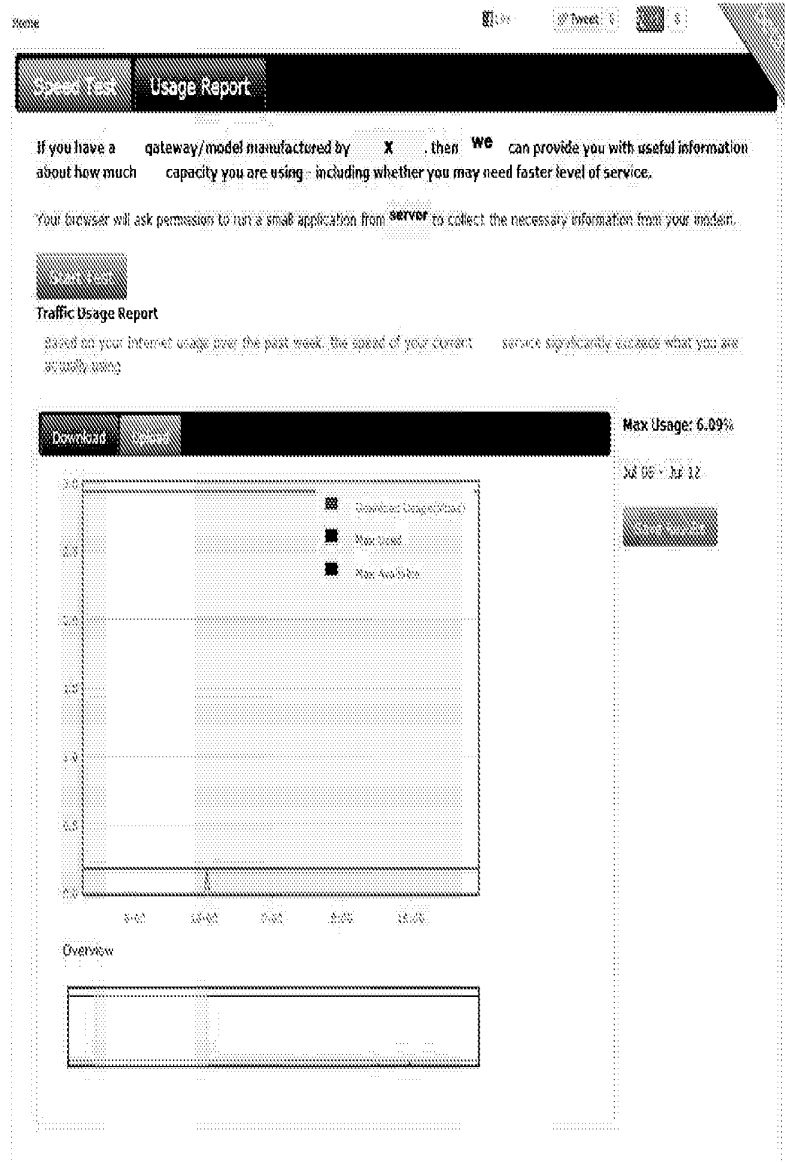
Phone Number 408.421.7522

Speed Test **Speed Test** **Judge Razor**

Download	Upload	Response Time
2194.87	2195	0
Mbps	Mbps	msec

Start Test Show speed required for common Internet applications

FIG. 6A



620

FIG. 6B

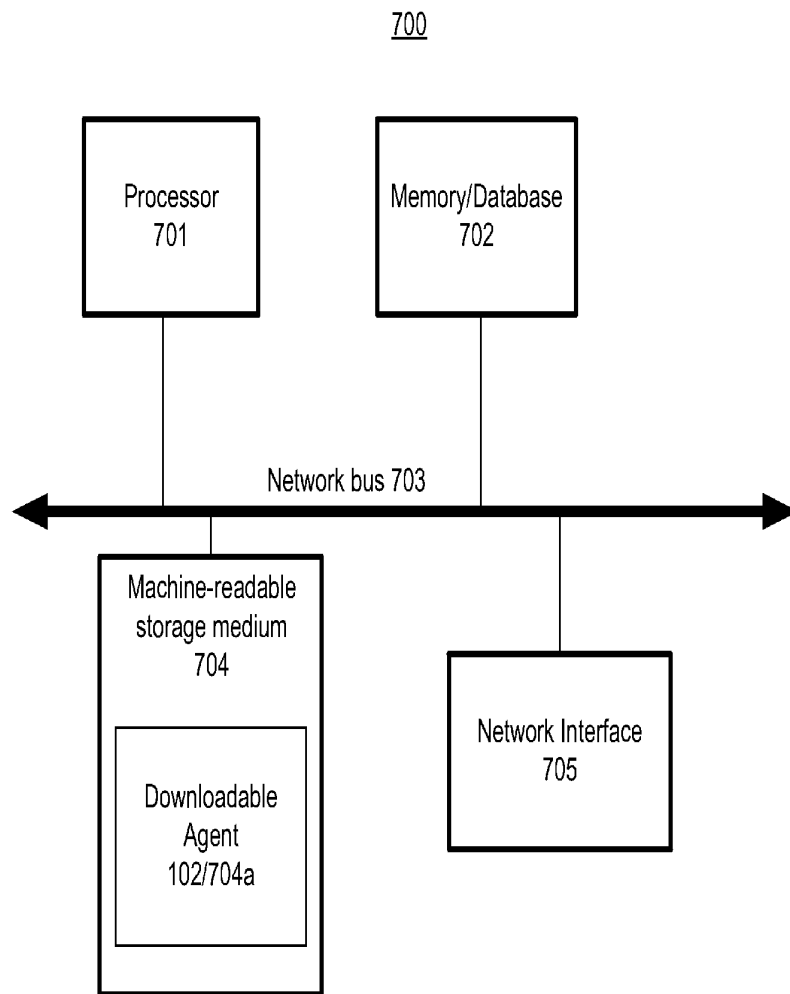


FIG. 7

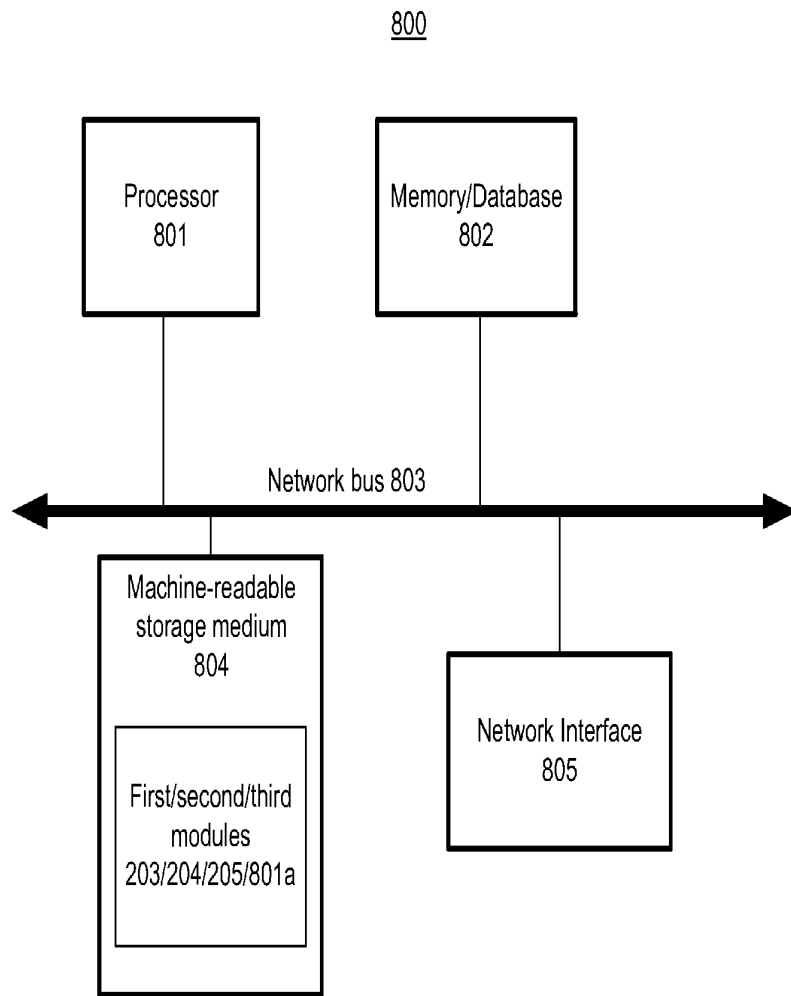


FIG. 8

8241P073PCT

**METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A
COMMUNICATION SYSTEM, DEVICE, OR LINK**

BACKGROUND

[0001] In current practice, Wide Area Network (WAN) and/or Local Area Network (LAN) performance information is not centrally analyzed by a communication device coupled to such networks to account for information such as topological information, geographical information, user's network usage pattern, quality of network connection, time, throughput, etc. Accordingly, communication devices coupled to such networks may operate with lower performance than otherwise possible because the communication devices have no means for knowing performance data that can be used to intelligently assess and manage performance of the communication device and/or network connection. An example of a communication device is a smart phone, computer, a router, etc.

BRIEF DESCRIPTION OF THE DRAWINGS

[0002] Embodiments of the disclosure will be understood more fully from the detailed description given below and from the accompanying drawings of various embodiments of the disclosure, which, however, should not be taken to limit the disclosure to the specific embodiments, but are for explanation and understanding only.

[0003] **Fig. 1** is a communication network with some or all communication devices having a downloadable agent to assist with performance analysis, according to one embodiment of the disclosure.

[0004] **Fig. 2** is a system with a server (or the analysis machine) operable to communicate with one or more downloadable agents, according to one embodiment of the disclosure.

[0005] **Fig. 3** is a flowchart of a method performed by the downloadable agent and an analysis machine of the communication network, according to one embodiment of the disclosure.

8241P073PCT

[0006] **Fig. 4A** is a flowchart of a method performed by the downloadable agent, according to another embodiment of the disclosure.

[0007] **Fig. 4B** is a flowchart of a method performed by the server (or analysis machine), according to one embodiment of the disclosure.

[0008] **Fig. 5A** is flowchart of a method for performing a diagnostic test, according to one embodiment of the disclosure.

[0009] **Fig. 5B** is flowchart of a method for running (i.e., executing) functions, according to another embodiment of the disclosure.

[0010] **Fig. 6A** is an exemplary report provided by the server based on the information received from the downloadable agent, according to one embodiment of the disclosure.

[0011] **Fig. 6B** is another exemplary report provided by the server based on the information received from the downloadable agent, according to one embodiment of the disclosure.

[0012] **Fig. 7** is a processor-based system having machine-readable storage medium with computer executable instructions of a downloadable agent, according to one embodiment of the disclosure.

[0013] **Fig. 8** is a processor-based system having machine-readable storage medium with computer executable instructions executed by the server, according to one embodiment of the disclosure.

DETAILED DESCRIPTION

[0014] One of the problems with current communication systems is that information about the communication device and communication device performance inside the local area network (LAN) is generally available to other devices on the LAN, however not available to machines outside the LAN; i.e., the wide area network (WAN), or the cloud. In order to overcome this and other problems, the embodiments of this disclosure describe an agent (also called downloadable agent herein) which is placed inside the LAN, where the agent collects data on behalf of the cloud or WAN-based server and then transfers that

8241P073PCT

data to the cloud or WAN-based server for analysis. Such an embodiment allows collection of information on all devices centrally for a comprehensive analysis.

[0015] The embodiments herein describe a method performed by a downloadable agent for collecting information associated with a communication device and then sending the collected information to another machine for analysis. In one embodiment, the other machine is a server in a cloud which has access to information related to many communication devices and can use that information to generate a performance report for the communication device. In one embodiment, the downloadable agent receives the report. In one embodiment, the report can be used to enhance the performance of the communication device. In one embodiment, the method comprises: collecting wide area network (WAN) performance information, wherein the downloadable agent is executable on a computing device coupled to a (local area network) LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and transmitting the WAN performance information to a machine. In one embodiment, the downloadable agent may be executable on a variety of different computer platforms and operating systems.

[0016] The term “Local Area Network” (LAN) herein generally refers to a computer or communication network that interconnects computers or communication devices in a limited area such as a home, school, computer laboratory, or office building using network media.

[0017] The term “Wide Area Network” (WAN) herein generally refers to a telecommunication network that covers a broad area (i.e., any network that links across metropolitan, regional, or national boundaries) compared to the limited area covered by a LAN.

[0018] In one embodiment, the machine (e.g., a server in a cloud) is operable to: store the WAN performance information in a database associated with the machine, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber’s service provider. In one embodiment, the broadband subscriber and/or the broadband subscriber’s service provider analyses the report and adjusts various performance parameters associated with the communication

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device or the networking devices with which it communicates to enhance the performance of the communication.

[0019] The term “performance” herein refers generally to network throughput (e.g., TCP/UDP), latency, jitter, connectivity, error rates, power consumption, transmit power, etc. Improving performance of the communication system includes increasing throughput, reducing error rate and latency, improving (i.e., reducing) jitter, reducing power consumption, etc. for the communicating system. The term “TCP” stands for Transmission Control Protocol. The term “UDP” refers to User Datagram Protocol. The term “successful” herein refers to an indication suggesting safe receipt of a packet that is often confirmed by ACK (acknowledge) message packet. In another embodiment, operational data such as error counts, retransmission counts, modulation, signal strength, etc. are used to estimate the performance and throughput of the communications link.

[0020] The embodiments herein allow a user of a communication device to install (download) an agent on their communication device, for example, personal computer, tablet computer, laptop, network gateway, smart phone, smart device, computer, DSL (Digital Subscriber Line) access equipment, router, etc) so that the communication device is able to collect performance related information for analysis by another machine (e.g., a server on a cloud) and then receive at least one of several statistical and commercial analyses including throughput and other measures of communications performance; availability of higher bandwidth for operating a communication device/link (e.g., DSL) service; purchase information (or service product information) for improving communication device/link (e.g., DSL) service performance; or utilization information for optimizing a consumers’ communication device/link (e.g., DSL) service cost. Such downloadable agent allows for customized enhancement of user experience with a communication device by enhancing the communication device’s or link’s performance.

[0021] In the following description, numerous details are discussed to provide a more thorough explanation of embodiments of the present disclosure. It will be apparent, however, to one skilled in the art, that embodiments of the present disclosure may be practiced without these specific details. In other instances, well-

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known structures and devices are shown in block diagram form, rather than in detail, in order to avoid obscuring embodiments of the present disclosure.

[0022] Note that in the corresponding drawings of the embodiments, signals are represented with lines. Some lines may be thicker, to indicate more constituent signal paths, and/or have arrows at one or more ends, to indicate primary information flow direction. Such indications are not intended to be limiting. Rather, the lines are used in connection with one or more exemplary embodiments to facilitate easier understanding of a circuit or a logical unit. Any represented signal, as dictated by design needs or preferences, may actually comprise one or more signals that may travel in either direction and may be implemented with any suitable type of signal scheme.

[0023] In the following description and claims, the term “coupled” and its derivatives may be used. The term “coupled” herein refers to two or more elements which are in direct contact (physically, electrically, magnetically, electromagnetically, optically, etc.). The term “coupled” herein may also refer to two or more elements that are not in direct contact with each other, but still cooperate or interact with each other.

[0024] As used herein, unless otherwise specified the use of the ordinal adjectives “first,” “second,” and “third,” etc., to describe a common object, merely indicate that different instances of like objects are being referred to, and are not intended to imply that the objects so described must be in a given sequence, either temporally, spatially, in ranking or in any other manner.

[0025] **Fig. 1** is a communication network 100 with some or all communication devices having a respective downloadable agent (DA) to assist with performance analysis, according to one embodiment of the disclosure. In one embodiment, the communication network 100 comprises a local network 101 (e.g., a network at home) having Customer Premises Equipment (CPE) 101a and a personal computer (PC) 101b. In one embodiment, the local area network (LAN) 101 optionally comprises a line enhancement device 101c which is any device coupled to the DSI 110 that improves the quality or performance on the DSI 110. In one embodiment, the line enhancement device 101c is a standalone device. In

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another embodiment, the line enhancement device 101c is integrated with the CPE 101a. In one embodiment, one or more devices of the LAN (e.g., home LAN) 101 are operable to communicate with the server 105 via the Internet 109 (via wired or wireless connections).

[0026] In one embodiment, the communication network 100 comprises a server 105 coupled to a database 106, wherein the server and/or the database 106 reside in a cloud 104.

[0027] The term “cloud” herein refers generally to cloud computing which is the delivery of computing and storage capacity as a service to a community of end-recipients. The term “cloud” is indicated with use of a cloud-shaped symbol 104 as an abstraction for the complex infrastructure it contains in system diagrams. Cloud computing entrusts services with a user's data, software and computation over a network. In one embodiment, the server 105 resides in the cloud 104 and is operable to perform complex analysis (e.g., statistical) based on information collected from other communication devices via the Internet.

[0028] In one embodiment, the communication network 100 comprises a DSL access equipment 103a (also called a DSL access network, or DSL node) which is operable to communicate with the CPE 101a via a DSL line 110. In one embodiment, the DSL access equipment 103a comprises a DSLAM (digital subscriber line access multiplexer). In one embodiment, the DSL access equipment 103a comprises a CO (central office). In one embodiment, the DSL access equipment 103a receives control signals 108 from the server 105 that instruct a DSL operator 103b about ways to improve performance of its customers e.g., CPE 101a, etc.

[0029] In one embodiment, the control signals 108 include at least one or more of signals or commands related to: power, for example, transmit power, spectrum control, for example, Power Spectral Density (PSD) mask, margin, data rate, latency/delay, coding, for example, Forward Error Correction (FEC) coding.

[0030] In one embodiment, the server 105 is operable to access external communication devices (external to the cloud 104) through cloud-based applications via a web browser or mobile application. In the embodiments discussed herein the

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downloadable agent (DA) 102 is operable to communicate with the resources (e.g., server 105, database 106) of the cloud 104. In one embodiment, the DA 102 may be downloaded from any platform e.g., a disk, memory stick, web browser, web server, etc.

[0031] In one embodiment, the DA 102 is operable to execute on multiple computing platforms with different operating systems. For example, the DA 102 may operate on operating systems including Android, Berkley Software Distribution (BSD), iOS, GNU/Linux, Apple Mac OS X, Microsoft Windows, Windows Phone, and IBM z/OS. In one embodiment, the DA 102 is operable to execute in a virtual machine (VM). A VM is a software implementation of a machine (e.g., a computer) that executes programs like a physical machine. Examples of virtual machines include a Java Virtual Machine and the previously mentioned operating systems executing in VMWare, Virtual Box or the like. In one embodiment, the DA 102 may receive automatic updates to keep the application up to date with the latest features. In one embodiment, the downloadable agent is dynamically downloaded to the computing device.

[0032] The term “dynamically” herein refers to the downloading of an agent by the computing device on-demand and prior to use of the agent. A dynamically downloaded agent may be deleted from the computing device following the use of that agent.

[0033] In one embodiment, the communication network 100 comprises a wireless device, for example, a smart device (e.g., smart phone, tablet, etc) with a DA 102. In one embodiment, the DA 102 is operable to review an analysis report generated by the server 105 for any of the communicating devices it has authorization to access.

[0034] In one embodiment, the server 105 is operable to receive WAN performance information from a DA 102, wherein the DA 102 is executable on a computing device (e.g., 101a-b, 107, 113) coupled to a LAN 111 of a broadband subscriber, wherein the LAN 111 is coupled by another device to a WAN 112. In one embodiment, a DSL modem and a home gateway couple the LAN 111 to the

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WAN 112. In one embodiment, the DSL modem and home gateway are integrated into a single enclosure.

[0035] In one embodiment, the computing device is one of: computer, personal computer, laptop/desktop, smart phone, tablet computing device; an access point (AP); a base station; a wireless smart phone device; a wireless LAN device; an access gateway; a router, a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[0036] In one embodiment, the server 105 is operable to store the WAN performance information in the database 106 associated with the server 105. In one embodiment, the server 105 is operable to store the WAN performance information with an associated timestamp. In one embodiment, the DA 102 is operable to collect LAN performance data from at least one of the computing device (e.g., 101b) and another device (e.g., PC 113) coupled to the LAN 111. In one embodiment, the server 105 is operable to receive the LAN performance data from the DA 102.

[0037] In one embodiment, the WAN and LAN performance information include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment

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characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[0038] Topological information may include information regarding the WAN or LAN topology. For example, whether a DSL modem is behind a firewall, or whether the Internet gateway is connected to a Wi-Fi access point via a router. The geographical information may include the address or global positioning system (GPS) location of the WAN or LAN modem, or the Internet gateway. The geographical information may be useful for, for example, neighborhood analysis, and for correlating information regarding neighbors, or users in a given geographical location. Environment Statistics may include any statistics related to the environment surrounding the WAN or LAN. For example, usage statistics, statistics on periods of peak operation, statistics on the data traffic (peak traffic, average traffic, etc.).

[0039] In one embodiment, LAN performance information also includes, without limitation: LAN media type, such as Ethernet, Wi-Fi, or powerline adapters; LAN media throughput rates; channel assignments for Wi-Fi media; Wi-Fi mode such as 802.11g or 802.11n; Wi-Fi transmit power levels; and spectral masks for powerline communication.

[0040] In one embodiment, the server 105 is operable to analyze the WAN performance information to generate an analysis result. In one embodiment, the server 105 is operable to generate analysis result by computing throughput of DSL connection 110 by collecting current performance metrics associated with DSL service. In one embodiment, the server 105 is operable to perform statistical analysis, including throughput, based on information received from the DA 102 and other information in the database.

[0041] In one embodiment, the server 105 is operable to compute throughput of a communication link (e.g., Wi-Fi or Ethernet link 109) by probing. In one embodiment, the process of probing comprises: transmitting probing data from a communication device (e.g., PC 101b) to another communication device (e.g., PC 113); and waiting for a predetermined time before reading operational data

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including counter values related to user data traffic. In one embodiment, the counter values include at least one of packet error counts, packet retransmission counts, successful ACK message counts, etc. The throughput information discussed in this embodiment and other embodiments of this disclosure could include at least one or more of the following: instantaneous speed or data rate, average data rate, and/or information on the peak and minimum data rates of a connection or communication link associated with the LAN and/or with the associated WAN.

[0042] The term “active probing” or simply “probing” herein generally refers to testing of a communication network by sending test pattern/data over the network from one communication device to another communication device, and then measuring the response from the sent test pattern. The response data is also referred herein as “active data” or “active measurement data” which is data associated with active probing of a communication network.

[0043] The term “operational data” herein generally refers to user visible or accessible data and is generally used for debugging and basic performance monitoring of communications systems.

[0044] In one embodiment, the method of probing comprises: transmitting probing data from a communication device (e.g., PC 101b) to another communication device (e.g., PC 113); and receiving a report indicating amount of data or data received by the other communication device.

[0045] In one embodiment, the server 105 is operable to determine availability of higher bandwidth for operating a DSL service. In one embodiment, the server 105 is operable to determine purchase information (or service product information) for improving DSL service performance. In one embodiment, the server 105 is operable to determine network, service, or communication link utilization information for optimizing a consumer DSL service cost. In one embodiment, the server 105 is operable to group data in the database 106 according to at least one of geographical location, services type, service provider, or time. The service product information includes information regarding the type and specification of the DSL service or services which is a DSL service user/customer has purchased from the DSL service provider.

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[0046] In one embodiment, the server 105 is operable to report the analysis result by sending availability of higher bandwidth for operating a DSL service to the DA 102 of 101a. In one embodiment, the server 105 is operable to report the analysis result by sending purchase information (or service product information) to PC 101b, smart device 107, or the user for improving DSL service performance. In one embodiment, the server 105 is operable to report the analysis result by sending utilization information to PC 101b, smart device 107, or any device accessible by the user for optimizing consumer DSL service cost.

[0047] In one embodiment, the server 105 is operable to report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider. In one embodiment, the server 105 is operable to report the analysis result by sending statistical analysis to the PC 101b, smart device 107, or any device accessible by the user, the statistical analysis including throughput. In one embodiment, the server 105 is operable to report the analysis result by sending availability of higher bandwidth for operating a DSL service to the DA 102 of 101a. In one embodiment, the server 105 is operable to report the analysis result by sending purchase information (or service product information) to PC 101b, smart device 107, or the user for improving DSL service performance. In one embodiment, the server 105 is operable to report the analysis result by sending utilization information to PC 101b, smart device 107, or any device accessible by the user for optimizing consumer DSL service cost.

[0048] In one embodiment, the server 105 is operable to receive an on-demand change request. In one embodiment, the on-demand change is associated with at least one of: throughput, latency, packet loss, or jitter. For example, DA 102 of the PC 101b sends a request via connection 109 to the server 105 to acquire higher throughput than current throughput for its DSL line 110. In such an embodiment, the server 105 performs analysis based on available data in the database 106 and determines if the on-demand request by the PC 102c can be met. If it can be met, a report is provided to the DA 102 by the server 105 with information (e.g., cost etc) about how to improve throughput.

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[0049] **Fig. 2** is a system 200 with the server 105 (or the analysis machine) operable to communicate with one or more downloadable agents 102, according to one embodiment of the disclosure. Embodiments of **Fig. 2** are described with reference to **Fig. 1**. In one embodiment, the system 200 comprises a device 201 (e.g., cloud 104) having the server 105 coupled to the database 106.

[0050] In one embodiment, the server 105 comprises: a first module 202 for collecting the WAN and LAN performance and configuration information. In one embodiment, the server 105 comprises a second module 203 for performing statistical analysis using the WAN and LAN performance and configuration information. In one embodiment, the server 105 comprises a third module 204 for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider.

[0051] In one embodiment, the modules (e.g., DA 102) that receive the instruction and command from the third module 204 are accessible by the Internet. In one embodiment, the server 105 comprises: a management interface 205 for communicating with the DA 102 (any one of DAs 1-N, where 'N' is a positive integer) via the Internet 206 (e.g., 111, 109 of **Fig. 1**). In one embodiment, the server 105 comprises: a user interface module 207 for providing access to other communication devices and for displaying information associated with the first 202, second 203 and third 204 modules.

[0052] **Fig. 3** is a flowchart 300 of a method performed by the downloadable agent 102 and an analysis machine 105 (also referred to as the server 105) of the communication network 100, according to one embodiment of the disclosure. Although the blocks in the flowcharts with reference to **Fig. 3** are shown in a particular order, the order of the actions can be modified. Thus, the illustrated embodiments can be performed in a different order, and some actions/blocks may be performed in parallel. The flowchart of **Fig. 3** is illustrated with reference to the embodiments of **Figs. 1-2**. Some of the blocks and/or operations listed in **Fig. 3** are optional in accordance with certain embodiments. The numbering of the blocks

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presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur. Additionally, operations from the various flows may be utilized in a variety of combinations.

[0053] At block 301, the DA 102 collects WAN performance information, wherein the DA 102 is executable on a computing device (e.g., 101c) coupled to a LAN 111 of a broadband subscriber, wherein the LAN 111 is coupled by another device (e.g., PC 113) to a WAN 112. At block 302, the DA 102 transmits the WAN performance information to a machine (e.g., server 105). At block 303, the DA 102 is operable to collect LAN performance data from at least one of the computing device (e.g., 101c) and the other device (e.g., PC 113) coupled to the LAN 111.

[0054] At block 304, the DA 102 is operable to transmit the LAN performance data to the server 105. At block 305, the server 105 is operable to store the WAN/LAN performance information in the database 106 associated with the machine 105. At block 306, the server 105 is operable to store the WAN/LAN performance information with an associated timestamp. At block 307, the server 105 is operable to analyze the WAN/LAN performance information to generate an analysis result. At block 308, the server is operable to report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider. At block 309, the DA 102 receives the report with the analysis result from the server 105.

[0055] **Fig. 4A** is a flowchart 400 of a method performed by the downloadable agent 102, according to another embodiment of the disclosure. Although the blocks in the flowcharts with reference to **Fig. 4A** are shown in a particular order, the order of the actions can be modified. Thus, the illustrated embodiments can be performed in a different order, and some actions/blocks may be performed in parallel. The flowchart of **Fig. 4A** is illustrated with reference to the embodiments of **Figs. 1-2**. Some of the blocks and/or operations listed in **Fig. 4A** are optional in accordance with certain embodiments. The numbering of the blocks presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur. Additionally, operations from the various flows may be utilized in a variety of combinations.

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[0056] At block 401, the downloadable agent 102 collects first information related to performance of a network device (e.g., 101c) associated with the downloadable agent 102. At block 402, the DA 102 sends the first information to a machine (e.g., server 105), wherein the first information is stored in a database 106 coupled to the machine 105, and wherein the machine 105 is operable to: receive second information from another downloadable agent (e.g., 102 of PC 113); and analyze the first and second information with reference to data already stored in the database 106. In one embodiment, the first and second information is time stamped.

[0057] In one embodiment, the first and second information include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, error information (link error rate), type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[0058] At block 403, the DA 102 receives a report of the analyzed first and second information. In one embodiment, reporting the analysis result comprises at least one of: sending statistical analysis including throughput; sending availability of higher bandwidth for operating a DSL service; sending purchase information (or service product information) for improving DSL service performance; or sending utilization information for optimizing a consumers DSL service cost.

[0059] In one embodiment, the downloadable agent 102 is executable on multiple computing machines (e.g., PC, smart phone, tablet, CPE, etc). In one embodiment, the downloadable agent 102 is communicatively coupled to a first LAN device 101c. In one embodiment, the method of collecting first information comprises collecting information from multiple computing entities (e.g., 114, 101a, 101b) coupled to the first LAN device 101c. In one embodiment, the other downloadable agent 102 is communicatively coupled to a second LAN device 113. In one embodiment, the other downloadable agent (e.g., 102 of 113) is operable to collect information from multiple computing entities (e.g., 114 and others) coupled

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to the second LAN device 113, the second LAN device 113 being different from the first LAN device 101c.

[0060] In one embodiment, the network device, and the first and second LAN devices comprise at least one of: computer, personal computer (PC), laptop, tablet PC, smart phone, an access point (AP); a base station; a wireless mobile device; a wireless LAN device; a DSLAM; an access gateway; a router; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[0061] In one embodiment, the machine is a server 105 in a cloud 104. In one embodiment, the method further comprises: sending an on-demand change request associated with at least one of: throughput, or latency. In one embodiment, the method of receiving the report comprises at least one of: receiving statistical analysis including throughput; receiving availability of higher bandwidth for operating a DSL service; receiving purchase information (or service product information) for improving DSL service performance; or receiving utilization information for optimizing a consumers DSL service cost.

[0062] **Fig. 4B** is a flowchart 410 of a method performed by the server 105 (or analysis machine), according to one embodiment of the disclosure. Although the blocks in the flowcharts with reference to **Fig 4B** are shown in a particular order, the

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order of the actions can be modified. Thus, the illustrated embodiments can be performed in a different order, and some actions/blocks may be performed in parallel. The flowchart of **Fig. 4B** is illustrated with reference to the embodiments of **Figs. 1-3**. Some of the blocks and/or operations listed in **Fig. 4B** are optional in accordance with certain embodiments. The numbering of the blocks presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur. Additionally, operations from the various flows may be utilized in a variety of combinations.

[0063] At block 411, the server 105 receives first information from a first downloadable agent 102 (e.g., DA 1 of **Fig. 2**). At block 412, the server 105 receives second information from a second downloadable agent 102 (e.g., DA 2 of **Fig. 2**). In one embodiment, the first and second information are time stamped. In one embodiment, the first and second information includes at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[0064] In one embodiment, the first (e.g., DA 1 of **Fig. 2**) and second (e.g., DA 2 of **Fig. 2**) agents are executable on multiple computing machines. In one embodiment, the first downloadable agent (e.g., DA 1 of **Fig. 2**) is communicatively coupled to a first LAN device 101c. In one embodiment, the first downloadable agent (e.g., DA 1 of **Fig. 2**) is operable to collect information from multiple computing entities (e.g., 101a, 101b) coupled to the first LAN device 101c. In one embodiment, the first LAN device and the second LAN device are on the same LAN 111. In one embodiment, the first and second LAN devices are coupled to distinct LANs (not shown).

[0065] In one embodiment, the second downloadable agent (e.g., DA 1 of **Fig. 2**) is communicatively coupled to a second LAN device 113. In one embodiment, the second downloadable agent (e.g., DA 1 of **Fig. 2**) is operable to

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collect information from multiple computing entities (e.g., 114, and others) coupled to the second LAN device 113, the second LAN device 113 being different from the first LAN device 101c.

[0066] In one embodiment, the first PC 101b and second 113 LAN devices comprise at least one of: Computer, personal computer (PC), laptop, tablet PC, smart phone, an access point (AP); a base station; a wireless smart phone device; a wireless LAN device; a router; an access gateway; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[0067] In one embodiment, the first (e.g., DA 1 of **Fig. 2**) and second (e.g., DA 2 of **Fig. 2**) downloadable agents execute on devices coupled to the same LAN 111. In one embodiment, the first and second downloadable agents execute on devices coupled to distinct LANs (not shown). In such an embodiment, server 105 may (a) process data from distinct LANs separately, to produce analyses and recommendations for each LAN based solely on measurements made from the DAs attached to each respective LAN device; or (b) process data from distinct LANs jointly, to produce analyses and recommendations for each LAN based, at least in part, on data reported from other LANs.

[0068] The term “measurement” herein generally refers to information that is collected, and optionally processed, by the DAs from the LAN devices. In one

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embodiment, the DAs process the information, and send the processed information to the server 105. For example, as opposed to sending collected information regarding raw data rate, the DAs may process the raw data rate and other related information collected over time, to measure throughput and send the measured throughput to the server 105. The measured throughput may be the average raw data rate over a specified period of time.

[0069] In one embodiment, jointly processed results from multiple LANs are used to determine whether one of the LANs is under or over-performing relative to its neighboring LANs. In one embodiment, server 105 processes data from the distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN. In this embodiment, recommendations and analyses are generated for a LAN based on data collected from it and data collected from other LANs.

[0070] In one embodiment, jointly processed results from multiple LANs are used to determine whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN. In one embodiment, comparing performance among LANs may require the presence of downloadable agents on multiple LANs. In one embodiment, comparing performances of access to a particular remote host can be done from a single LAN or from multiple LANs.

[0071] In one embodiment, LAN measurements that determine whether a LAN is under or over performing relative to its neighboring LANs, include basic estimates of throughput and stability. In one embodiment, LAN measurements include measurements made from a particular LAN to one or more servers on the Internet to assess average Internet access performance or to access performance for particular Internet sites from devices attached to the LAN.

[0072] At block 413, the server 105 stores the first and second information in the database 106. At block 404, the server analyzes the first and second information with reference to data already stored in the database 106. In one embodiment, the method of analyzing the first information with reference to the

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second information comprises at least one of: performing statistical analysis including throughput; determining availability of higher bandwidth for operating a DSL service; determining purchase information (or service product information) for improving DSL service performance; determining utilization information for optimizing a consumers DSL service cost; or grouping data in the database according to at least one of geographical location, services type, service provider, or time.

[0073] At block 415, the server 105 reports the analyzed first and second information to a management entity (e.g., Internet service provider (ISP), DSL controller 103, CPE 101a, PC 101b, PC 113, smart phone 114, etc). In one embodiment, the method of reporting comprises at least one of: providing statistical analysis including throughput; providing availability of higher bandwidth for operating a DSL service; providing purchase information (or service product information) for improving DSL service performance; or providing utilization information for optimizing a consumers DSL service cost.

[0074] In one embodiment, the method further comprises: determining control information for a DSL operator, the control information according to the analyzed first and second information; and recommending the DSL operator with the control information to improve performance of a DSL service. In one embodiment, the control information relates to on-demand change in performance of the DSL service. In one embodiment, the on-demand change is associated with at least one of: throughput, latency, packet loss, or jitter. In one embodiment, the method of receiving the first and second information is via Internet.

[0075] **Fig. 5A** is flowchart 500 of a method for performing a diagnostic test, according to one embodiment of the disclosure. Although the blocks in the flowchart with reference to **Fig 5A** are shown in a particular order, the order of the actions can be modified. Thus, the illustrated embodiments can be performed in a different order, and some actions/blocks may be performed in parallel.

[0076] At block 501, the user/customer accesses a test page. In one embodiment, the test page is accessible over the web. **Fig. 6A** is an exemplary report 600 (or test page) provided by the server 105 based on the information

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received from the DA 102, according to one embodiment of the disclosure. In one embodiment, the test page provides a number of test options. For example, at block 502 a user may choose to perform a Run Speed test (a test option), which is also shown as the tab Speed Test in **Fig. 6A**. In another example, at block 503 a user/customer may run a utilization test (another test option), shown by the tab Utilization Test in **Fig. 6A**. The report 600 illustrates a speed test result page, after performing a speed test. In this particular non-limiting illustration, the report 600 shows the download and upload speeds in Mbps, and also shows an estimate of the response time of the communication device under test. In one embodiment, the report 600 is accessible by a subscriber or user/customer of the particular Internet service being tested.

[0077] At block 504, the system (machine on which the agent is running) seeks permission from the user/customer to run the downloadable agent 102 on the machine. If the permission is granted, the downloadable agent 102 attempts to access the communication device (such as a DSL modem) diagnostics page, and would try to run a speed test (e.g., at block 505) or utilization test. If the connection fails, for example due to a link error, the process moves back as shown by block 506. If the test is successful, the process moves to block 507, which checks whether the user/customer is login to the system/server (such as server 105). If the user is logged in, a more complete report is shown to the user at block 508 which includes current and past results. If the user/customer was not logged in, then at block 509 only current results are shown.

[0078] The flowcharts discussed herein are merely examples, of an example embodiment, and not all blocks need to be performed. Other embodiments of the disclosure could also map to a similar flowchart. For example, at block 505, the downloadable agent 102 may collect data and produce analysis for the LAN and WAN performance of some other device on the LAN, rather than collecting data and producing analyses for the device on which the DA 102 executes.

[0079] **Fig. 5B** is flowchart 510 of a method for running (i.e., executing) functions, according to another embodiment of the disclosure. The figure is similar to **Fig. 5A**, but more general. Although the blocks in the flowchart with reference to

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Fig 5B are shown in a particular order, the order of the actions can be modified. Thus, the illustrated embodiments can be performed in a different order, and some actions/blocks may be performed in parallel.

[0080] At block 511, the user/customer accesses a Graphic User Interface (GUI) page. In one embodiment, the GUI page is accessible over the web. In one embodiment, the GUI page provides a number of functions for running diagnostics, performance measurement or data collection. For example, at block 512 a user may choose to perform data collection. In another example, at block 513 a user/customer may run a diagnostics function or a performance measurement.

[0081] At block 514, the system (machine on which the agent is running) seeks permission from the user/customer to run the downloadable agent 102 on the machine. If the permission is granted, the downloadable agent 102 attempts to access the communication device (such as a DSL modem), and would try to run one of the functions above (e.g., at block 515), such as a performance measurement or diagnostics test. If the connection fails, for example due to a link error, the process moves back as shown by block 516. If the test is successful, the process moves to block 507, which checks whether the user/customer is login to the system/server (such as server 105). If the user is logged in, a more complete report is shown to the user at block 518 which includes current and past results. If the user/customer was not logged in, then at block 519 only current results are shown.

[0082] The flowcharts discussed herein are merely examples, of an example embodiment, and not all blocks need to be performed. Other embodiments of the disclosure could also map to a similar flowchart. For example, at block 505, the downloadable agent 102 may collect data and produce analysis for the LAN and WAN performance of some other device on the LAN, rather than collecting data and producing analyses for the device on which the DA 102 executes.

[0083] **Fig. 6B** is another exemplary report 620 provided by the server based on received information from the downloadable agent, according to one embodiment of the disclosure. The report 620 depicts a usage report, according to one embodiment. The report 620, for example, includes information on utilization of the capacity of the subscriber or user/customer link. The report 620 may also

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provide information on whether a customer link has the potential to operate at higher speeds. The report 620 also shows a Traffic Usage Report. The example Traffic Usage Report shows traffic information collected over a week, such as Download Usage, max data rate used, max available data rate, etc.

[0084] **Fig. 7** is a processor-based system 700 having machine-readable storage medium with computer executable instructions of a downloadable agent, according to one embodiment of the disclosure. The storage medium 704 and associated computer executable instructions 102/704a may be in any of the communication devices and/or servers discussed herein. The computer-machine-readable/executable instructions 102/704a are executed by a processor 701. Elements of embodiments are provided as machine-readable medium for storing the computer-executable instructions (e.g., instructions to implement the flowcharts of **Figs. 2 and 4** and other processes discussed in the description).

[0085] In one embodiment, the processor-based system 700 further comprises a database 702 to store data used by the instructions 102/704a. In one embodiment, the processor-based system 700 includes a network interface 705 to communicate with other devices. In one embodiment, the components of the processor-based system 700 communicate with one another via a network bus 703.

[0086] The machine-readable storage medium 704 may include, but is not limited to, flash memory, optical disks, hard disk drive (HDD), Solid State Drive (SSD), CD-Read Only Memory (CD-ROMs), DVD ROMs, RAMs, EPROMs, EEPROMs, magnetic or optical cards, or other type of machine-readable media suitable for storing electronic or computer-executable instructions. For example, embodiments of the disclosure may be downloaded as a computer program (e.g., BIOS) which may be transferred from a remote computer (e.g., a server) to a requesting computer (e.g., a client) by way of data signals via a communication link (e.g., a modem or network connection).

[0087] **Fig. 8** is a processor-based system 800 having machine-readable storage medium with computer executable instructions executed by the server 105, according to one embodiment of the disclosure. The storage medium 804 and associated computer executable instructions 202/203/204/804a may be in any of the

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communication devices and/or servers discussed herein. The computer-machine-readable/executable instructions 202/203/204/804a are executed by a processor 801 of the server 105. Elements of embodiments are provided as machine-readable medium for storing the computer-executable instructions (c.g., instructions to implement the flowcharts of **Figs. 2, 4, 6B** and other processes discussed in the description).

[0088] In one embodiment, the processor-based system 800 further comprises a database 802 to store data used by the instructions 202/203/204/804a. In one embodiment, the processor-based system 800 includes a network interface 605 to communicate with other devices. In one embodiment, the components of the processor-based system 600 communicate with one another via a network bus 803.

[0089] The machine-readable storage medium 804 may include, but is not limited to, flash memory, optical disks, hard disk drive (HDD), Solid State Drive (SSD), CD-Read Only Memory (CD-ROMs), DVD ROMs, RAMs, EPROMs, EEPROMs, magnetic or optical cards, or other type of machine-readable media suitable for storing electronic or computer-executable instructions. For example, embodiments of the disclosure may be downloaded as a computer program (e.g., BIOS) which may be transferred from a remote computer (e.g., a server) to a requesting computer (e.g., a client) by way of data signals via a communication link (e.g., a modem or network connection).

[0090] Reference in the specification to "an embodiment," "one embodiment," "some embodiments," or "other embodiments" means that a particular feature, structure, or characteristic described in connection with the embodiments is included in at least some embodiments, but not necessarily all embodiments. The various appearances of "an embodiment," "one embodiment," or "some embodiments" are not necessarily all referring to the same embodiments. If the specification states a component, feature, structure, or characteristic "may," "might," or "could" be included, that particular component, feature, structure, or characteristic is not required to be included. If the specification or claim refers to "a" or "an" element, that does not mean there is only one of the elements. If the

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specification or claims refer to "an additional" element, that does not preclude there being more than one of the additional element.

[0091] Furthermore, the particular features, structures, functions, or characteristics may be combined in any suitable manner in one or more embodiments. For example, a first embodiment may be combined with a second embodiment anywhere the particular features, structures, functions, or characteristics associated with the two embodiments are not mutually exclusive.

[0092] While the disclosure has been described in conjunction with specific embodiments thereof, many alternatives, modifications and variations of such embodiments will be apparent to those of ordinary skill in the art in light of the foregoing description. The embodiments of the disclosure are intended to embrace all such alternatives, modifications, and variations as to fall within the broad scope of the appended claims.

[0093] The following examples pertain to further embodiments. Specifics in the examples may be used anywhere in one or more embodiments. All optional features of the apparatus described herein may also be implemented with respect to a method or process.

[0094] For example, in one embodiment a method performed by a downloadable agent comprises: collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and transmitting the WAN performance information to a machine; wherein the machine is operable to: store the WAN performance information in a database associated with the machine, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

[0095] In one embodiment, the other device is a router. In one embodiment, the machine is operable to store the WAN performance information with an associated timestamp. In one embodiment, the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other

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device coupled to the LAN. In one embodiment, the method further comprises transmitting by the downloadable agent the LAN performance data to the machine.

[0096] In one embodiment, the downloadable agent is executable in a virtual machine on the computing device. In one embodiment, the downloadable agent is dynamically downloaded to the computing device. In one embodiment, the method further comprises receiving the analysis result, wherein receiving the analysis result comprises at least one of: receiving statistical analysis including throughput; receiving availability of higher bandwidth for operating a DSL service; receiving purchase information (or service product information) for improving DSL service performance; or receiving utilization information for optimizing a consumers DSL service cost.

[0097] In one embodiment, the WAN performance information includes at least one of: topological information, geographical information, throughput, latency, jitter, packet loss, time, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, user's provisioned WAN service, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[0098] In one embodiment, the method further comprises: sending an on-demand change request associated with at least one of: throughput, or latency. In one embodiment, the machine is a server that resides in a cloud. In one embodiment, the computing device is one of: a personal computer; a gaming console; an access point (AP); a base station; a wireless smart phone device; a wireless LAN device; an access gateway; a router; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within

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an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[0099] In another example, a machine readable storage medium is provided having computer executable instructions that when executed cause a processor to perform a method according to any one of method discussed above.

[00100] In another example, a system comprises: a database; and a server coupled to the database, the server operable to: receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and store the WAN performance information in the database associated with the server, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

[00101] In one embodiment, the server resides in a cloud. In one embodiment, the server is operable to store the WAN performance information with an associated timestamp. In one embodiment, the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN. In one embodiment, the server is operable to receive from the downloadable agent the LAN performance data. In one embodiment, the server comprises: a first module for collecting the WAN performance information; a second module for performing statistical analysis using the first WAN performance information; and a third module for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider.

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[00102] In one embodiment, the modules that receive the instruction and command from the third module are accessible by internet. In one embodiment, the server comprises: a management interface for communicating with the downloadable agent via internet. In one embodiment, the server comprises: a user interface module for providing access and for displaying information associated with the first, second, third modules.

[00103] In one embodiment, the server is operable to compute throughput of DSL connection by collecting current performance metrics associated with DSL service. In one embodiment, the server to perform throughput computation with reference to a website. In one embodiment, the throughput computation comprises probing a network. In one embodiment, the downloadable agent is executable in a virtual machine on the computing device. In one embodiment, the downloadable agent is dynamically downloaded to the computing device.

[00104] In one embodiment, reporting the analysis result comprises at least one of: sending statistical analysis including throughput; sending availability of higher bandwidth for operating a DSL service; sending purchase information (or service product information) for improving DSL service performance; or sending utilization information for optimizing a consumers DSL service cost. In one embodiment, the WAN performance information includes at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[00105] In one embodiment, the system is operable to receive an on-demand change request associated with at least one of: throughput, or latency. In one embodiment, the computing device is one of: an access point (AP); a base station; a wireless smartphone device; a wireless LAN device; an access gateway; a router, a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline

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device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[00106] In another example, a method performed by a server comprises: receiving first information from a first downloadable agent; receiving second information from a second downloadable agent; storing the first and second information in a database; analyzing the first and second information with reference to data already stored in the database; and reporting the analyzed first and second information to a management entity.

[00107] In one embodiment, the first and second information are time stamped. In one embodiment, the first and second agents are executable on multiple computing machines. In one embodiment, the first downloadable agent is communicatively coupled to a first LAN device. In one embodiment, the first downloadable agent is operable to collect information from multiple computing entities coupled to the first LAN device. In one embodiment, the second downloadable agent is communicatively coupled to a second LAN device. In one embodiment, the second downloadable agent is operable to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.

[00108] In one embodiment, the first and second LAN devices comprise at least one of: tablet computing device; an access point (AP); a base station; a wireless smartphone device; a wireless LAN device; a router; an access gateway; a

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performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[00109] In one embodiment, the first and second downloadable agents execute on devices coupled to the same LAN. In one embodiment, the first and second downloadable agents execute on devices coupled to distinct LANs. In one embodiment, the method further comprises: determining control information for a DSL operator, the control information according to the analyzed first and second information; and recommending the DSL operator with the control information to improve performance of a DSL service.

[00110] In one embodiment, the control information relates to on-demand change in performance of the DSL service. In one embodiment, the on-demand change is associated with at least one of: throughput, latency, packet loss, or jitter. In one embodiment, the method of reporting comprises at least one of: providing statistical analysis including throughput; providing availability of higher bandwidth for operating a DSL service; providing purchase information (or service product information) for improving DSL service performance; or providing utilization information for optimizing a consumers DSL service cost. In one embodiment, the method of receiving the first and second information is via Internet.

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[00111] In one embodiment, the first and second information includes at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[00112] In one embodiment, the method of analyzing the first information with reference to the second information comprises at least one of: performing statistical analysis including throughput; determining availability of higher bandwidth for operating a DSL service; determining purchase information (or service product information) for improving DSL service performance; determining utilization information for optimizing a consumers DSL service cost; or grouping data in the database according to at least one of geographical location, services type, service provider, or time.

[00113] In one embodiment, the method further comprises: processing data from the distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by corresponding first or second downloadable agents. In one embodiment, the method of further comprises: processing data from the distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN. In one embodiment, the analyses for each LAN include at least one of: whether the LAN is under or over performing relative to a neighboring LAN; or whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN.

[00114] In one embodiment, the server comprises: a first module for collecting the first and second information; a second module for performing statistical analysis using the first and/or second information; and a third module for generating instruction and command for the first and/or second devices or modules

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according to the statistical analysis. In one embodiment, the modules that receive the instruction and command from the third module are accessible by internet. In one embodiment, the server comprises: a management interface for communicating with the first and second downloadable agents via internet. In one embodiment, the server comprises: a user interface module for providing access and for displaying information associated with the first, second, third modules.

[00115] In one embodiment, the first information is collected by a downloadable agent coupled to a DSL connection, the downloadable agent to send the first information to the server. In one embodiment, the server resides in a cloud. In one embodiment, the server is operable to compute throughput of a DSL connection by collecting current performance metrics associated with the DSL service. In one embodiment, the server to perform throughput computation with reference to a website. In one embodiment, the throughput computation comprises probing a network.

[00116] In one embodiment, the method of probing comprises: transmitting probing data from a communication device to another communication device; and waiting for a predetermined time before reading operational data including counter values related to user data traffic. In one embodiment, the method of probing comprises: transmitting probing data from a communication device to another communication device; and receiving a report indicating amount of data or data received by the other communication device. In one embodiment, the server is operable to apply a machine learning algorithm for training a performance estimation algorithm for the communication device.

[00117] In another example, a machine readable storage medium is provided having computer executable instructions that when executed cause a processor to perform a method according to the method discussed above.

[00118] In another example, a system comprises: a database; a communication interface for communicating with other devices; and a server coupled to the database and the communication interface, wherein the server is operable to perform a method according to the method discussed above.

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[00119] In one embodiment, the server comprises: a first module for collecting the first and second information; a second module for performing statistical analysis using the first and/or second information; and a third module for generating instruction and command for the first and/or second devices or modules according to the statistical analysis. In one embodiment, the modules that receive the instruction and command from the third module are accessible by internet. In one embodiment, the server comprises: a management interface for communicating with the first and second agents via internet. In one embodiment, the server comprises: a user interface module for providing access and for displaying information associated with the first, second, third modules.

[00120] In one embodiment, the first information is collected by a downloadable agent coupled to a DSL connection, the downloadable agent to send the first information to the server. In one embodiment, the server is operable to compute throughput of the DSL connection by collecting current performance metrics associated with the DSL service. In one embodiment, the server to perform throughput computation with reference to a website. In one embodiment, the throughput computation comprises probing a network. In one embodiment, the server resides in a cloud. In one embodiment, the communication interface comprises at least one of: a wired Ethernet interface; a powerline communications interface; or a wireless interface.

[00121] In one embodiment, the other devices comprise at least one of: tablet computing device; an access point (AP); a base station; a wireless mobile device; a wireless LAN device; an access gateway; a router; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer

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electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[00122] In another example, a method performed by a downloadable agent on a processor comprises: collecting first information related to performance of a network device associated with the downloadable agent; sending the first information to a machine, wherein the first information is stored in a database coupled to the machine, and wherein the machine is operable to: receive second information from another downloadable agent; and analyze the first and second information with reference to data already stored in the database; and receiving a report of the analyzed first and second information.

[00123] In one embodiment, the first and second information is time stamped. In one embodiment, the downloadable agent is executable on multiple computing machines. In one embodiment, the downloadable agent is communicatively coupled to a first LAN device. In one embodiment, the method of collecting first information comprises collecting information from multiple computing entities coupled to the first LAN device. In one embodiment, the other downloadable agent is communicatively coupled to a second LAN device. In one embodiment, the other downloadable agent is operable to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.

[00124] In one embodiment, the network device, and the first and second LAN devices comprise at least one of: tablet computing device; an access point (AP); a base station; a wireless mobile device; a wireless LAN device; a DSLAM; an access gateway; a router; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home

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appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[00125] In one embodiment, the machine is a server in a cloud. In one embodiment, the first and second information include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[00126] In one embodiment, the method further comprises: sending an on-demand change request associated with at least one of: throughput, or latency. In one embodiment, the method of receiving the report comprises at least one of: receiving statistical analysis including throughput; receiving availability of higher bandwidth for operating a DSL service; receiving purchase information (or service product information) for improving DSL service performance; or receiving utilization information for optimizing a consumers DSL service cost.

[00127] In one embodiment, the machine is operable to: process data from distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by respective downloadable agents coupled to respective distinct LANs. In one embodiment, the machine is operable to: process data from distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created

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and from other LANs different from that LAN. In one embodiment, the analyses for each LAN include at least one of: whether the LAN is under or over performing relative to a neighboring LAN; or whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN.

[00128] In another example, a machine readable storage medium is provided having computer executable instructions that when executed cause a processor to perform a method according to the method discussed above.

[00129] An abstract is provided that will allow the reader to ascertain the nature and gist of the technical disclosure. The abstract is submitted with the understanding that it will not be used to limit the scope or meaning of the claims. The following claims are hereby incorporated into the detailed description, with each claim standing on its own as a separate embodiment.

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CLAIMS

We claim:

1. A method performed by a downloadable agent, the method comprising:
 - collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
 - transmitting the WAN performance information to a machine; wherein the machine is operable to:
 - store the WAN performance information in a database associated with the machine,
 - analyze the WAN performance information to generate an analysis result; and
 - report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.
2. The method of claim 1, wherein the other device is a router.
3. The method of claim 1, wherein the machine is operable to store the WAN performance information with an associated timestamp.
4. The method of claim 1 wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.
5. The method of claim 4 further comprises transmitting by the downloadable agent the LAN performance data to the machine.

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6. The method of claim 1, wherein the downloadable agent is executable in a virtual machine on the computing device.
7. The method of claim 1 wherein the downloadable agent is dynamically downloaded to the computing device.
8. The method of claim 1 further comprises receiving the analysis result, wherein receiving the analysis result comprises at least one of:
 - receiving statistical analysis including throughput;
 - receiving availability of higher bandwidth for operating a DSL service;
 - receiving service product information for improving DSL service performance; or
 - receiving utilization information for optimizing a consumers DSL service cost.
9. The method of claim 1, wherein the WAN performance information includes at least one of:
 - topological information,
 - geographical information,
 - throughput,
 - latency,
 - jitter,
 - packet loss,
 - time,
 - type of communication device,
 - device network identification,
 - manufacturer and model of equipment,
 - equipment characteristics,
 - firmware,
 - user's network usage pattern,

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user's provisioned WAN service,
RF characteristics including at least one of: signal power, frequency
bands and mode of operation,
environment statistics, or
data on operation of communication devices.

10. The method of claim 1 further comprises:
 sending an on-demand change request associated with at least one of:
 throughput, or latency.
11. The method of claim 1, wherein the machine is a server that resides in a
 cloud.
12. The method of claim 1, wherein the computing device is one of:
 tablet computing device;
 a personal computer;
 a gaming console;
 an access point (AP);
 a base station;
 a wireless smartphone device;
 a wireless LAN device;
 an access gateway;
 a router;
 a performance enhancement device;
 a Digital Subscriber Line (DSL) Customer Premises Equipment
 (CPE) modem;
 a cable CPE modem;
 an in-home powerline device;
 a Home Phoneline Network Alliance (HPNA) based device;
 an in-home coax distribution device;
 a G.hn (Global Home Networking Standard) compatible device;

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an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge; and
an Ethernet connected network switch.

13. A machine readable storage medium having computer executable instructions that when executed cause a processor to perform a method according to any one of method claims 1 to 12.
14. A system comprising:
 - a database; and
 - a server coupled to the database, the server operable to:
 - receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and

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store the WAN performance information in the database associated with the server,

analyze the WAN performance information to generate an analysis result; and

report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

15. The system of claim 14, wherein the server resides in a cloud.
16. The system of claim 14, wherein the server is operable to store the WAN performance information with an associated timestamp.
17. The system of claim 14, wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.
18. The system of claim 17, wherein the server is operable to receive from the downloadable agent the LAN performance data.
19. The system of claim 18, wherein the server comprises:
 - a first module for collecting the WAN performance information;
 - a second module for performing statistical analysis using the first WAN performance information; and
 - a third module for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider..
20. The system of claim 19, wherein the modules that receive the instruction and command from the third module are accessible by internet.

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21. The system of claim 19, wherein the server comprises:
 - a management interface for communicating with the downloadable agent via internet.
22. The system of claim 19, wherein the server comprises:
 - a user interface module for providing access and for displaying information associated with the first, second, third modules.
23. The system of claim 14, wherein the server is operable to compute throughput of DSL connection by collecting current performance metrics associated with DSL service.
24. The system of claim 23, wherein the server to perform throughput computation with reference to a website.
25. The system of claim 24, wherein the throughput computation comprises probing a network.
26. The system of claim 14, wherein the downloadable agent is executable in a virtual machine on the computing device.
27. The system of claim 14, wherein the downloadable agent is dynamically downloaded to the computing device.
28. The system of claim 14, wherein the server is operable to report the analysis result by performing at least one of:
 - sending statistical analysis including throughput;
 - sending availability of higher bandwidth for operating a DSL service;
 - sending service product information for improving DSL service performance; or
 - sending utilization information for optimizing a consumers DSL

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service cost.

29. The system of claim 14, wherein the WAN performance information includes at least one of:
- topological information,
 - geographical information,
 - time,
 - throughput,
 - latency,
 - jitter,
 - packet loss,
 - type of communication device,
 - device network identification,
 - manufacturer and model of equipment,
 - equipment characteristics,
 - firmware,
 - user's network usage pattern,
 - RF characteristics including at least one of: signal power, frequency bands and mode of operation,
 - environment statistics, or
 - data on operation of communication devices.
30. The system of claim 14, wherein the server is operable to receive an on-demand change request associated with at least one of: throughput, or latency.
31. The system of claim 14, wherein the computing device is one of:
- tablet computing device;
 - an access point (AP);
 - a base station;
 - a wireless smartphone device;

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a wireless LAN device;
an access gateway;
a router,
a performance enhancement device;
a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge; and
an Ethernet connected network switch.

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32. A method comprising:
receiving first information from a first downloadable agent;
receiving second information from a second downloadable agent;
storing the first and second information in a database;
analyzing the first and second information with reference to data
already stored in the database; and
reporting the analyzed first and second information to a management
entity.
33. The method of claim 32, wherein the first and second information are time
stamped.
34. The method of claim 32, wherein the first and second agents are executable
on multiple computing machines.
35. The method of claim 32, wherein the first downloadable agent is
communicatively coupled to a first LAN device.
36. The method of claim 35, wherein the first downloadable agent is operable to
collect information from multiple computing entities coupled to the first
LAN device.
37. The method of claim 35, wherein the second downloadable agent is
communicatively coupled to a second LAN device.
38. The method of claim 37, wherein the second downloadable agent is operable
to collect information from multiple computing entities coupled to the
second LAN device, the second LAN device being different from the first
LAN device.
39. The method of claim 38, wherein the first and second LAN devices comprise
at least one of:

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an access point (AP);
a base station;
a wireless smartphone device;
a wireless LAN device;
a router
an access gateway;
a performance enhancement device;
a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge; and

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an Ethernet connected network switch.

40. The method of claim 32, wherein the first and second downloadable agents execute on devices coupled to the same LAN.

41. The method of claim 32, wherein the first and second downloadable agents execute on devices coupled to distinct LANs.

42. The method of claim 41 further comprises:
processing data from the distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by corresponding first or second downloadable agents.

43. The method of claim 41 further comprises:
processing data from the distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN.

44. The method of claims 42 or 43, wherein the analyses for each LAN include at least one of:

whether the LAN is under or over performing relative to a neighboring LAN; or

whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN.

45. The method of claim 32 further comprises:
determining control information for a DSL operator, the control

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information according to the analyzed first and second information; and
recommending the DSL operator with the control information to
improve performance of a DSL service.

46. The method of claim 45, wherein the control information includes at least one or more of signals or commands related to:
- power,
 - spectrum control,
 - margin, data rate,
 - latency/delay, or
 - coding.
47. The method of claim 40, wherein the control information relates to on-demand change in performance of the DSL service.
48. The method of claim 44, wherein the on-demand change is associated with at least one of:
- throughput,
 - latency,
 - packet loss, or
 - jitter.
49. The method of claim 32, wherein reporting comprises at least one of:
- providing statistical analysis including throughput;
 - providing availability of higher bandwidth for operating a DSL service;
 - providing service product information for improving DSL service performance; or
 - providing utilization information for optimizing a consumers DSL service cost.
50. The method of claim 32, wherein receiving the first and second information

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is via Internet.

51. The method of claim 32, wherein the first and second information includes at least one of:
- topological information,
 - geographical information,
 - time,
 - throughput,
 - latency,
 - jitter,
 - packet loss,
 - type of communication device,
 - device network identification,
 - manufacturer and model of equipment,
 - equipment characteristics,
 - firmware,
 - user's network usage pattern,
 - RF characteristics including at least one of: signal power, frequency bands and mode of operation,
 - environment statistics, or
 - data on operation of communication devices.
52. The method of claim 32, wherein analyzing the first information with reference to the second information comprises at least one of:
- performing statistical analysis including throughput;
 - determining availability of higher bandwidth for operating a DSL service;
 - determining service product information for improving DSL service performance;
 - determining utilization information for optimizing a consumers DSL service cost; or

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grouping data in the database according to at least one of geographical location, services type, service provider, or time.

53. The method of claim 32, wherein the methods of receiving, analyzing, and reporting are performed by a server.
54. The method of claim 53, wherein the server comprises:
 - a first module for collecting the first and second information;
 - a second module for performing statistical analysis using the first and/or second information; and
 - a third module for generating instruction and command for the first and/or second devices or modules according to the statistical analysis.
55. The method of claim 54, wherein the modules that receive the instruction and command from the third module are accessible by internet.
56. The method of claim 54, wherein the server comprises:
 - a management interface for communicating with the first and second downloadable agents via internet.
57. The method of claim 54, wherein the server comprises:
 - a user interface module for providing access and for displaying information associated with the first, second, third modules.
58. The method of claim 54, wherein the first information is collected by a downloadable agent coupled to a DSI connection, the downloadable agent to send the first information to the server.
59. The method of claim 54, wherein the server resides in a cloud.
60. The method of claim 54, wherein the server is operable to compute

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throughput of a DSL connection by collecting current performance metrics associated with the DSL service.

61. The method of claim 60, wherein the server to perform throughput computation with reference to a website.
62. The method of claim 61, wherein the throughput computation comprises probing a network.
63. The method of claim 62, wherein probing comprises:
 - transmitting probing data from a communication device to another communication device; and
 - waiting for a predetermined time before reading operational data including counter values related to user data traffic.
64. The method of claim 62, wherein probing comprises:
 - transmitting probing data from a communication device to another communication device; and
 - receiving a report indicating amount of data or data received by the other communication device.
65. The method of claim 63, wherein the server to apply a machine learning algorithm for training a performance estimation algorithm for the communication device.
66. A machine readable storage medium having computer executable instructions that when executed cause a processor to perform a method according to any one of method claims 32 to 65.
67. A system comprising:
 - a database;

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a communication interface for communicating with other devices;

and

a server coupled to the database and the communication interface, the server operable to perform a method according to any one of method claims 32 to 49.

68. The system of claim 67, wherein the server comprises:
- a first module for collecting the first and second information;
 - a second module for performing statistical analysis using the first and/or second information; and
 - a third module for generating instruction and command for the first and/or second devices or modules according to the statistical analysis.
69. The system of claim 68, wherein the modules that receive the instruction and command from the third module are accessible by internet.
70. The system of claim 68, wherein the server comprises:
- a management interface for communicating with the first and second agents via internet.
71. The system of claim 68, wherein the server comprises:
- a user interface module for providing access and for displaying information associated with the first, second, third modules.
72. The system of claim 68, wherein the first information is collected by a downloadable agent coupled to a DSL connection, the downloadable agent to send the first information to the server.
73. The system of claim 72, wherein the server is operable to compute throughput of the DSL connection by collecting current performance metrics associated with the DSL service.

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74. The system of claim 73, wherein the server to perform throughput computation with reference to a website.
75. The system of claim 74, wherein the throughput computation comprises probing a network.
76. The system of claim 67, wherein the server resides in a cloud.
77. The system of claim 67, wherein the communication interface comprises at least one of:
a wired Ethernet interface;
a powerline communications interface; or
a wireless interface.
78. The system of claim 67, wherein the other devices comprise at least one of:
tablet computing device;
an access point (AP);
a base station;
a wireless mobile device;
a wireless LAN device;
an access gateway;
a router;
a performance enhancement device;
a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;

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- an in-home appliance communicatively interfaced with the LAN;
- a wireless femtocell base station;
- a wireless Wi-Fi compatible base station;
- a wireless mobile device repeater;
- a wireless mobile device base station;
- nodes within an ad-hoc/mesh network;
- a set-top box (STB)/set-top unit (STU) customer electronics device;
- an Internet Protocol (IP) enabled television;
- an IP enabled media player;
- an IP enabled gaming console;
- an Ethernet gateway;
- a computing device connected to the LAN;
- an Ethernet connected computer peripheral device;
- an Ethernet connected router;
- an Ethernet connected wireless bridge;
- an Ethernet connected network bridge; and
- an Ethernet connected network switch.

79. A method performed by a downloadable agent on a processor, the method comprising:
- collecting first information related to performance of a network device associated with the downloadable agent;
 - sending the first information to a machine, wherein the first information is stored in a database coupled to the machine, and wherein the machine is operable to:
 - receive second information from another downloadable agent;
 - and
 - analyze the first and second information with reference to data already stored in the database; and
 - receiving a report of the analyzed first and second information.

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80. The method of claim 79, wherein the first and second information is time stamped.
81. The method of claim 79, wherein the downloadable agent is executable on multiple computing machines.
82. The method of claim 79, wherein the downloadable agent is communicatively coupled to a first LAN device.
83. The method of claim 82, wherein collecting first information comprises collecting information from multiple computing entities coupled to the first LAN device.
84. The method of claim 82, wherein the other downloadable agent is communicatively coupled to a second LAN device.
85. The method of claim 84, wherein the other downloadable agent is operable to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.
86. The method of claim 85, wherein the network device and the first and second LAN devices comprise at least one of:
- an access point (AP);
 - a base station;
 - a wireless mobile device;
 - a wireless LAN device;
 - a DSLAM;
 - an access gateway;
 - a router;
 - a performance enhancement device;
 - a Digital Subscriber Line (DSL) Customer Premises Equipment

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(CPE) modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge; and
an Ethernet connected network switch.

87. The method of claim 79, wherein the machine is a server in a cloud.
88. The method of claim 79, wherein the first and second information include at least one of:
topological information,
geographical information,
time,

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throughput,
latency,
jitter,
packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency
bands and mode of operation,
environment statistics, or
data on operation of communication devices.

89. The method of claim 79 further comprises:
 sending an on-demand change request associated with at least one of:
 throughput, or latency.
90. The method of claim 79, wherein receiving the report comprises at least one
of:
 receiving statistical analysis including throughput;
 receiving availability of higher bandwidth for operating a DSL
service;
 receiving service product information for improving DSL service
performance; or
 receiving utilization information for optimizing a consumers DSL
service cost.
91. The method of claim 79, wherein the machine is operable to:

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process data from distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by respective downloadable agents coupled to respective distinct LANs.

92. The method of claim 79, wherein the machine is operable to:
process data from distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN.

93. The method of claims 91 or 92, wherein the analyses for each LAN include at least one of:

whether the LAN is under or over performing relative to a neighboring LAN; or

whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN.

94. A machine readable storage medium having computer executable instructions that when executed cause a processor to perform a method according to any one of method claims 79-93.

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ABSTRACT

Described is a method performed by a downloadable agent, the method comprising: collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and transmitting the WAN performance information to a machine; wherein the machine is operable to: store and analyze the performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and its service provider. Described is a corresponding system which comprises a database; and a server coupled to the database, the server operable to: receive WAN performance information from a downloadable agent; store the information in the database, analyze the information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	8241P073Z
		Application Number	
Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1					Remove
Applicant Authority		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117	<input type="radio"/> Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Leonardo		Dagum		
Residence Information (Select One)					
		<input checked="" type="radio"/> US Residency		<input type="radio"/> Non US Residency	<input type="radio"/> Active US Military Service
City	Redwood City	State/Province	CA	Country of Residence i	US
Citizenship under 37 CFR 1.41(b) i		CA			
Mailing Address of Applicant:					
Address 1		133 Woodsworth Avenue			
Address 2					
City	Redwood City	State/Province	CA		
Postal Code	94062	Countryi	US		
Applicant 2					Remove
Applicant Authority		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117	<input type="radio"/> Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Philip		Bednarz		
Residence Information (Select One)					
		<input checked="" type="radio"/> US Residency		<input type="radio"/> Non US Residency	<input type="radio"/> Active US Military Service
City	Palo Alto	State/Province	CA	Country of Residence i	US
Citizenship under 37 CFR 1.41(b) i		US			
Mailing Address of Applicant:					
Address 1		731 Holly Oak			
Address 2					
City	Palo Alto	State/Province	CA		
Postal Code	94303	Countryi	US		
Applicant 3					Remove
Applicant Authority		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117	<input type="radio"/> Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Marc		Goldburg		
Residence Information (Select One)					
		<input checked="" type="radio"/> US Residency		<input type="radio"/> Non US Residency	<input type="radio"/> Active US Military Service
City	Redwood City	State/Province	CA	Country of Residence i	US

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	8241P073Z	
		Application Number		
Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
Citizenship under 37 CFR 1.41(b) i		US		
Mailing Address of Applicant:				
Address 1		226 Hillsdale Way		
Address 2				
City	Redwood City	State/Province	CA	
Postal Code	94062	Countryⁱ	US	
Applicant 4				<input type="button" value="Remove"/>
Applicant Authority		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117
				<input type="radio"/> Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix
	Ardavan	Maleki	Tehrani	
Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service				
City	Menlo Park	State/Province	CA	Country of Residenceⁱ US
Citizenship under 37 CFR 1.41(b) i		US		
Mailing Address of Applicant:				
Address 1		350 Sharon Park Drive R-24		
Address 2				
City	Menlo Park	State/Province	CA	
Postal Code	94025	Countryⁱ	US	
Applicant 5				<input type="button" value="Remove"/>
Applicant Authority		<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117
				<input type="radio"/> Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix
	Wonjong		Rhee	
Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service				
City	San Francisco	State/Province	CA	Country of Residenceⁱ US
Citizenship under 37 CFR 1.41(b) i		US		
Mailing Address of Applicant:				
Address 1		235 Berry Street Apt. #606		
Address 2				
City	San Francisco	State/Province	CA	
Postal Code	94158	Countryⁱ	US	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.				<input type="button" value="Add"/>

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

An Address is being provided for the correspondence Information of this application.

Customer Number 08791

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	8241P073Z
		Application Number	
Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK		
Email Address	FIP_Group@BSTZ.com	<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

Application Information:

Title of the Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK		
Attorney Docket Number	8241P073Z	Small Entity Status Claimed	<input type="checkbox"/>
Application Type	Provisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	10	Suggested Figure for Publication (if any)	

Publication Information:

<input type="checkbox"/>	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
<input type="checkbox"/>	Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.			
Please Select One:	<input checked="" type="radio"/> Customer Number	<input type="radio"/> US Patent Practitioner	<input type="radio"/> Limited Recognition (37 CFR 11.9)
Customer Number	08791		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.			
Prior Application Status			<input type="button" value="Remove"/>
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			<input type="button" value="Add"/>

Foreign Priority Information:

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	8241P073Z
		Application Number	
Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK		

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Remove

Application Number	Country ⁱ	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			<input type="radio"/> Yes <input type="radio"/> No

Additional Foreign Priority Data may be generated within this form by selecting the Add button.

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Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Remove

Assignee 1

If the Assignee is an Organization check here.

Organization Name Adaptive Spectrum and Signal Alignment, Inc.

Mailing Address Information:

Address 1	333 Twin Dolphin Drive		
Address 2			
City	Redwood City	State/Province	CA
Country ⁱ	US	Postal Code	94065-1417
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the Add button.

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Signature	/Usman A. Mughal/		Date (YYYY-MM-DD)	2012-07-13	
First Name	Usman	Last Name	Mughal	Registration Number	62887

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1	Drawings-only black and white line drawings	8241P073PCT_FIGURES_FINAL_7_13_12.pdf	520539 9a0f7d2ee02eab7ef79a62b4432505e9e499e7cb	no	11
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		Document Description	Start	End	
		Specification	1	35	
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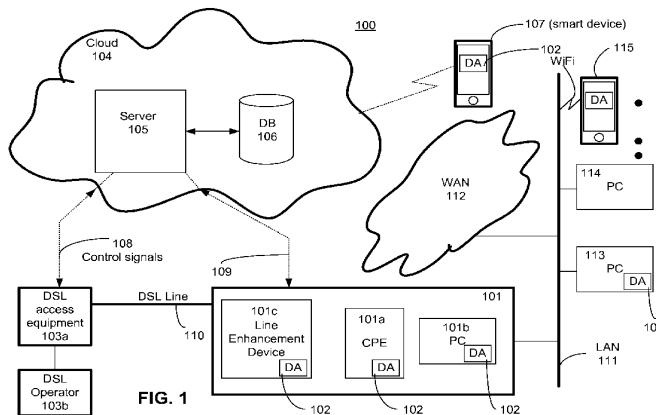
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[Continued on next page]

(54) Title: METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK



(57) Abstract: Described is a method performed by a downloadable agent, the method comprising: collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and transmitting the WAN performance information to a machine; wherein the machine is operable to: store and analyze the performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and its service provider. Described is a corresponding system which comprises a database; and a server coupled to the database, the server operable to: receive WAN performance information from a downloadable agent; store the information in the database, analyze the information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

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**METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A
COMMUNICATION SYSTEM, DEVICE, OR LINK**

CLAIM OF PRIORITY

[0001] This application claims priority to, and incorporates by reference in its entirety, U.S. Provisional Application No. 61/671,672 filed July 13, 2012, and entitled “METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK.”

BACKGROUND

[0002] In current practice, Wide Area Network (WAN) and/or Local Area Network (LAN) performance information is not centrally analyzed by a communication device coupled to such networks to account for information such as topological information, geographical information, user’s network usage pattern, quality of network connection, time, throughput, etc. Accordingly, communication devices coupled to such networks may operate with lower performance than otherwise possible because the communication devices have no means for knowing performance data that can be used to intelligently assess and manage performance of the communication device and/or network connection. An example of a communication device is a smart phone, computer, a router, etc.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] Embodiments of the disclosure will be understood more fully from the detailed description given below and from the accompanying drawings of various embodiments of the disclosure, which, however, should not be taken to limit the disclosure to the specific embodiments, but are for explanation and understanding only.

[0004] **Fig. 1** is a communication network with some or all communication devices having a downloadable agent to assist with performance analysis, according to one embodiment of the disclosure.

[0005] **Fig. 2** is a system with a server (or the analysis machine) operable to communicate with one or more downloadable agents, according to one embodiment of the disclosure.

[0006] **Fig. 3** is a flowchart of a method performed by the downloadable agent and an analysis machine of the communication network, according to one embodiment of the disclosure.

[0007] **Fig. 4A** is a flowchart of a method performed by the downloadable agent, according to another embodiment of the disclosure.

[0008] **Fig. 4B** is a flowchart of a method performed by the server (or analysis machine), according to one embodiment of the disclosure.

[0009] **Fig. 5A** is flowchart of a method for performing a diagnostic test, according to one embodiment of the disclosure.

[0010] **Fig. 5B** is flowchart of a method for running (i.e., executing) functions, according to another embodiment of the disclosure.

[0011] **Fig. 6A** is an exemplary report provided by the server based on the information received from the downloadable agent, according to one embodiment of the disclosure.

[0012] **Fig. 6B** is another exemplary report provided by the server based on the information received from the downloadable agent, according to one embodiment of the disclosure.

[0013] **Fig. 7** is a processor-based system having machine-readable storage medium with computer executable instructions of a downloadable agent, according to one embodiment of the disclosure.

[0014] **Fig. 8** is a processor-based system having machine-readable storage medium with computer executable instructions executed by the server, according to one embodiment of the disclosure.

DETAILED DESCRIPTION

[0015] One of the problems with current communication systems is that information about the communication device and communication device performance inside the local area network (LAN) is generally available to other devices on the LAN, however not available to machines outside the LAN; i.e., the wide area network (WAN), or the cloud. In order to overcome this and other problems, the embodiments of this disclosure describe an agent (also called downloadable agent herein) which is placed inside the LAN, where the agent collects data on behalf of the cloud or WAN-based server and then transfers that data to the cloud or WAN-based server for analysis. Such an embodiment allows collection of information on all devices centrally for a comprehensive analysis.

[0016] The embodiments herein describe a method performed by a downloadable agent for collecting information associated with a communication device and then sending the collected information to another machine for analysis. In one embodiment, other interfaces of the communication device may be used in conjunction or independent of the downloadable agent to collect information associated with the communication device and then to send that collected information to another machine for analysis.

[0017] In one embodiment, the other machine is a server in a cloud which has access to information related to many communication devices and can use that information to generate a performance report for the communication device. In one embodiment, the server in the cloud does not have access to information of the communication devices in the absence of the downloadable agents. The downloadable agent, that may be downloaded on a user's browser or installed on the communication device, provides the server access to the information associated with the communication device. In one embodiment, the downloadable agent receives the report. In one embodiment, the report can be used to enhance the performance of the communication device. In one embodiment, the method comprises: collecting wide area network (WAN) performance information, wherein the downloadable agent is executable on a computing device coupled to a (local area network) LAN of a broadband subscriber, wherein the LAN is coupled by another

device to a WAN; and transmitting the WAN performance information to a machine. In one embodiment, the downloadable agent may be executable on a variety of different computer platforms and operating systems.

[0018] The term “Local Area Network” (LAN) herein generally refers to a computer or communication network that interconnects computers or communication devices in a limited area such as a home, school, computer laboratory, or office building using network media.

[0019] The term “Wide Area Network” (WAN) herein generally refers to a telecommunication network that covers a broad area (i.e., any network that links across metropolitan, regional, or national boundaries) compared to the limited area covered by a LAN.

[0020] In one embodiment, the machine (e.g., a server in a cloud) is operable to: store the WAN performance information in a database associated with the machine, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber’s service provider. In one embodiment, the broadband subscriber and/or the broadband subscriber’s service provider analyses the report and adjusts various performance parameters associated with the communication device or the networking devices with which it communicates to enhance the performance of the communication.

[0021] The term “performance” herein refers generally to network throughput (e.g., TCP/UDP), latency, jitter, connectivity, error rates, power consumption, transmit power, etc. Improving performance of the communication system includes increasing throughput, reducing error rate and latency, improving (i.e., reducing) jitter, reducing power consumption, etc. for the communicating system. The term “TCP” stands for Transmission Control Protocol. The term “UDP” refers to User Datagram Protocol. The term “successful” herein refers to an indication suggesting safe receipt of a packet that is often confirmed by ACK (acknowledge) message packet. In another embodiment, operational data such as error counts, retransmission counts, modulation, signal strength, etc. are used to estimate the performance and throughput of the communications link.

[0022] The embodiments herein allow a user of a communication device to install (download) an agent on their communication device, for example, personal computer, tablet computer, laptop, network gateway, smart phone, smart device, computer, DSL (Digital Subscriber Line) access equipment, router, etc) so that the communication device is able to collect performance related information for analysis by another machine (e.g., a server on a cloud) and then receive at least one of several statistical and commercial analyses including throughput and other measures of communications performance; availability of higher bandwidth for operating a communication device/link (e.g., DSL) service; purchase information (or service product information) for improving communication device/link (e.g., DSL) service performance; or utilization information for optimizing a consumers' communication device/link (e.g., DSL) service cost. Such downloadable agent allows for customized enhancement of user experience with a communication device by enhancing the communication device's or link's performance.

[0023] In the following description, numerous details are discussed to provide a more thorough explanation of embodiments of the present disclosure. It will be apparent, however, to one skilled in the art, that embodiments of the present disclosure may be practiced without these specific details. In other instances, well-known structures and devices are shown in block diagram form, rather than in detail, in order to avoid obscuring embodiments of the present disclosure.

[0024] Note that in the corresponding drawings of the embodiments, signals are represented with lines. Some lines may be thicker, to indicate more constituent signal paths, and/or have arrows at one or more ends, to indicate primary information flow direction. Such indications are not intended to be limiting. Rather, the lines are used in connection with one or more exemplary embodiments to facilitate easier understanding of a circuit or a logical unit. Any represented signal, as dictated by design needs or preferences, may actually comprise one or more signals that may travel in either direction and may be implemented with any suitable type of signal scheme.

[0025] In the following description and claims, the term "coupled" and its derivatives may be used. The term "coupled" herein refers to two or more elements

which are in direct contact (physically, electrically, magnetically, electromagnetically, optically, etc.). The term “coupled” herein may also refer to two or more elements that are not in direct contact with each other, but still cooperate or interact with each other.

[0026] As used herein, unless otherwise specified the use of the ordinal adjectives “first,” “second,” and “third,” etc., to describe a common object, merely indicate that different instances of like objects are being referred to, and are not intended to imply that the objects so described must be in a given sequence, either temporally, spatially, in ranking or in any other manner.

[0027] **Fig. 1** is a communication network 100 with some or all communication devices having a respective downloadable agent (DA) to assist with performance analysis, according to one embodiment of the disclosure. In one embodiment, the communication network 100 comprises a local network 101 (e.g., a network at home) having Customer Premises Equipment (CPE) 101a and a personal computer (PC) 101b. In one embodiment, the local area network (LAN) 101 optionally comprises a line enhancement device 101c which is any device coupled to the DSL 110 that improves the quality or performance on the DSL 110. In one embodiment, the line enhancement device 101c is a standalone device. In another embodiment, the line enhancement device 101c is integrated with the CPE 101a. In one embodiment, one or more devices of the LAN (e.g., home LAN) 101 are operable to communicate with the server 105 via the Internet 109 (via wired or wireless connections).

[0028] In one embodiment, the communication network 100 comprises a server 105 coupled to a database 106, wherein the server and/or the database 106 reside in a cloud 104.

[0029] The term “cloud” herein refers generally to cloud computing which is the delivery of computing and storage capacity as a service to a community of end-recipients. The term “cloud” is indicated with use of a cloud-shaped symbol 104 as an abstraction for the complex infrastructure it contains in system diagrams. Cloud computing entrusts services with a user's data, software and computation over a network. In one embodiment, the server 105 resides in the cloud 104 and is

operable to perform complex analysis (e.g., statistical) based on information collected from other communication devices via the Internet.

[0030] In one embodiment, the communication network 100 comprises a DSL access equipment 103a (also called a DSL access network, or DSL node) which is operable to communicate with the CPE 101a via a DSL line 110. In one embodiment, the DSL access equipment 103a comprises a DSLAM (digital subscriber line access multiplexer). In one embodiment, the DSL access equipment 103a comprises a CO (central office). In one embodiment, the DSL access equipment 103a receives control signals 108 from the server 105 that instruct a DSL operator 103b about ways to improve performance of its customers e.g., CPE 101a, etc.

[0031] In one embodiment, the control signals 108 include at least one or more of signals or commands related to: power, for example, transmit power, spectrum control, for example, Power Spectral Density (PSD) mask, margin, data rate, latency/delay, coding, for example, Forward Error Correction (FEC) coding.

[0032] In one embodiment, the server 105 is operable to access external communication devices (external to the cloud 104) through cloud-based applications via a web browser or mobile application. In the embodiments discussed herein the downloadable agent (DA) 102 is operable to communicate with the resources (e.g., server 105, database 106) of the cloud 104. In one embodiment, the DA 102 may be downloaded from any platform e.g., a disk, memory stick, web browser, web server, etc. In one embodiment, the DA 102 associated with a communication device executes on an Internet browser (e.g., Safari®, Netscape®, FireFox®, Internet Explorer®, etc). In one embodiment, the DA 102 associated with the communication device is accessible remotely via the Internet.

[0033] In one embodiment, the DA 102 is operable to execute on multiple computing platforms with different operating systems. For example, the DA 102 may operate on operating systems including Android, Berkley Software Distribution (BSD), iOS, GNU/Linux, Apple Mac OS X, Microsoft Windows, Windows Phone, and IBM z/OS. In one embodiment, the DA 102 is operable to execute in a virtual machine (VM). A VM is a software implementation of a machine (e.g., a computer)

that executes programs like a physical machine. Examples of virtual machines include a Java Virtual Machine and the previously mentioned operating systems executing in VMWare, Virtual Box or the like. In one embodiment, the DA 102 may receive automatic updates to keep the application up to date with the latest features. In one embodiment, the downloadable agent is dynamically downloaded to the computing device.

[0034] The term “dynamically” herein refers to the downloading of an agent by the computing device on-demand and prior to use of the agent. A dynamically downloaded agent may be deleted from the computing device following the use of that agent.

[0035] In one embodiment, the communication network 100 comprises a wireless device, for example, a smart device (e.g., smart phone, tablet, etc) with a DA 102. In one embodiment, the DA 102 is operable to review an analysis report generated by the server 105 for any of the communicating devices it has authorization to access.

[0036] In one embodiment, the server 105 is operable to receive WAN performance information from a DA 102, wherein the DA 102 is executable on a computing device (e.g., 101a-b, 107, 113) coupled to a LAN 111 of a broadband subscriber, wherein the LAN 111 is coupled by another device to a WAN 112. In one embodiment, a DSL modem and a home gateway couple the LAN 111 to the WAN 112. In one embodiment, the DSL modem and home gateway are integrated into a single enclosure.

[0037] In one embodiment, the DA 102 associated with the communication device collects data locally within the communication device and then periodically sends the collected data to the server 105. In one embodiment, the DA 102 may wait for certain conditions or thresholds to be met before sending all collected data to the server 105.

[0038] In one embodiment, the conditions and/or thresholds are related to a function of the type of data collected. For example, collected data may include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network

identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[0039] In one embodiment, the conditions are limits or thresholds on a performance level related to collected data. In one embodiment, a condition is an upper limit on jitter, or a lower limit on throughput. For example, if throughput drops below a lower limit/threshold, then the DA 102 may report and send the data to the server 105. In another example, if packet loss exceeds an upper limit, then the DA 102 may report and send the data to the server. In one embodiment, a condition is time expiration on a scheduled collection. For example, the DA 102 may send data to the server 105 after a pre-defined time is expired.

[0040] In another embodiment, server 105 collects information from the DA's, through server initiated communication. In one embodiment, server 105 collects information by polling or scheduled based system. One such example of polling is ping. In one embodiment, the server 105 may send a signal to a DA 102, or ping a DA 102, or communicate with a DA 102 on scheduled basis, after which the DA 102 sends collected information to the server 105.

[0041] In one embodiment, the computing device is one of: computer, personal computer, laptop/desktop, smart phone, tablet computing device; an access point (AP); a base station; a wireless smart phone device; a wireless LAN device; an access gateway; a router, a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled

gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[0042] In one embodiment, the server 105 is operable to store the WAN performance information in the database 106 associated with the server 105. In one embodiment, the server 105 is operable to store the WAN performance information with an associated timestamp. In one embodiment, the DA 102 is operable to collect LAN performance data from at least one of the computing device (e.g., 101b) and another device (e.g., PC 113) coupled to the LAN 111. In one embodiment, the server 105 is operable to receive the LAN performance data from the DA 102.

[0043] In one embodiment, the WAN and LAN performance information include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[0044] Topological information may include information regarding the WAN or LAN topology. For example, whether a DSL modem is behind a firewall, or whether the Internet gateway is connected to a Wi-Fi access point via a router. The geographical information may include the address or global positioning system (GPS) location of the WAN or LAN modem, or the Internet gateway. The geographical information may be useful for, for example, neighborhood analysis, and for correlating information regarding neighbors, or users in a given geographical location. Environment Statistics may include any statistics related to the environment surrounding the WAN or LAN. For example, usage statistics, statistics on periods of peak operation, statistics on the data traffic (peak traffic, average traffic, etc.).

[0045] In one embodiment, LAN performance information also includes, without limitation: LAN media type, such as Ethernet, Wi-Fi, or powerline adapters; LAN media throughput rates; channel assignments for Wi-Fi media; Wi-Fi mode such as 802.11g or 802.11n; Wi-Fi transmit power levels; and spectral masks for powerline communication.

[0046] In one embodiment, the server 105 is operable to analyze the WAN performance information to generate an analysis result. In one embodiment, the server 105 is operable to generate analysis result by computing throughput of DSL connection 110 by collecting current performance metrics associated with DSL service. In one embodiment, the server 105 is operable to perform statistical analysis, including throughput, based on information received from the DA 102 and other information in the database.

[0047] In one embodiment, the server 105 is operable to compute throughput of a communication link (e.g., Wi-Fi or Ethernet link 109) by probing. In one embodiment, the process of probing comprises: transmitting probing data from a communication device (e.g., PC 101b) to another communication device (e.g., PC 113); and waiting for a predetermined time before reading operational data including counter values related to user data traffic. In one embodiment, the counter values include at least one of packet error counts, packet retransmission counts, successful ACK message counts, etc. The throughput information discussed in this embodiment and other embodiments of this disclosure could include at least one or more of the following: instantaneous speed or data rate, average data rate, and/or information on the peak and minimum data rates of a connection or communication link associated with the LAN and/or with the associated WAN.

[0048] The term “active probing” or simply “probing” herein generally refers to testing of a communication network by sending test pattern/data over the network from one communication device to another communication device, and then measuring the response from the sent test pattern. The response data is also referred herein as “active data” or “active measurement data” which is data associated with active probing of a communication network.

[0049] The term “operational data” herein generally refers to user visible or accessible data and is generally used for debugging and basic performance monitoring of communications systems.

[0050] In one embodiment, the method of probing comprises: transmitting probing data from a communication device (e.g., PC 101b) to another communication device (e.g., PC 113); and receiving a report indicating amount of data or data received by the other communication device.

[0051] In one embodiment, the server 105 is operable to determine availability of higher bandwidth for operating a DSL service. In one embodiment, the server 105 is operable to determine purchase information (or service product information) for improving DSL service performance. In one embodiment, the server 105 is operable to determine network, service, or communication link utilization information for optimizing a consumer DSL service cost. In one embodiment, the server 105 is operable to group data in the database 106 according to at least one of geographical location, services type, service provider, or time. The service product information includes information regarding the type and specification of the DSL service or services which is a DSL service user/customer has purchased from the DSL service provider.

[0052] In one embodiment, the server 105 receives information from other devices and/or sources other than the communication devices to perform a comprehensive analysis of the performance of the communication system as a whole and/or individually for the communication devices in the communication system. Examples of the other devices and/or sources include near-by radio stations, location of AM radio stations, goals or business rules defined by an operator, weather forecast from the National Weather Service, etc.

[0053] In one embodiment, the server 105 is operable to report the analysis result by sending availability of higher bandwidth for operating a DSL service to the DA 102 of 101a. In one embodiment, the server 105 is operable to report the analysis result by sending purchase information (or service product information) to PC 101b, smart device 107, or the user for improving DSL service performance. In one embodiment, the server 105 is operable to report the analysis result by sending

utilization information to PC 101b, smart device 107, or any device accessible by the user for optimizing consumer DSL service cost. In one embodiment, the DA 102 receives updated or new operational parameters from the server 105 based on the analysis performed by the server 105. For example, the server 105 when analyzing the data collected by the DA 102 of 101a, also takes into account historical information about the communication device 101a and information from other communication devices coupled to the network to provide updated operational parameters to the DA 102 of 101a so that the communication device 101a operates more efficiently under the current circumstances.

[0054] In one embodiment, the server 105 is operable to report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider. In one embodiment, the server 105 is operable to report the analysis result by sending statistical analysis to the PC 101b, smart device 107, or any device accessible by the user, the statistical analysis including throughput. In one embodiment, the server 105 is operable to report the analysis result by sending availability of higher bandwidth for operating a DSL service to the DA 102 of 101a. In one embodiment, the server 105 is operable to report the analysis result by sending purchase information (or service product information) to PC 101b, smart device 107, or the user for improving DSL service performance. In one embodiment, the server 105 is operable to report the analysis result by sending utilization information to PC 101b, smart device 107, or any device accessible by the user for optimizing consumer DSL service cost.

[0055] In one embodiment, the server 105 is operable to receive an on-demand change request. In one embodiment, the on-demand change is associated with at least one of: throughput, latency, packet loss, or jitter. For example, DA 102 of the PC 101b sends a request via connection 109 to the server 105 to acquire higher throughput than current throughput for its DSL line 110. In such an embodiment, the server 105 performs analysis based on available data in the database 106 and determines if the on-demand request by the PC 102c can be met. If it can be met, a report is provided to the DA 102 by the server 105 with information (e.g., cost etc) about how to improve throughput.

[0056] In one embodiment, the server 105 provides a marketplace of ideas for the communication devices for trading bandwidth (or performance) for media (or related) services. For example, the server 105 may provide information to the communication devices (after performing its analysis from the collected and historical information of the communication system) such as subscription to premium media services, direct payment, etc in exchange for improved performance.

[0057] **Fig. 2** is a system 200 with the server 105 (or the analysis machine) operable to communicate with one or more downloadable agents 102, according to one embodiment of the disclosure. Embodiments of **Fig. 2** are described with reference to **Fig. 1**. In one embodiment, the system 200 comprises a device 201 (e.g., cloud 104) having the server 105 coupled to the database 106.

[0058] In one embodiment, the server 105 comprises: a first module 202 for collecting the WAN and LAN performance and configuration information. In one embodiment, the server 105 comprises a second module 203 for performing statistical analysis using the WAN and LAN performance and configuration information. In one embodiment, the server 105 comprises a third module 204 for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider.

[0059] In one embodiment, the modules (e.g., DA 102) that receive the instruction and command from the third module 204 are accessible by the Internet. In one embodiment, the server 105 comprises: a management interface 205 for communicating with the DA 102 (any one of DAs 1-N, where 'N' is a positive integer) via the Internet 206 (e.g., 111, 109 of **Fig. 1**). In one embodiment, the server 105 comprises: a user interface module 207 for providing access to other communication devices and for displaying information associated with the first 202, second 203 and third 204 modules.

[0060] **Fig. 3** is a flowchart 300 of a method performed by the downloadable agent 102 and an analysis machine 105 (also referred to as the server 105) of the

communication network 100, according to one embodiment of the disclosure. Although the blocks in the flowcharts with reference to **Fig 3** are shown in a particular order, the order of the actions can be modified. Thus, the illustrated embodiments can be performed in a different order, and some actions/blocks may be performed in parallel. The flowchart of **Fig. 3** is illustrated with reference to the embodiments of **Figs. 1-2**. Some of the blocks and/or operations listed in **Fig. 3** are optional in accordance with certain embodiments. The numbering of the blocks presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur. Additionally, operations from the various flows may be utilized in a variety of combinations.

[0061] At block 301, the DA 102 collects WAN performance information, wherein the DA 102 is executable on a computing device (e.g., 101c) coupled to a LAN 111 of a broadband subscriber, wherein the LAN 111 is coupled by another device (e.g., PC 113) to a WAN 112. At block 302, the DA 102 transmits the WAN performance information to a machine (e.g., server 105). At block 303, the DA 102 is operable to collect LAN performance data from at least one of the computing device (e.g., 101c) and the other device (e.g., PC 113) coupled to the LAN 111.

[0062] At block 304, the DA 102 is operable to transmit the LAN performance data to the server 105. At block 305, the server 105 is operable to store the WAN/LAN performance information in the database 106 associated with the machine 105. At block 306, the server 105 is operable to store the WAN/LAN performance information with an associated timestamp. At block 307, the server 105 is operable to analyze the WAN/LAN performance information to generate an analysis result. At block 308, the server is operable to report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider. At block 309, the DA 102 receives the report with the analysis result from the server 105.

[0063] **Fig. 4A** is a flowchart 400 of a method performed by the downloadable agent 102, according to another embodiment of the disclosure. Although the blocks in the flowcharts with reference to **Fig 4A** are shown in a particular order, the order of the actions can be modified. Thus, the illustrated

embodiments can be performed in a different order, and some actions/blocks may be performed in parallel. The flowchart of **Fig. 4A** is illustrated with reference to the embodiments of **Figs. 1-2**. Some of the blocks and/or operations listed in **Fig. 4A** are optional in accordance with certain embodiments. The numbering of the blocks presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur. Additionally, operations from the various flows may be utilized in a variety of combinations.

[0064] At block 401, the downloadable agent 102 collects first information related to performance of a network device (e.g., 101c) associated with the downloadable agent 102. At block 402, the DA 102 sends the first information to a machine (e.g., server 105), wherein the first information is stored in a database 106 coupled to the machine 105, and wherein the machine 105 is operable to: receive second information from another downloadable agent (e.g., 102 of PC 113); and analyze the first and second information with reference to data already stored in the database 106. In one embodiment, the first and second information is time stamped.

[0065] In one embodiment, the first and second information include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, error information (link error rate), type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[0066] At block 403, the DA 102 receives a report of the analyzed first and second information. In one embodiment, reporting the analysis result comprises at least one of: sending statistical analysis including throughput; sending availability of higher bandwidth for operating a DSL service; sending purchase information (or service product information) for improving DSL service performance; or sending utilization information for optimizing a consumers DSL service cost.

[0067] In one embodiment, the downloadable agent 102 is executable on multiple computing machines (e.g., PC, smart phone, tablet, CPE, etc). In one embodiment, the downloadable agent 102 is communicatively coupled to a first

LAN device 101c. In one embodiment, the method of collecting first information comprises collecting information from multiple computing entities (e.g., 114, 101a, 101b) coupled to the first LAN device 101c. In one embodiment, the other downloadable agent 102 is communicatively coupled to a second LAN device 113. In one embodiment, the other downloadable agent (e.g., 102 of 113) is operable to collect information from multiple computing entities (e.g., 114 and others) coupled to the second LAN device 113, the second LAN device 113 being different from the first LAN device 101c.

[0068] In one embodiment, the network device, and the first and second LAN devices comprise at least one of: computer, personal computer (PC), laptop, tablet PC, smart phone, an access point (AP); a base station; a wireless mobile device; a wireless LAN device; a DSLAM; an access gateway; a router; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch, wearable devices, internet enabled cameras, etc.

[0069] In one embodiment, the machine is a server 105 in a cloud 104. In one embodiment, the method further comprises: sending an on-demand change request associated with at least one of: throughput, or latency. In one embodiment, the method of receiving the report comprises at least one of: receiving statistical analysis including throughput; receiving availability of higher bandwidth for

operating a DSL service; receiving purchase information (or service product information) for improving DSL service performance; or receiving utilization information for optimizing a consumers DSL service cost.

[0070] **Fig. 4B** is a flowchart 410 of a method performed by the server 105 (or analysis machine), according to one embodiment of the disclosure. Although the blocks in the flowcharts with reference to **Fig. 4B** are shown in a particular order, the order of the actions can be modified. Thus, the illustrated embodiments can be performed in a different order, and some actions/blocks may be performed in parallel. The flowchart of **Fig. 4B** is illustrated with reference to the embodiments of **Figs. 1-3**. Some of the blocks and/or operations listed in **Fig. 4B** are optional in accordance with certain embodiments. The numbering of the blocks presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur. Additionally, operations from the various flows may be utilized in a variety of combinations.

[0071] At block 411, the server 105 receives first information from a first downloadable agent 102 (e.g., DA 1 of **Fig. 2**). At block 412, the server 105 receives second information from a second downloadable agent 102 (e.g., DA 2 of **Fig. 2**). In one embodiment, the first and second information are time stamped. In one embodiment, the first and second information includes at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[0072] In one embodiment, the first (e.g., DA 1 of **Fig. 2**) and second (e.g., DA 2 of **Fig. 2**) agents are executable on multiple computing machines. In one embodiment, the first downloadable agent (e.g., DA 1 of **Fig. 2**) is communicatively coupled to a first LAN device 101c. In one embodiment, the first downloadable agent (e.g., DA 1 of **Fig. 2**) is operable to collect information from multiple computing entities (e.g., 101a, 101b) coupled to the first LAN device 101c. In one

embodiment, the first LAN device and the second LAN device are on the same LAN 111. In one embodiment, the first and second LAN devices are coupled to distinct LANs (not shown).

[0073] In one embodiment, the second downloadable agent (e.g., DA 1 of **Fig. 2**) is communicatively coupled to a second LAN device 113. In one embodiment, the second downloadable agent (e.g., DA 1 of **Fig. 2**) is operable to collect information from multiple computing entities (e.g., 114, and others) coupled to the second LAN device 113, the second LAN device 113 being different from the first LAN device 101c.

[0074] In one embodiment, the first PC 101b and second 113 LAN devices comprise at least one of: Computer, personal computer (PC), laptop, tablet PC, smart phone, an access point (AP); a base station; a wireless smart phone device; a wireless LAN device; a router; an access gateway; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch, wearable devices, internet enabled cameras, etc.

[0075] In one embodiment, the first (e.g., DA 1 of **Fig. 2**) and second (e.g., DA 2 of **Fig. 2**) downloadable agents execute on devices coupled to the same LAN 111. In one embodiment, the first and second downloadable agents execute on devices coupled to distinct LANs (not shown). In such an embodiment, server 105

may (a) process data from distinct LANs separately, to produce analyses and recommendations for each LAN based solely on measurements made from the DAs attached to each respective LAN device; or (b) process data from distinct LANs jointly, to produce analyses and recommendations for each LAN based, at least in part, on data reported from other LANs.

[0076] The term “measurement” herein generally refers to information that is collected, and optionally processed, by the DAs from the LAN devices. In one embodiment, the DAs process the information, and send the processed information to the server 105. For example, as opposed to sending collected information regarding raw data rate, the DAs may process the raw data rate and other related information collected over time, to measure throughput and send the measured throughput to the server 105. The measured throughput may be the average raw data rate over a specified period of time.

[0077] In one embodiment, jointly processed results from multiple LANs are used to determine whether one of the LANs is under or over-performing relative to its neighboring LANs. In one embodiment, server 105 processes data from the distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN. In this embodiment, recommendations and analyses are generated for a LAN based on data collected from it and data collected from other LANs.

[0078] In one embodiment, jointly processed results from multiple LANs are used to determine whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN. In one embodiment, comparing performance among LANs may require the presence of downloadable agents on multiple LANs. In one embodiment, comparing performances of access to a particular remote host can be done from a single LAN or from multiple LANs.

[0079] In one embodiment, LAN measurements that determine whether a LAN is under or over performing relative to its neighboring LANs, include basic estimates of throughput and stability. In one embodiment, LAN measurements

include measurements made from a particular LAN to one or more servers on the Internet to assess average Internet access performance or to access performance for particular Internet sites from devices attached to the LAN.

[0080] At block 413, the server 105 stores the first and second information in the database 106. At block 404, the server analyzes the first and second information with reference to data already stored in the database 106. In one embodiment, the method of analyzing the first information with reference to the second information comprises at least one of: performing statistical analysis including throughput; determining availability of higher bandwidth for operating a DSL service; determining purchase information (or service product information) for improving DSL service performance; determining utilization information for optimizing a consumers DSL service cost; or grouping data in the database according to at least one of geographical location, services type, service provider, or time.

[0081] At block 415, the server 105 reports the analyzed first and second information to a management entity (e.g., Internet service provider (ISP), DSL controller 103, CPE 101a, PC 101b, PC 113, smart phone 114, etc). In one embodiment, the method of reporting comprises at least one of: providing statistical analysis including throughput; providing availability of higher bandwidth for operating a DSL service; providing purchase information (or service product information) for improving DSL service performance; or providing utilization information for optimizing a consumers DSL service cost, providing latency information for gaming, providing line bandwidth assessment (e.g., whether a line can support more bandwidth than its current bandwidth), providing stability information about a line (e.g., whether a line is now stable enough for higher throughput).

[0082] In one embodiment, the method further comprises: determining control information for a DSL operator, the control information according to the analyzed first and second information; and recommending the DSL operator with the control information to improve performance of a DSL service. In one embodiment, the control information relates to on-demand change in performance

of the DSL service. In one embodiment, the on-demand change is associated with at least one of: throughput, latency, packet loss, or jitter. In one embodiment, the method of receiving the first and second information is via Internet.

[0083] **Fig. 5A** is flowchart 500 of a method for performing a diagnostic test, according to one embodiment of the disclosure. Although the blocks in the flowchart with reference to **Fig. 5A** are shown in a particular order, the order of the actions can be modified. Thus, the illustrated embodiments can be performed in a different order, and some actions/blocks may be performed in parallel.

[0084] At block 501, the user/customer accesses a test page. In one embodiment, the test page is accessible over the web. **Fig. 6A** is an exemplary report 600 (or test page) provided by the server 105 based on the information received from the DA 102, according to one embodiment of the disclosure. In one embodiment, the test page provides a number of test options. For example, at block 502 a user may choose to perform a Run Speed test (a test option), which is also shown as the tab Speed Test in **Fig. 6A**. In another example, at block 503 a user/customer may run a utilization test (another test option), shown by the tab Utilization Test in **Fig. 6A**. The report 600 illustrates a speed test result page, after performing a speed test. In this particular non-limiting illustration, the report 600 shows the download and upload speeds in Mbps, and also shows an estimate of the response time of the communication device under test. In one embodiment, the report 600 is accessible by a subscriber or user/customer of the particular Internet service being tested.

[0085] At block 504, the system (machine on which the agent is running) seeks permission from the user/customer to run the downloadable agent 102 on the machine. If the permission is granted, the downloadable agent 102 attempts to access the communication device (such as a DSL modem) diagnostics page, and would try to run a speed test (e.g., at block 505) or utilization test. If the connection fails, for example due to a link error, the process moves back as shown by block 506. If the test is successful, the process moves to block 507, which checks whether the user/customer is login to the system/server (such as server 105). If the user is logged in, a more complete report is shown to the user at block 508 which includes

current and past results. If the user/customer was not logged in, then at block 509 only current results are shown.

[0086] The flowcharts discussed herein are merely examples, of an example embodiment, and not all blocks need to be performed. Other embodiments of the disclosure could also map to a similar flowchart. For example, at block 505, the downloadable agent 102 may collect data and produce analysis for the LAN and WAN performance of some other device on the LAN, rather than collecting data and producing analyses for the device on which the DA 102 executes.

[0087] **Fig. 5B** is flowchart 510 of a method for running (i.e., executing) functions, according to another embodiment of the disclosure. The figure is similar to **Fig. 5A**, but more general. Although the blocks in the flowchart with reference to **Fig. 5B** are shown in a particular order, the order of the actions can be modified. Thus, the illustrated embodiments can be performed in a different order, and some actions/blocks may be performed in parallel.

[0088] At block 511, the user/customer accesses a Graphic User Interface (GUI) page. In one embodiment, the GUI page is accessible over the web. In one embodiment, the GUI page provides a number of functions for running diagnostics, performance measurement or data collection. For example, at block 512 a user may choose to perform data collection. In another example, at block 513 a user/customer may run a diagnostics function or a performance measurement..

[0089] At block 514, the system (machine on which the agent is running) seeks permission from the user/customer to run the downloadable agent 102 on the machine. If the permission is granted, the downloadable agent 102 attempts to access the communication device (such as a DSL modem), and would try to run one of the functions above (e.g., at block 515), such as a performance measurement or diagnostics test. If the connection fails, for example due to a link error, the process moves back as shown by block 516. If the test is successful, the process moves to block 507, which checks whether the user/customer is login to the system/server (such as server 105). If the user is logged in, a more complete report is shown to the user at block 518 which includes current and past results. If the user/customer was not logged in, then at block 519 only current results are shown.

[0090] The flowcharts discussed herein are merely examples, of an example embodiment, and not all blocks need to be performed. Other embodiments of the disclosure could also map to a similar flowchart. For example, at block 505, the downloadable agent 102 may collect data and produce analysis for the LAN and WAN performance of some other device on the LAN, rather than collecting data and producing analyses for the device on which the DA 102 executes.

[0091] **Fig. 6B** is another exemplary report 620 provided by the server based on received information from the downloadable agent, according to one embodiment of the disclosure. The report 620 depicts a usage report, according to one embodiment. The report 620, for example, includes information on utilization of the capacity of the subscriber or user/customer link. The report 620 may also provide information on whether a customer link has the potential to operate at higher speeds. The report 620 also shows a Traffic Usage Report. The example Traffic Usage Report shows traffic information collected over a week, such as Download Usage, max data rate used, max available data rate, etc.

[0092] **Fig. 7** is a processor-based system 700 having machine-readable storage medium with computer executable instructions of a downloadable agent, according to one embodiment of the disclosure. The storage medium 704 and associated computer executable instructions 102/704a may be in any of the communication devices and/or servers discussed herein. The computer-machine-readable/executable instructions 102/704a are executed by a processor 701. Elements of embodiments are provided as machine-readable medium for storing the computer-executable instructions (e.g., instructions to implement the flowcharts of **Figs. 2 and 4** and other processes discussed in the description).

[0093] In one embodiment, the processor-based system 700 further comprises a database 702 to store data used by the instructions 102/704a. In one embodiment, the processor-based system 700 includes a network interface 705 to communicate with other devices. In one embodiment, the components of the processor-based system 700 communicate with one another via a network bus 703.

[0094] The machine-readable storage medium 704 may include, but is not limited to, flash memory, optical disks, hard disk drive (HDD), Solid State Drive

(SSD), CD-Read Only Memory (CD-ROMs), DVD ROMs, RAMs, EPROMs, EEPROMs, magnetic or optical cards, or other type of machine-readable media suitable for storing electronic or computer-executable instructions. For example, embodiments of the disclosure may be downloaded as a computer program (e.g., BIOS) which may be transferred from a remote computer (e.g., a server) to a requesting computer (e.g., a client) by way of data signals via a communication link (e.g., a modem or network connection).

[0095] **Fig. 8** is a processor-based system 800 having machine-readable storage medium with computer executable instructions executed by the server 105, according to one embodiment of the disclosure. The storage medium 804 and associated computer executable instructions 202/203/204/804a may be in any of the communication devices and/or servers discussed herein. The computer-machine-readable/executable instructions 202/203/204/804a are executed by a processor 801 of the server 105. Elements of embodiments are provided as machine-readable medium for storing the computer-executable instructions (e.g., instructions to implement the flowcharts of **Figs. 2, 4, 6B** and other processes discussed in the description).

[0096] In one embodiment, the processor-based system 800 further comprises a database 802 to store data used by the instructions 202/203/204/804a. In one embodiment, the processor-based system 800 includes a network interface 605 to communicate with other devices. In one embodiment, the components of the processor-based system 600 communicate with one another via a network bus 803.

[0097] The machine-readable storage medium 804 may include, but is not limited to, flash memory, optical disks, hard disk drive (HDD), Solid State Drive (SSD), CD-Read Only Memory (CD-ROMs), DVD ROMs, RAMs, EPROMs, EEPROMs, magnetic or optical cards, or other type of machine-readable media suitable for storing electronic or computer-executable instructions. For example, embodiments of the disclosure may be downloaded as a computer program (e.g., BIOS) which may be transferred from a remote computer (e.g., a server) to a requesting computer (e.g., a client) by way of data signals via a communication link (e.g., a modem or network connection).

[0098] Reference in the specification to "an embodiment," "one embodiment," "some embodiments," or "other embodiments" means that a particular feature, structure, or characteristic described in connection with the embodiments is included in at least some embodiments, but not necessarily all embodiments. The various appearances of "an embodiment," "one embodiment," or "some embodiments" are not necessarily all referring to the same embodiments. If the specification states a component, feature, structure, or characteristic "may," "might," or "could" be included, that particular component, feature, structure, or characteristic is not required to be included. If the specification or claim refers to "a" or "an" element, that does not mean there is only one of the elements. If the specification or claims refer to "an additional" element, that does not preclude there being more than one of the additional element.

[0099] Furthermore, the particular features, structures, functions, or characteristics may be combined in any suitable manner in one or more embodiments. For example, a first embodiment may be combined with a second embodiment anywhere the particular features, structures, functions, or characteristics associated with the two embodiments are not mutually exclusive.

[00100] While the disclosure has been described in conjunction with specific embodiments thereof, many alternatives, modifications and variations of such embodiments will be apparent to those of ordinary skill in the art in light of the foregoing description. The embodiments of the disclosure are intended to embrace all such alternatives, modifications, and variations as to fall within the broad scope of the appended claims.

[00101] The following examples pertain to further embodiments. Specifics in the examples may be used anywhere in one or more embodiments. All optional features of the apparatus described herein may also be implemented with respect to a method or process.

[00102] For example, in one embodiment a method performed by a downloadable agent comprises: collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN;

and transmitting the WAN performance information to a machine; wherein the machine is operable to: store the WAN performance information in a database associated with the machine, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

[00103] In one embodiment, the other device is a router. In one embodiment, the machine is operable to store the WAN performance information with an associated timestamp. In one embodiment, the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN. In one embodiment, the method further comprises transmitting by the downloadable agent the LAN performance data to the machine.

[00104] In one embodiment, the downloadable agent is executable in a virtual machine on the computing device. In one embodiment, the downloadable agent is dynamically downloaded to the computing device. In one embodiment, the method further comprises receiving the analysis result, wherein receiving the analysis result comprises at least one of: receiving statistical analysis including throughput; receiving availability of higher bandwidth for operating a DSL service; receiving purchase information (or service product information) for improving DSL service performance; or receiving utilization information for optimizing a consumers DSL service cost.

[00105] In one embodiment, the WAN performance information includes at least one of: topological information, geographical information, throughput, latency, jitter, packet loss, time, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, user's provisioned WAN service, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[00106] In one embodiment, the method further comprises: sending an on-demand change request associated with at least one of: throughput, or latency. In one embodiment, the machine is a server that resides in a cloud. In one embodiment, the computing device is one of: a personal computer; a gaming

console; an access point (AP); a base station; a wireless smart phone device; a wireless LAN device; an access gateway; a router; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[00107] In another example, a machine readable storage medium is provided having computer executable instructions that when executed cause a processor to perform a method according to any one of method discussed above.

[00108] In another example, a system comprises: a database; and a server coupled to the database, the server operable to: receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and store the WAN performance information in the database associated with the server, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

[00109] In one embodiment, the server resides in a cloud. In one embodiment, the server is operable to store the WAN performance information with an associated timestamp. In one embodiment, the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other

device coupled to the LAN. In one embodiment, the server is operable to receive from the downloadable agent the LAN performance data. In one embodiment, the server comprises: a first module for collecting the WAN performance information; a second module for performing statistical analysis using the first WAN performance information; and a third module for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider.

[00110] In one embodiment, the modules that receive the instruction and command from the third module are accessible by internet. In one embodiment, the server comprises: a management interface for communicating with the downloadable agent via internet. In one embodiment, the server comprises: a user interface module for providing access and for displaying information associated with the first, second, third modules.

[00111] In one embodiment, the server is operable to compute throughput of DSL connection by collecting current performance metrics associated with DSL service. In one embodiment, the server to perform throughput computation with reference to a website. In one embodiment, the throughput computation comprises probing a network. In one embodiment, the downloadable agent is executable in a virtual machine on the computing device. In one embodiment, the downloadable agent is dynamically downloaded to the computing device.

[00112] In one embodiment, reporting the analysis result comprises at least one of: sending statistical analysis including throughput; sending availability of higher bandwidth for operating a DSL service; sending purchase information (or service product information) for improving DSL service performance; or sending utilization information for optimizing a consumers DSL service cost. In one embodiment, the WAN performance information includes at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power,

frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[00113] In one embodiment, the system is operable to receive an on-demand change request associated with at least one of: throughput, or latency. In one embodiment, the computing device is one of: an access point (AP); a base station; a wireless smartphone device; a wireless LAN device; an access gateway; a router, a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[00114] In another example, a method performed by a server comprises: receiving first information from a first downloadable agent; receiving second information from a second downloadable agent; storing the first and second information in a database; analyzing the first and second information with reference to data already stored in the database; and reporting the analyzed first and second information to a management entity.

[00115] In one embodiment, the first and second information are time stamped. In one embodiment, the first and second agents are executable on multiple computing machines. In one embodiment, the first downloadable agent is communicatively coupled to a first LAN device. In one embodiment, the first downloadable agent is operable to collect information from multiple computing

entities coupled to the first LAN device. In one embodiment, the second downloadable agent is communicatively coupled to a second LAN device. In one embodiment, the second downloadable agent is operable to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.

[00116] In one embodiment, the first and second LAN devices comprise at least one of: tablet computing device; an access point (AP); a base station; a wireless smartphone device; a wireless LAN device; a router; an access gateway; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[00117] In one embodiment, the first and second downloadable agents execute on devices coupled to the same LAN. In one embodiment, the first and second downloadable agents execute on devices coupled to distinct LANs. In one embodiment, the method further comprises: determining control information for a DSL operator, the control information according to the analyzed first and second information; and recommending the DSL operator with the control information to improve performance of a DSL service.

[00118] In one embodiment, the control information relates to on-demand change in performance of the DSL service. In one embodiment, the on-demand

change is associated with at least one of: throughput, latency, packet loss, or jitter. In one embodiment, the method of reporting comprises at least one of: providing statistical analysis including throughput; providing availability of higher bandwidth for operating a DSL service; providing purchase information (or service product information) for improving DSL service performance; or providing utilization information for optimizing a consumers DSL service cost. In one embodiment, the method of receiving the first and second information is via Internet.

[00119] In one embodiment, the first and second information includes at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[00120] In one embodiment, the method of analyzing the first information with reference to the second information comprises at least one of: performing statistical analysis including throughput; determining availability of higher bandwidth for operating a DSL service; determining purchase information (or service product information) for improving DSL service performance; determining utilization information for optimizing a consumers DSL service cost; or grouping data in the database according to at least one of geographical location, services type, service provider, or time.

[00121] In one embodiment, the method further comprises: processing data from the distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by corresponding first or second downloadable agents. In one embodiment, the method of further comprises: processing data from the distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN. In one embodiment, the analyses for each LAN include at least one of: whether the LAN is under or over

performing relative to a neighboring LAN; or whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN.

[00122] In one embodiment, the server comprises: a first module for collecting the first and second information; a second module for performing statistical analysis using the first and/or second information; and a third module for generating instruction and command for the first and/or second devices or modules according to the statistical analysis. In one embodiment, the modules that receive the instruction and command from the third module are accessible by internet. In one embodiment, the server comprises: a management interface for communicating with the first and second downloadable agents via internet. In one embodiment, the server comprises: a user interface module for providing access and for displaying information associated with the first, second, third modules.

[00123] In one embodiment, the first information is collected by a downloadable agent coupled to a DSL connection, the downloadable agent to send the first information to the server. In one embodiment, the server resides in a cloud. In one embodiment, the server is operable to compute throughput of a DSL connection by collecting current performance metrics associated with the DSL service. In one embodiment, the server to perform throughput computation with reference to a website. In one embodiment, the throughput computation comprises probing a network.

[00124] In one embodiment, the method of probing comprises: transmitting probing data from a communication device to another communication device; and waiting for a predetermined time before reading operational data including counter values related to user data traffic. In one embodiment, the method of probing comprises: transmitting probing data from a communication device to another communication device; and receiving a report indicating amount of data or data received by the other communication device. In one embodiment, the server is operable to apply a machine learning algorithm for training a performance estimation algorithm for the communication device.

[00125] In another example, a machine readable storage medium is provided having computer executable instructions that when executed cause a processor to perform a method according to the method discussed above.

[00126] In another example, a system comprises: a database; a communication interface for communicating with other devices; and a server coupled to the database and the communication interface, wherein the server is operable to perform a method according to the method discussed above.

[00127] In one embodiment, the server comprises: a first module for collecting the first and second information; a second module for performing statistical analysis using the first and/or second information; and a third module for generating instruction and command for the first and/or second devices or modules according to the statistical analysis. In one embodiment, the modules that receive the instruction and command from the third module are accessible by internet. In one embodiment, the server comprises: a management interface for communicating with the first and second agents via internet. In one embodiment, the server comprises: a user interface module for providing access and for displaying information associated with the first, second, third modules.

[00128] In one embodiment, the first information is collected by a downloadable agent coupled to a DSL connection, the downloadable agent to send the first information to the server. In one embodiment, the server is operable to compute throughput of the DSL connection by collecting current performance metrics associated with the DSL service. In one embodiment, the server to perform throughput computation with reference to a website. In one embodiment, the throughput computation comprises probing a network. In one embodiment, the server resides in a cloud. In one embodiment, the communication interface comprises at least one of: a wired Ethernet interface; a powerline communications interface; or a wireless interface.

[00129] In one embodiment, the other devices comprise at least one of: tablet computing device; an access point (AP); a base station; a wireless mobile device; a wireless LAN device; an access gateway; a router; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE)

modem; a cable CPE modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[00130] In another example, a method performed by a downloadable agent on a processor comprises: collecting first information related to performance of a network device associated with the downloadable agent; sending the first information to a machine, wherein the first information is stored in a database coupled to the machine, and wherein the machine is operable to: receive second information from another downloadable agent; and analyze the first and second information with reference to data already stored in the database; and receiving a report of the analyzed first and second information.

[00131] In one embodiment, the first and second information is time stamped. In one embodiment, the downloadable agent is executable on multiple computing machines. In one embodiment, the downloadable agent is communicatively coupled to a first LAN device. In one embodiment, the method of collecting first information comprises collecting information from multiple computing entities coupled to the first LAN device. In one embodiment, the other downloadable agent is communicatively coupled to a second LAN device. In one embodiment, the other downloadable agent is operable to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.

[00132] In one embodiment, the network device, and the first and second LAN devices comprise at least one of: tablet computing device; an access point (AP); a base station; a wireless mobile device; a wireless LAN device; a DSLAM; an access gateway; a router; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; and an Ethernet connected network switch.

[00133] In one embodiment, the machine is a server in a cloud. In one embodiment, the first and second information include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[00134] In one embodiment, the method further comprises: sending an on-demand change request associated with at least one of: throughput, or latency. In one embodiment, the method of receiving the report comprises at least one of: receiving statistical analysis including throughput; receiving availability of higher bandwidth for operating a DSL service; receiving purchase information (or service

product information) for improving DSL service performance; or receiving utilization information for optimizing a consumers DSL service cost.

[00135] In one embodiment, the machine is operable to: process data from distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by respective downloadable agents coupled to respective distinct LANs. In one embodiment, the machine is operable to: process data from distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN. In one embodiment, the analyses for each LAN include at least one of: whether the LAN is under or over performing relative to a neighboring LAN; or whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN.

[00136] In another example, a method performed by a downloadable agent on a processor comprises: collecting first information related to performance of a network device associated with the downloadable agent; sending the first information to a machine, wherein the first information is stored in a database coupled to the machine, and wherein the machine is operable to: receive second information from another downloadable agent; and analyze the first and second information with reference to data already stored in the database; and receiving a report of the analyzed first and second information.

[00137] In one embodiment, the first and second information is time stamped. In one embodiment, the downloadable agent is executable on multiple computing machines. In one embodiment, the downloadable agent is communicatively coupled to a first LAN device.

[00138] In one embodiment, collecting first information comprises collecting information from multiple computing entities coupled to the first LAN device. In one embodiment, the other downloadable agent is communicatively coupled to a second LAN device. In one embodiment, the other downloadable agent is operable

to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.

[00139] In one embodiment, the network device and the first and second LAN devices comprise at least one of: an access point (AP); a base station; a wireless mobile device; a wireless LAN device; a DSLAM; an access gateway; a router; a performance enhancement device; a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem; an in-home powerline device; a Home Phoneline Network Alliance (HPNA) based device; an in-home coax distribution device; a G.hn (Global Home Networking Standard) compatible device; an in-home metering communication device; an in-home appliance communicatively interfaced with the LAN; a wireless femtocell base station; a wireless Wi-Fi compatible base station; a wireless mobile device repeater; a wireless mobile device base station; nodes within an ad-hoc/mesh network; a set-top box (STB)/set-top unit (STU) customer electronics device; an Internet Protocol (IP) enabled television; an IP enabled media player; an IP enabled gaming console; an Ethernet gateway; a computing device connected to the LAN; an Ethernet connected computer peripheral device; an Ethernet connected router; an Ethernet connected wireless bridge; an Ethernet connected network bridge; an Ethernet connected network switch; wearable device; and internet enabled cameras.

[00140] In one embodiment, the machine is a server in a cloud. In one embodiment, the first and second information include at least one of: topological information, geographical information, time, throughput, latency, jitter, packet loss, type of communication device, device network identification, manufacturer and model of equipment, equipment characteristics, firmware, user's network usage pattern, RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

[00141] In one embodiment, the further comprises: sending an on-demand change request associated with at least one of: throughput, or latency. In one embodiment, receiving the report comprises at least one of: receiving statistical analysis including throughput; receiving availability of higher bandwidth for

operating a DSL service; receiving service product information for improving DSL service performance; or receiving utilization information for optimizing a consumers DSL service cost.

[00142] In one embodiment, the machine is operable to: process data from distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by respective downloadable agents coupled to respective distinct LANs. In one embodiment, the machine is operable to: process data from distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN.

[00143] In one embodiment, the analyses for each LAN include at least one of: whether the LAN is under or over performing relative to a neighboring LAN; or whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN. In one embodiment, the downloadable agent is executable on an Internet browser. In one embodiment, the downloadable agent is accessible remotely via the Internet.

[00144] In one embodiment, the method further comprises periodically sending collected first information to the machine. In one embodiment, the method further comprises waiting for a predetermined condition or threshold to be satisfied before sending the first information to the machine. In one embodiment, the predetermined condition or threshold is at least one of: a function of a type of data collected, or limit or threshold on a performance level associated with the collected data. In one embodiment, the machine is operable the first information by polling or scheduled based system. In one embodiment, the method further comprises collecting data from at least one of: National Weather Service; radio station; or operator.

[00145] In another example, a machine readable storage medium is provided having computer executable instructions that when executed cause a processor to perform a method according to the method discussed above.

[00146] An abstract is provided that will allow the reader to ascertain the nature and gist of the technical disclosure. The abstract is submitted with the understanding that it will not be used to limit the scope or meaning of the claims. The following claims are hereby incorporated into the detailed description, with each claim standing on its own as a separate embodiment.

CLAIMS

We claim:

1. A method performed by a downloadable agent, the method comprising:
 - collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
 - transmitting the WAN performance information to a machine, wherein the machine is operable to:
 - store the WAN performance information in a database associated with the machine,
 - analyze the WAN performance information to generate an analysis result; and
 - report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.
2. The method of claim 1, wherein the other device is a router.
3. The method of claim 1, wherein the machine is operable to store the WAN performance information with an associated timestamp.
4. The method of claim 1 wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.
5. The method of claim 4 further comprises transmitting by the downloadable agent the LAN performance data to the machine.

6. The method of claim 1, wherein the downloadable agent is executable in a virtual machine on the computing device.
7. The method of claim 1, wherein the downloadable agent is executable in a virtual machine on the computing device.
8. The method of claim 1 further comprises receiving the analysis result, wherein receiving the analysis result comprises at least one of:
 - receiving statistical analysis including throughput;
 - receiving availability of higher bandwidth for operating a DSL service;
 - receiving service product information for improving DSL service performance; or
 - receiving utilization information for optimizing a consumers DSL service cost.
9. The method of claim 1, wherein the WAN performance information includes at least one of:
 - topological information,
 - geographical information,
 - throughput,
 - latency,
 - jitter,
 - packet loss,
 - time,
 - type of communication device,
 - device network identification,
 - manufacturer and model of equipment,
 - equipment characteristics,
 - firmware,
 - user's network usage pattern,
 - user's provisioned WAN service,

RF characteristics including at least one of: signal power, frequency bands and mode of operation, environment statistics, or data on operation of communication devices.

10. The method of claim 1 further comprises:
 - sending an on-demand change request associated with at least one of: throughput, or latency.
11. The method of claim 1, wherein the machine is a server that resides in a cloud.
12. The method of claim 1, wherein the computing device is one of:
 - tablet computing device;
 - a personal computer;
 - a gaming console;
 - an access point (AP);
 - a base station;
 - a wireless smartphone device;
 - a wireless LAN device;
 - an access gateway;
 - a router;
 - a performance enhancement device;
 - a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
 - a cable CPE modem;
 - an in-home powerline device;
 - a Home Phoneline Network Alliance (HPNA) based device;
 - an in-home coax distribution device;
 - a G.hn (Global Home Networking Standard) compatible device;
 - an in-home metering communication device;

an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; and
internet enabled cameras.

13. The method of claim 1, wherein the downloadable agent is executable on an Internet browser.
14. The method of claim 1, wherein the downloadable agent is accessible remotely via the Internet.
15. The method of claim 1 further comprises periodically sending collected WAN performance information to the machine.
16. The method of claim 1 further comprises waiting for a predetermined condition or threshold to be satisfied before sending collected WAN performance information to the machine.

17. The method of claim 16, where the predetermined condition or threshold is at least one of:
- a function of a type of data collected, or
 - limit or threshold on a performance level associated with the collected data.
18. The method of claim 1, wherein the machine is operable to collect WAN performance information by polling or scheduled based system.
19. The method of claim 1 further comprises collecting data from at least one of:
- National Weather Service;
 - radio station; or
 - operator.
20. A machine readable storage medium having computer executable instructions that when executed cause a processor to perform a method according to any one of method claims 1 to 19.
21. A system comprising:
- a database; and
 - a server coupled to the database, the server operable to:
 - receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
 - store the WAN performance information in the database associated with the server,
 - analyze the WAN performance information to generate an analysis result; and
 - report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

22. The system of claim 21, wherein the server resides in a cloud.
23. The system of claim 21, wherein the server is operable to store the WAN performance information with an associated timestamp.
24. The system of claim 21, wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.
25. The system of claim 24, wherein the server is operable to receive from the downloadable agent the LAN performance data.
26. The system of claim 25, wherein the server comprises:
 - a first module for collecting the WAN performance information;
 - a second module for performing statistical analysis using the first WAN performance information; and
 - a third module for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider..
27. The system of claim 26, wherein the modules that receive the instruction and command from the third module are accessible by internet.
28. The system of claim 26, wherein the server comprises:
 - a management interface for communicating with the downloadable agent via internet.
29. The system of claim 26, wherein the server comprises:
 - a user interface module for providing access and for displaying

information associated with the first, second, third modules.

30. The system of claim 21, wherein the server is operable to compute throughput of DSL connection by collecting current performance metrics associated with DSL service.
31. The system of claim 30, wherein the server to perform throughput computation with reference to a website.
32. The system of claim 31, wherein the throughput computation comprises probing a network.
33. The system of claim 21, wherein the downloadable agent is executable in a virtual machine on the computing device.
34. The system of claim 21, wherein the downloadable agent is dynamically downloaded to the computing device.
35. The system of claim 21, wherein the server is operable to report the analysis result by performing at least one of:
 - sending statistical analysis including throughput;
 - sending availability of higher bandwidth for operating a DSL service;
 - sending service product information for improving DSL service performance; or
 - sending utilization information for optimizing a consumers DSL service cost.
36. The system of claim 21, wherein the WAN performance information includes at least one of:
 - topological information,
 - geographical information,

time,
throughput,
latency,
jitter,
packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency
bands and mode of operation,
environment statistics, or
data on operation of communication devices.

37. The system of claim 21, wherein the server is operable to receive an on-demand change request associated with at least one of: throughput, or latency.

38. The system of claim 21, wherein the computing device is one of:
tablet computing device;
an access point (AP);
a base station;
a wireless smartphone device;
a wireless LAN device;
an access gateway;
a router,
a performance enhancement device;
a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;

- a cable CPE modem;
- an in-home powerline device;
- a Home Phoneline Network Alliance (HPNA) based device;
- an in-home coax distribution device;
- a G.hn (Global Home Networking Standard) compatible device;
- an in-home metering communication device;
- an in-home appliance communicatively interfaced with the LAN;
- a wireless femtocell base station;
- a wireless Wi-Fi compatible base station;
- a wireless mobile device repeater;
- a wireless mobile device base station;
- nodes within an ad-hoc/mesh network;
- a set-top box (STB)/set-top unit (STU) customer electronics device;
- an Internet Protocol (IP) enabled television;
- an IP enabled media player;
- an IP enabled gaming console;
- an Ethernet gateway;
- a computing device connected to the LAN;
- an Ethernet connected computer peripheral device;
- an Ethernet connected router;
- an Ethernet connected wireless bridge;
- an Ethernet connected network bridge;
- an Ethernet connected network switch;
- wearable device; and
- internet enabled cameras.

39. The system of claim 21, wherein the server is operable to provide a marketplace of ideas for the communication devices for trading bandwidth for media services.

40. The system of claim 21, wherein the server is operable to collect WAN performance information by polling or scheduled based system.
41. A method comprising:
- receiving first information from a first downloadable agent;
 - receiving second information from a second downloadable agent;
 - storing the first and second information in a database;
 - analyzing the first and second information with reference to data already stored in the database; and
 - reporting the analyzed first and second information to a management entity.
42. The method of claim 41, wherein the first and second information are time stamped.
43. The method of claim 41, wherein the first and second agents are executable on multiple computing machines.
44. The method of claim 41, wherein the first downloadable agent is communicatively coupled to a first LAN device.
45. The method of claim 44, wherein the first downloadable agent is operable to collect information from multiple computing entities coupled to the first LAN device.
46. The method of claim 44, wherein the second downloadable agent is communicatively coupled to a second LAN device.
47. The method of claim 46, wherein the second downloadable agent is operable to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.

48. The method of claim 47, wherein the first and second LAN devices comprise at least one of:

- an access point (AP);
- a base station;
- a wireless smartphone device;
- a wireless LAN device;
- a router
- an access gateway;
- a performance enhancement device;
- a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
- a cable CPE modem;
- an in-home powerline device;
- a Home Phoneline Network Alliance (HPNA) based device;
- an in-home coax distribution device;
- a G.hn (Global Home Networking Standard) compatible device;
- an in-home metering communication device;
- an in-home appliance communicatively interfaced with the LAN;
- a wireless femtocell base station;
- a wireless Wi-Fi compatible base station;
- a wireless mobile device repeater;
- a wireless mobile device base station;
- nodes within an ad-hoc/mesh network;
- a set-top box (STB)/set-top unit (STU) customer electronics device;
- an Internet Protocol (IP) enabled television;
- an IP enabled media player;
- an IP enabled gaming console;
- an Ethernet gateway;
- a computing device connected to the LAN;
- an Ethernet connected computer peripheral device;

an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; and
internet enabled cameras.

49. The method of claim 41, wherein the first and second downloadable agents execute on devices coupled to the same LAN.

50. The method of claim 41, wherein the first and second downloadable agents execute on devices coupled to distinct LANs.

51. The method of claim 50 further comprises:

processing data from the distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by corresponding first or second downloadable agents.

52. The method of claim 50 further comprises:

processing data from the distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN.

53. The method of claims 51 or 52, wherein the analyses for each LAN include at least one of:

whether the LAN is under or over performing relative to a neighboring LAN; or

whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN.

54. The method of claim 41 further comprises:
- determining control information for a DSL operator, the control information according to the analyzed first and second information; and
 - recommending the DSL operator with the control information to improve performance of a DSL service.
55. The method of claim 54, wherein the control information includes at least one or more of signals or commands related to:
- power,
 - spectrum control,
 - margin, data rate,
 - latency/delay, or
 - coding.
56. The method of claim 54, wherein the control information relates to on-demand change in performance of the DSL service.
57. The method of claim 56, wherein the on-demand change is associated with at least one of:
- throughput,
 - latency,
 - packet loss, or
 - jitter.
58. The method of claim 41, wherein reporting comprises at least one of:
- providing statistical analysis including throughput;

providing availability of higher bandwidth for operating a DSL service;
providing service product information for improving DSL service performance; or
providing utilization information for optimizing a consumers DSL service cost.

59. The method of claim 41, wherein receiving the first and second information is via Internet.

60. The method of claim 41, wherein the first and second information includes at least one of:

topological information,
geographical information,
time,
throughput,
latency,
jitter,
packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency bands and mode of operation,
environment statistics, or
data on operation of communication devices.

61. The method of claim 41, wherein analyzing the first information with

- reference to the second information comprises at least one of:
- performing statistical analysis including throughput;
 - determining availability of higher bandwidth for operating a DSL service;
 - determining service product information for improving DSL service performance;
 - determining utilization information for optimizing a consumers DSL service cost; or
 - grouping data in the database according to at least one of geographical location, services type, service provider, or time.
62. The method of claim 41, wherein the methods of receiving, analyzing, and reporting are performed by a server.
63. The method of claim 62, wherein the server comprises:
- a first module for collecting the first and second information;
 - a second module for performing statistical analysis using the first and/or second information; and
 - a third module for generating instruction and command for the first and/or second devices or modules according to the statistical analysis.
64. The method of claim 63, wherein the modules that receive the instruction and command from the third module are accessible by internet.
65. The method of claim 63, wherein the server comprises:
- a management interface for communicating with the first and second downloadable agents via internet.
66. The method of claim 63, wherein the server comprises:
- a user interface module for providing access and for displaying information associated with the first, second, third modules.

67. The method of claim 63, wherein the first information is collected by a downloadable agent coupled to a DSL connection, the downloadable agent to send the first information to the server.
68. The method of claim 63, wherein the server resides in a cloud.
69. The method of claim 63, wherein the server is operable to compute throughput of a DSL connection by collecting current performance metrics associated with the DSL service.
70. The method of claim 69, wherein the server to perform throughput computation with reference to a website.
71. The method of claim 70, wherein the throughput computation comprises probing a network.
72. The method of claim 71, wherein probing comprises:
transmitting probing data from a communication device to another communication device; and
waiting for a predetermined time before reading operational data including counter values related to user data traffic.
73. The method of claim 71, wherein probing comprises:
transmitting probing data from a communication device to another communication device; and
receiving a report indicating amount of data or data received by the other communication device.
74. The method of claim 72, wherein the server to apply a machine learning algorithm for training a performance estimation algorithm for the

communication device.

75. A machine readable storage medium having computer executable instructions that when executed cause a processor to perform a method according to any one of method claims 41 to 74.
76. A system comprising:
a database;
a communication interface for communicating with other devices;
and
a server coupled to the database and the communication interface, the server operable to perform a method according to any one of method claims 38 to 59.
77. The system of claim 76, wherein the server comprises:
a first module for collecting the first and second information;
a second module for performing statistical analysis using the first and/or second information; and
a third module for generating instruction and command for the first and/or second devices or modules according to the statistical analysis.
78. The system of claim 77, wherein the modules that receive the instruction and command from the third module are accessible by internet.
79. The system of claim 77, wherein the server comprises:
a management interface for communicating with the first and second agents via internet.
80. The system of claim 77, wherein the server comprises:
a user interface module for providing access and for displaying information associated with the first, second, third modules.

81. The system of claim 77, wherein the first information is collected by a downloadable agent coupled to a DSL connection, the downloadable agent to send the first information to the server.
82. The system of claim 81, wherein the server is operable to compute throughput of the DSL connection by collecting current performance metrics associated with the DSL service.
83. The system of claim 81, wherein the server to perform throughput computation with reference to a website.
84. The system of claim 83, wherein the throughput computation comprises probing a network.
85. The system of claim 76, wherein the server resides in a cloud.
86. The system of claim 76, wherein the communication interface comprises at least one of:
- a wired Ethernet interface;
 - a powerline communications interface; or
 - a wireless interface.
87. The system of claim 76, wherein the other devices comprise at least one of:
- tablet computing device;
 - an access point (AP);
 - a base station;
 - a wireless mobile device;
 - a wireless LAN device;
 - an access gateway;
 - a router;
 - a performance enhancement device;

a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; and
internet enabled cameras.

88. A method performed by a downloadable agent on a processor, the method comprising:
collecting first information related to performance of a network

device associated with the downloadable agent;
 sending the first information to a machine, wherein the first information is stored in a database coupled to the machine, and wherein the machine is operable to:
 receive second information from another downloadable agent;
 and
 analyze the first and second information with reference to data already stored in the database; and
 receiving a report of the analyzed first and second information.

89. The method of claim 88, wherein the first and second information is time stamped.
90. The method of claim 88, wherein the downloadable agent is executable on multiple computing machines.
91. The method of claim 88, wherein the downloadable agent is communicatively coupled to a first LAN device.
92. The method of claim 91, wherein collecting first information comprises collecting information from multiple computing entities coupled to the first LAN device.
93. The method of claim 91, wherein the other downloadable agent is communicatively coupled to a second LAN device.
94. The method of claim 93, wherein the other downloadable agent is operable to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.
95. The method of claim 94, wherein the network device and the first and

second LAN devices comprise at least one of:

- an access point (AP);
- a base station;
- a wireless mobile device;
- a wireless LAN device;
- a DSLAM;
- an access gateway;
- a router;
- a performance enhancement device;
- a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
- an in-home powerline device;
- a Home Phoneline Network Alliance (HPNA) based device;
- an in-home coax distribution device;
- a G.hn (Global Home Networking Standard) compatible device;
- an in-home metering communication device;
- an in-home appliance communicatively interfaced with the LAN;
- a wireless femtocell base station;
- a wireless Wi-Fi compatible base station;
- a wireless mobile device repeater;
- a wireless mobile device base station;
- nodes within an ad-hoc/mesh network;
- a set-top box (STB)/set-top unit (STU) customer electronics device;
- an Internet Protocol (IP) enabled television;
- an IP enabled media player;
- an IP enabled gaming console;
- an Ethernet gateway;
- a computing device connected to the LAN;
- an Ethernet connected computer peripheral device;
- an Ethernet connected router;
- an Ethernet connected wireless bridge;

an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; and
internet enabled cameras.

96. The method of claim 88, wherein the machine is a server in a cloud.

97. The method of claim 88, wherein the first and second information include at least one of:

topological information,
geographical information,
time,
throughput,
latency,
jitter,
packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency
bands and mode of operation,
environment statistics, or
data on operation of communication devices.

98. The method of claim 88 further comprises:

 sending an on-demand change request associated with at least one of:
throughput, or latency.

99. The method of claim 88, wherein receiving the report comprises at least one of:
- receiving statistical analysis including throughput;
 - receiving availability of higher bandwidth for operating a DSL service;
 - receiving service product information for improving DSL service performance; or
 - receiving utilization information for optimizing a consumers DSL service cost.
100. The method of claim 88, wherein the machine is operable to:
- process data from distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by respective downloadable agents coupled to respective distinct LANs.
101. The method of claim 88, wherein the machine is operable to:
- process data from distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN.
102. The method of claims 100 or 101, wherein the analyses for each LAN include at least one of:
- whether the LAN is under or over performing relative to a neighboring LAN; or
 - whether access to a particular remote host on the Internet from a LAN is under or over performing relative to access to another remote host from that LAN.

103. The method of claim 88, wherein the downloadable agent is executable on an Internet browser.
104. The method of claim 88, wherein the downloadable agent is accessible remotely via the Internet.
105. The method of claim 88 further comprises periodically sending collected first information to the machine.
106. The method of claim 88 further comprises waiting for a predetermined condition or threshold to be satisfied before sending the first information to the machine.
107. The method of claim 106, where the predetermined condition or threshold is at least one of:
a function of a type of data collected, or
limit or threshold on a performance level associated with the collected data.
108. The method of claim 88, wherein the machine is operable the first information by polling or scheduled based system.
109. The method of claim 1 further comprises collecting data from at least one of:
National Weather Service;
radio station; or
operator.
110. A machine readable storage medium having computer executable instructions that when executed cause a processor to perform a method according to any one of method claims 88-109.

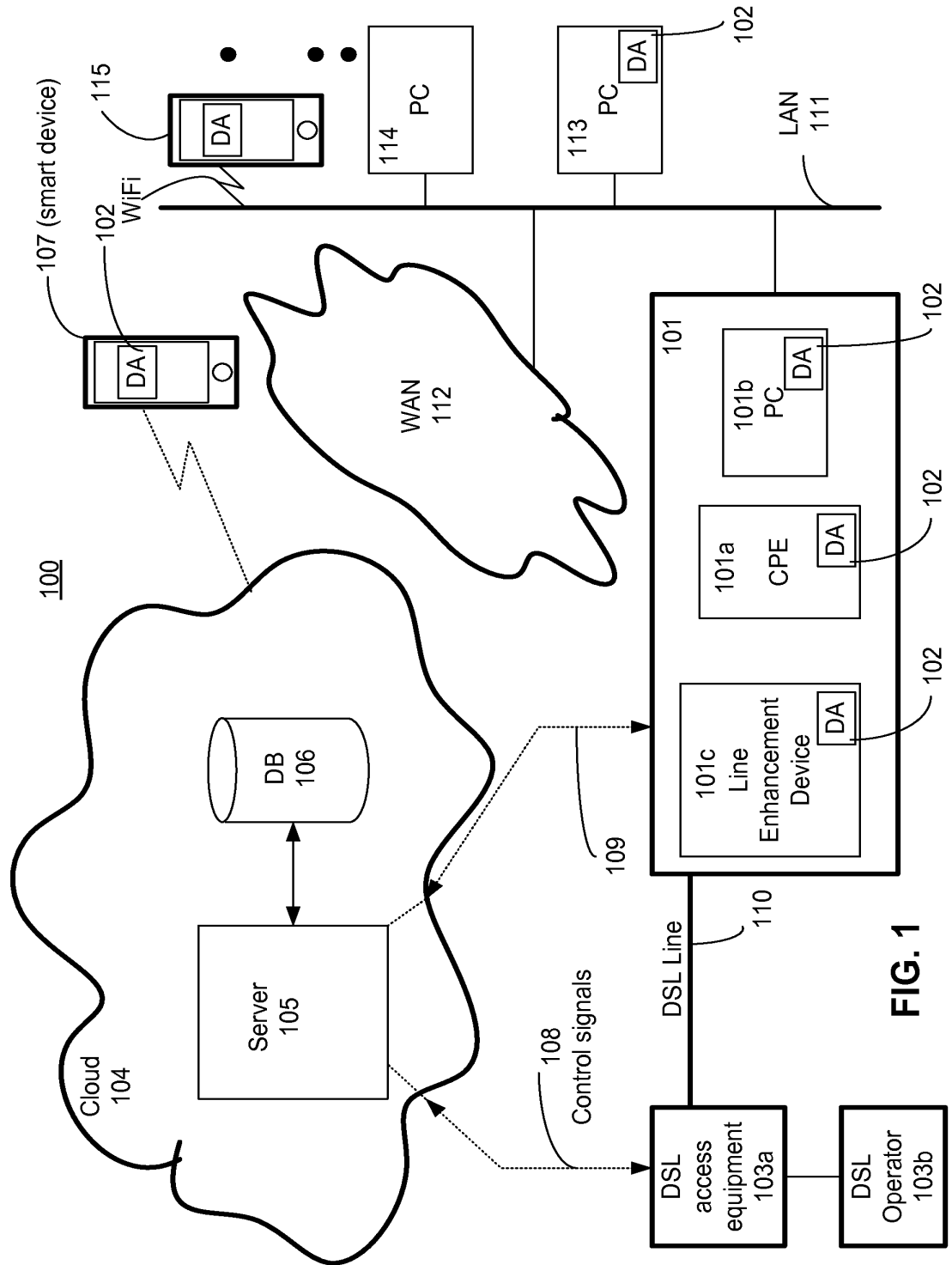


FIG. 1

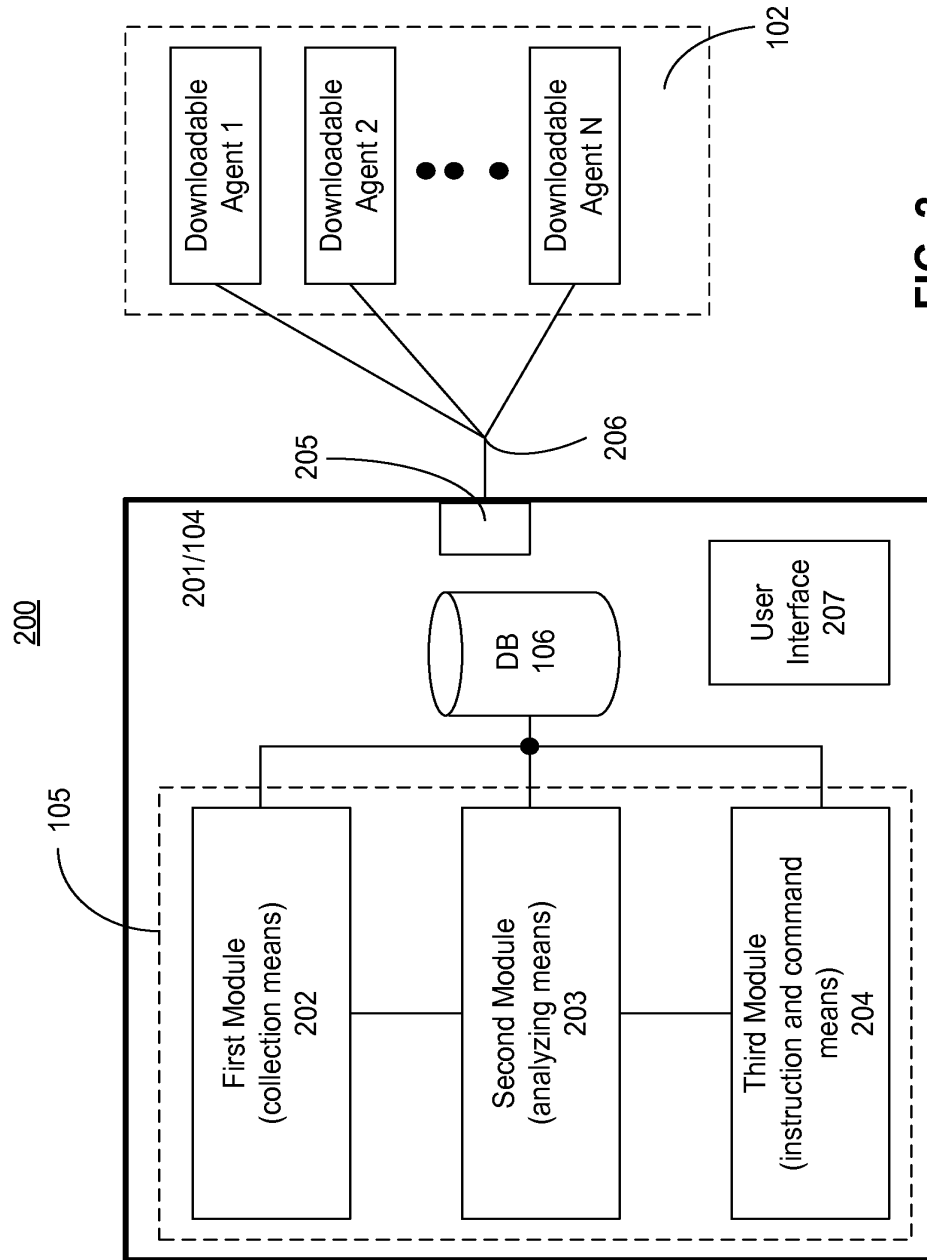


FIG. 2

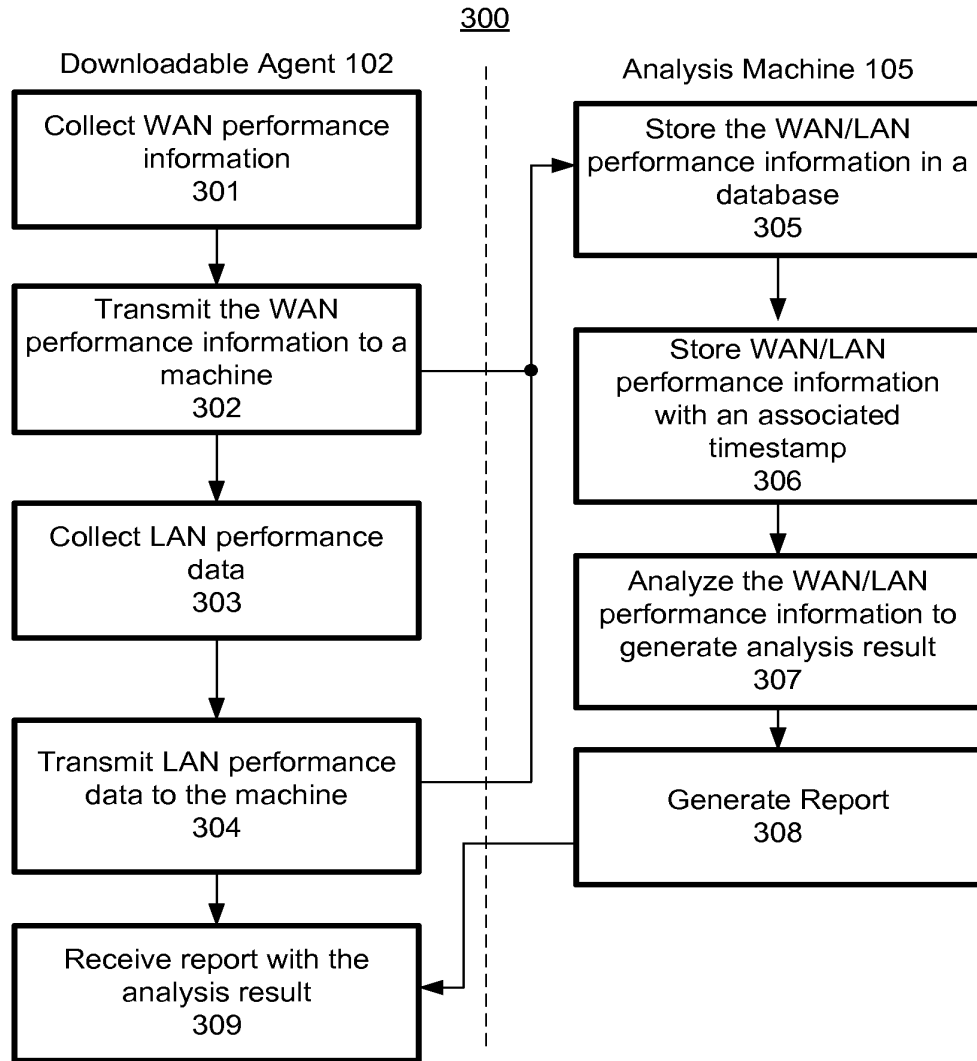
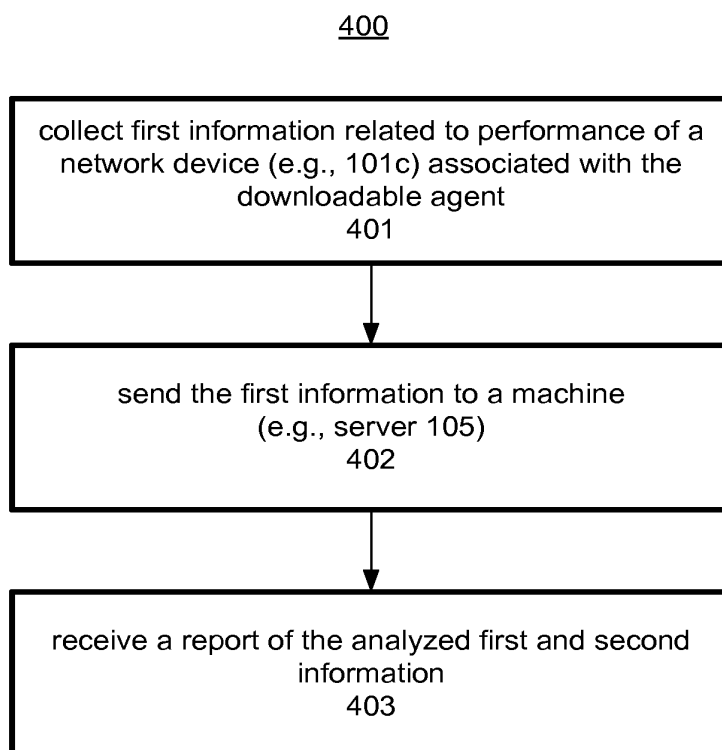


FIG. 3



SUBSTITUTE SHEET (RULE 26)

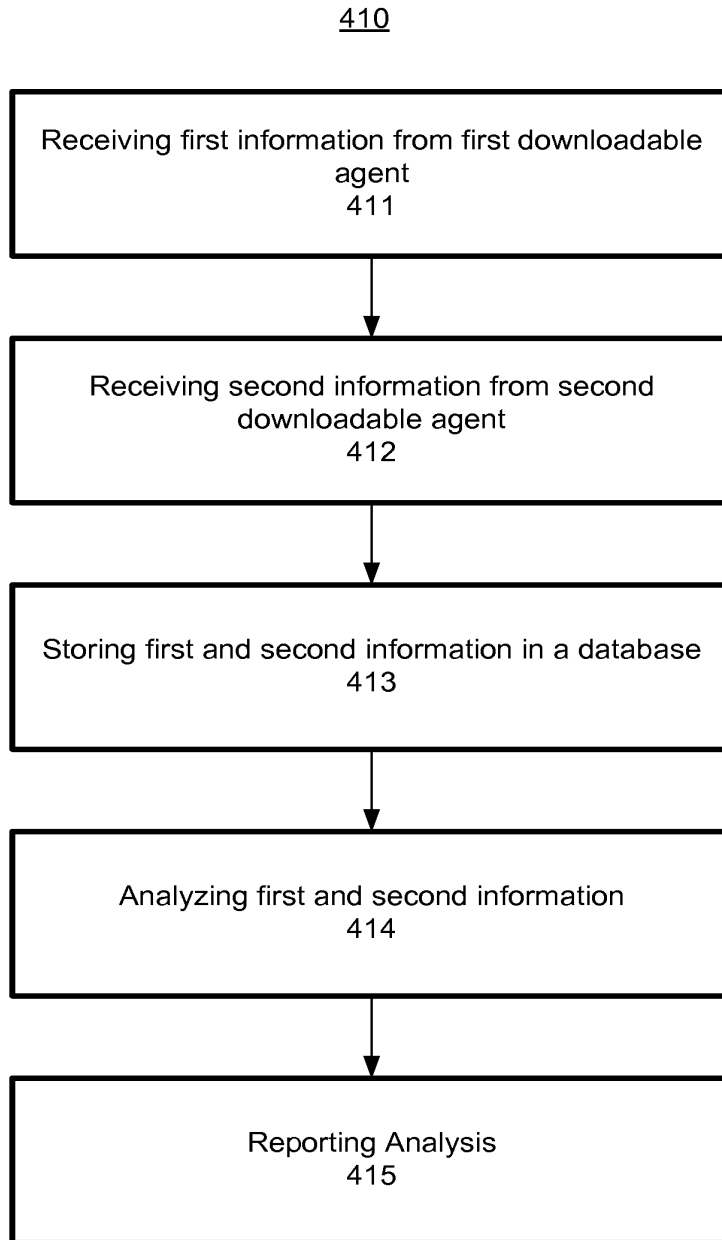


FIG. 4B

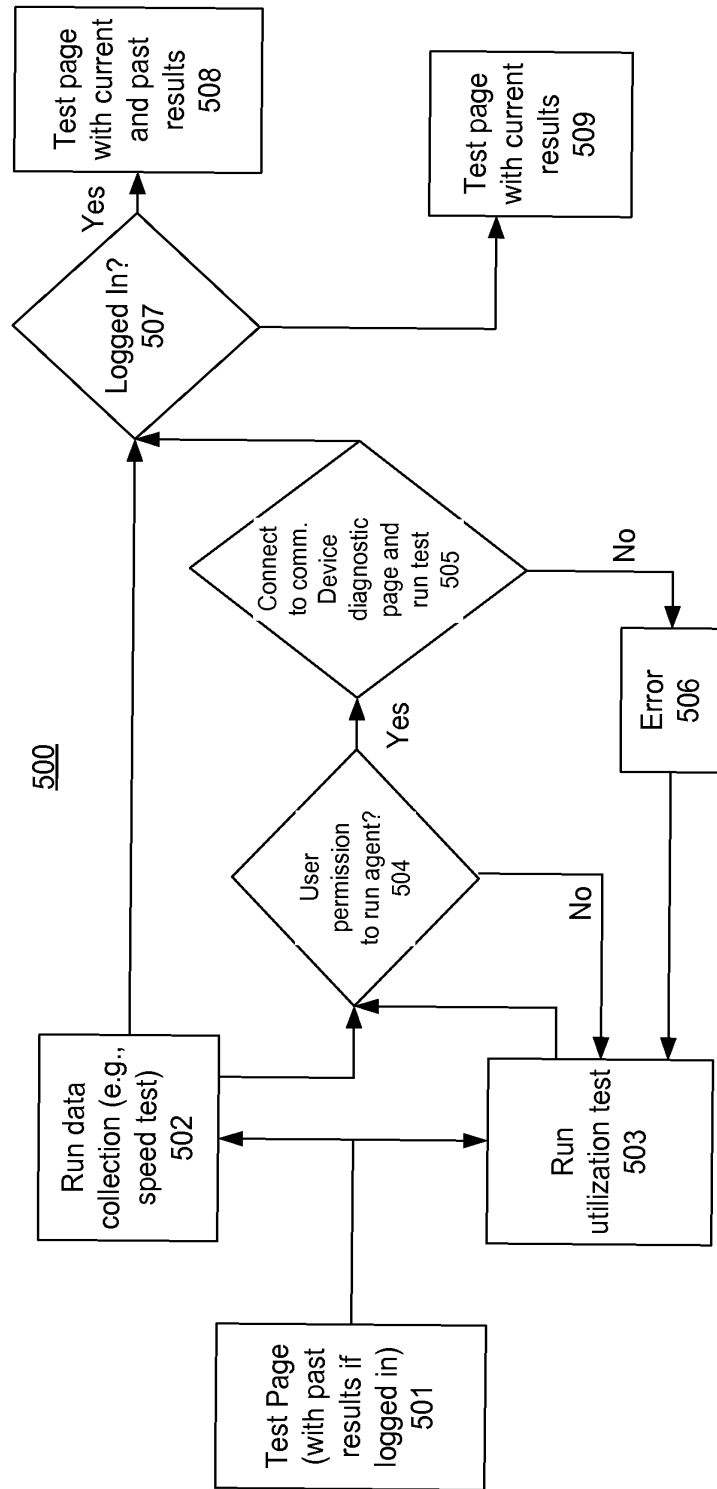


FIG. 5A

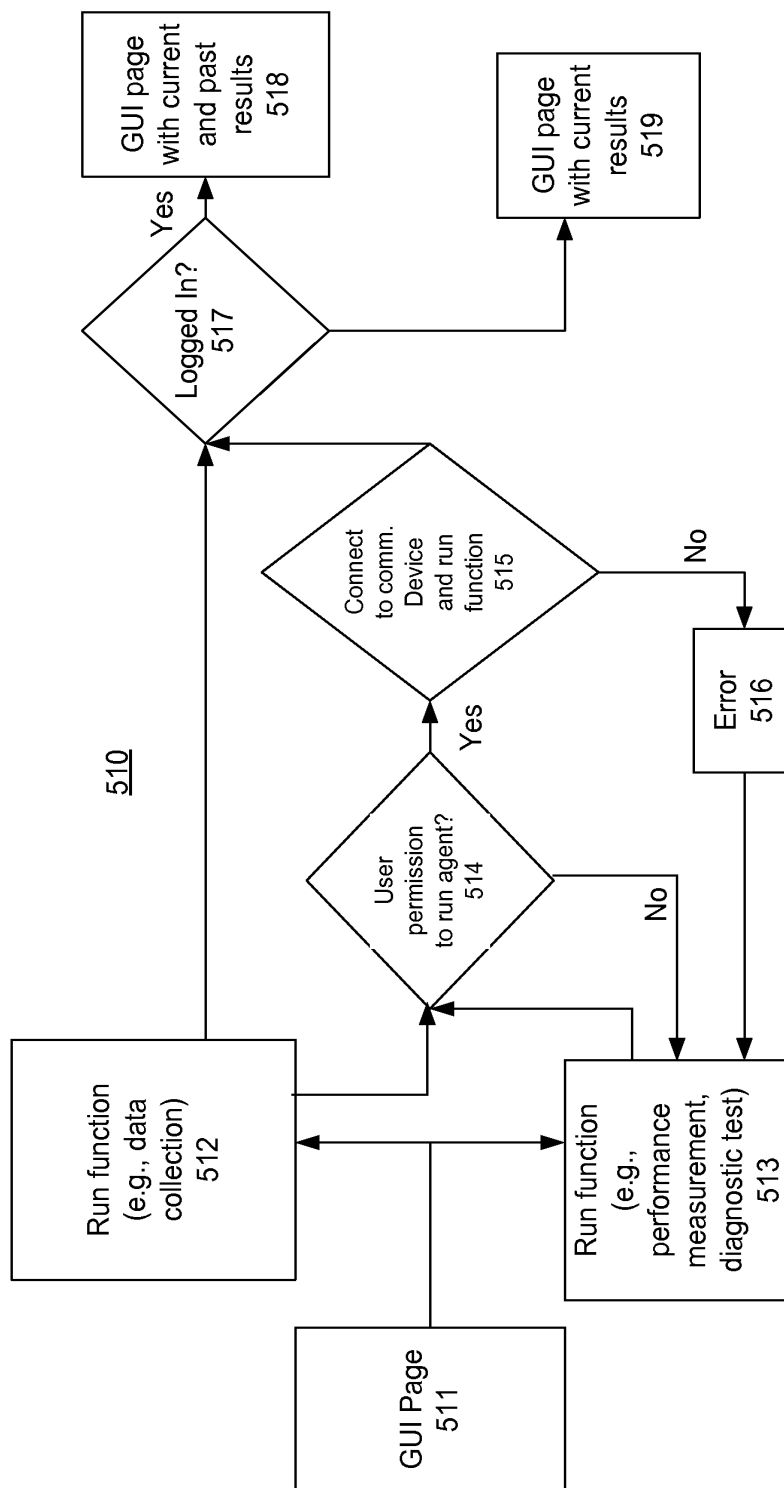


FIG. 5B

600

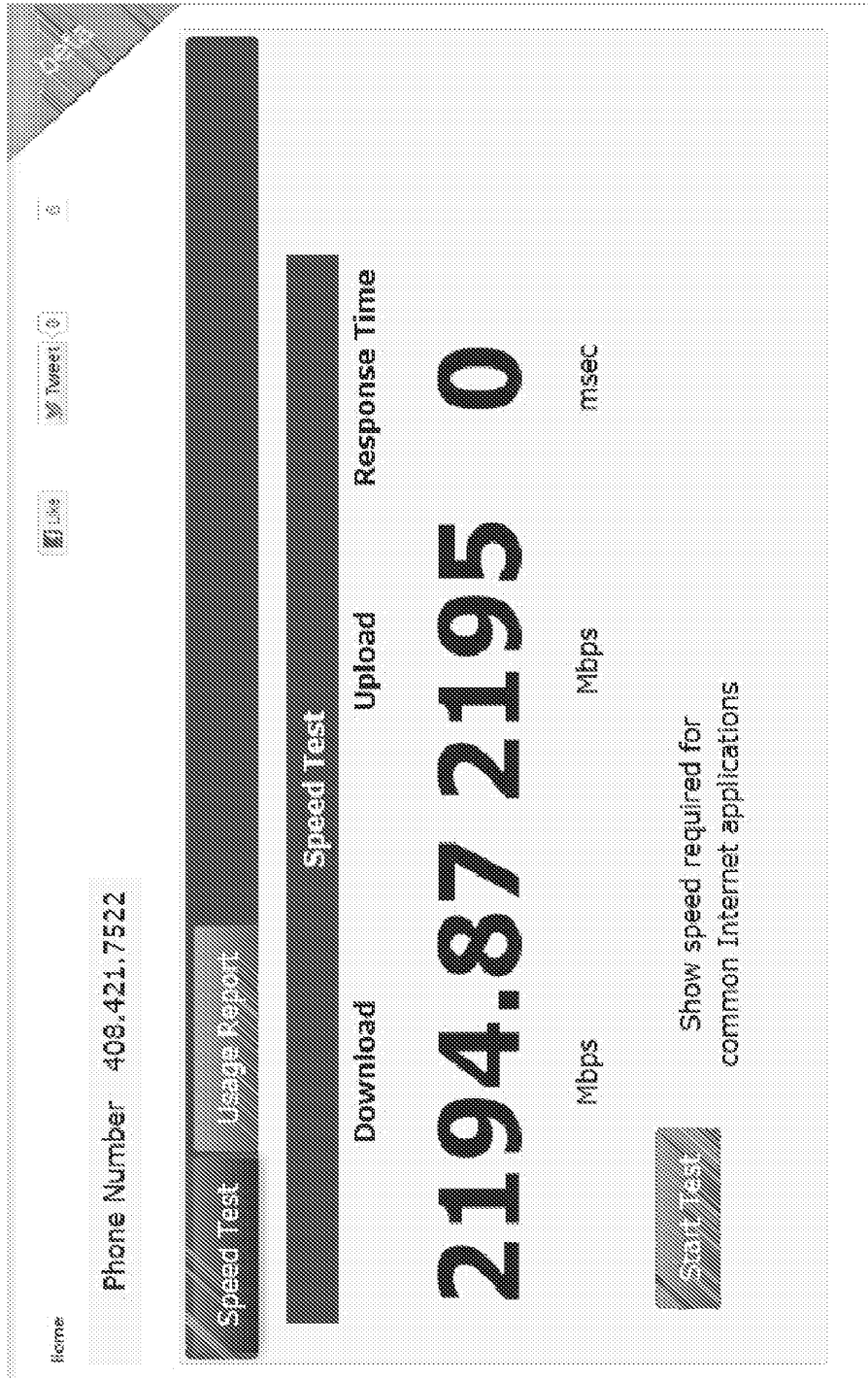


FIG. 6A

620

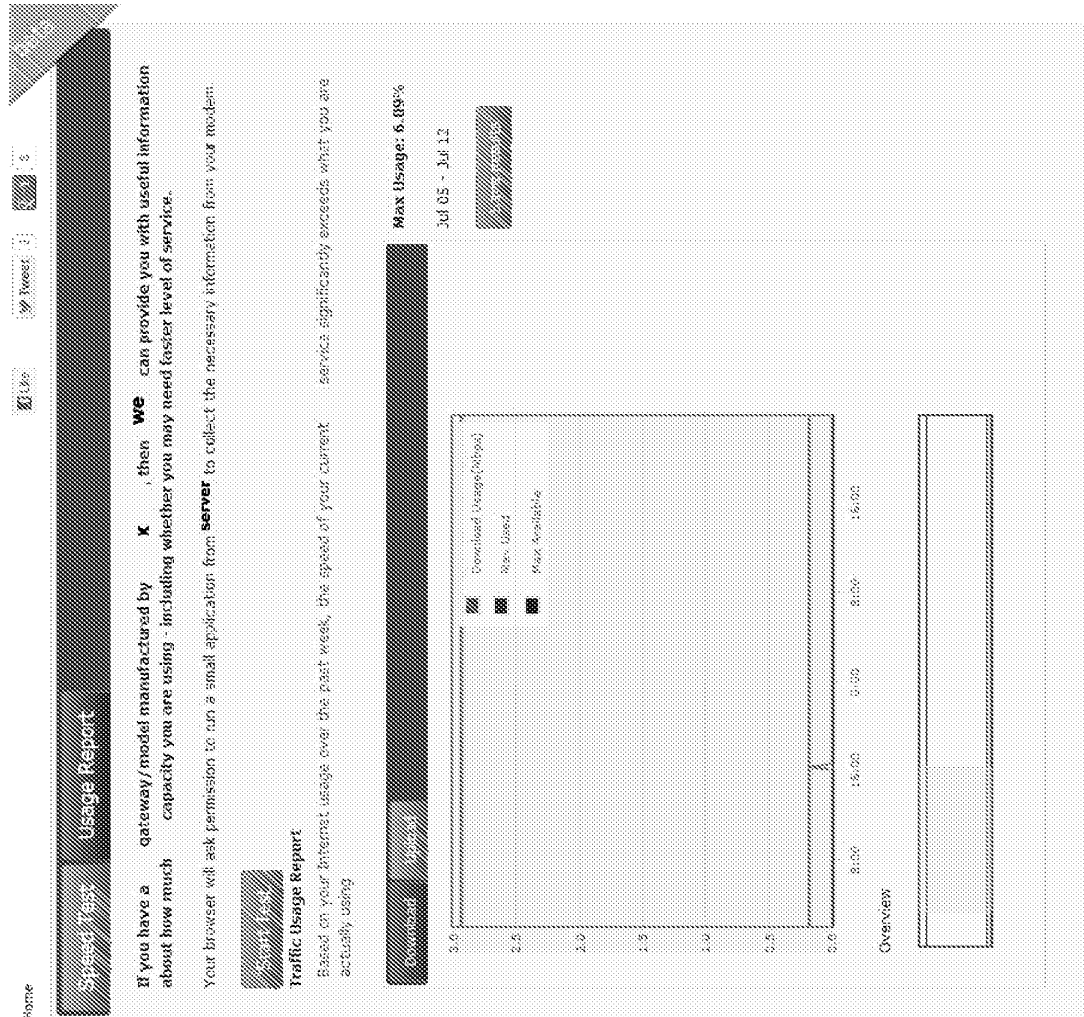


FIG. 6B

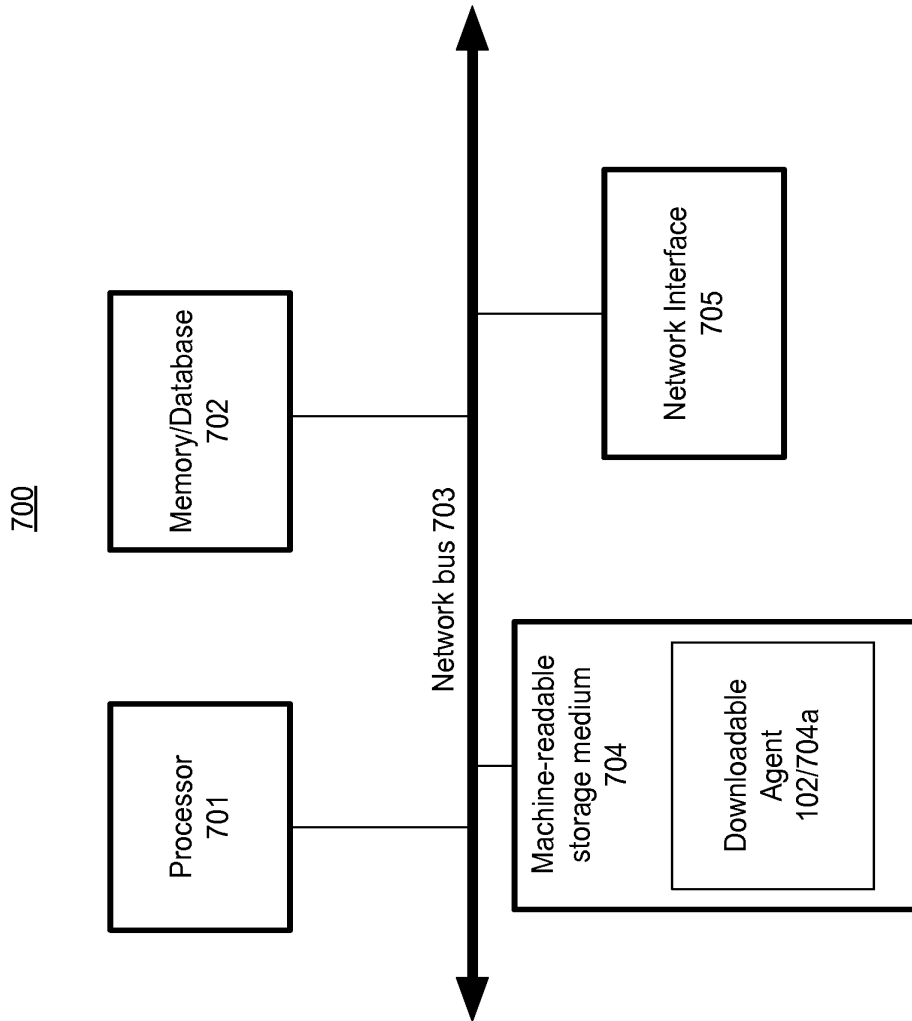


FIG. 7

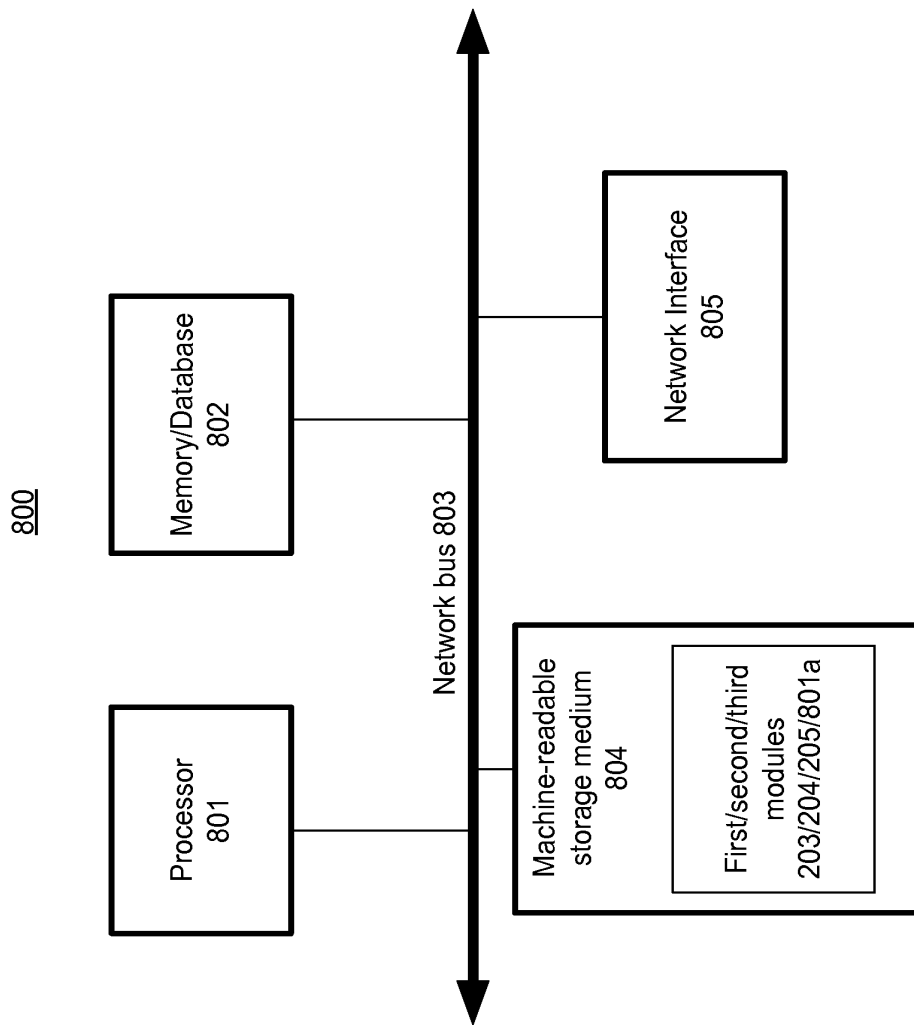


FIG. 8

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/414,436	Filing Date 01/12/2015	<input type="checkbox"/> To be Mailed
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ENTITY: LARGE SMALL MICRO

APPLICATION AS FILED – PART I

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).			
<input type="checkbox"/> 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	

APPLICATION AS AMENDED – PART II

AMENDMENT	(Column 1)	(Column 2)	(Column 3)	(Column 4)	RATE (\$)	ADDITIONAL FEE (\$)	
	01/12/2015	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA			
	Total (37 CFR 1.16(i))	* 72	Minus ** 20	= 52	X \$80 =	4160	
	Independent (37 CFR 1.16(h))	* 4	Minus *** 3	= 1	X \$420 =	420	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	4580	

AMENDMENT	(Column 1)	(Column 2)	(Column 3)	(Column 4)	RATE (\$)	ADDITIONAL FEE (\$)	
		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA			
	Total (37 CFR 1.16(i))	*	Minus **	=	X \$ =		
	Independent (37 CFR 1.16(h))	*	Minus ***	=	X \$ =		
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					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.

LIE
/ROSA WEST/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
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Table with 3 columns: U.S. APPLICATION NUMBER NO. (14/414,436), FIRST NAMED INVENTOR (Leonardo Dagum), ATTY. DOCKET NO. (8241P073). Includes fields for INTERNATIONAL APPLICATION NO. (PCT/US2012/057152), I.A. FILING DATE (09/25/2012), and PRIORITY DATE (07/13/2012).

8791
BLAKELY SOKOLOFF TAYLOR & ZAFMAN
1279 Oakmead Parkway
Sunnyvale, CA 94085-4040

CONFIRMATION NO. 4662
371 ACCEPTANCE LETTER



Date Mailed: 04/15/2015

NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office, in its capacity as a Designated / Elected Office (37 CFR 1.495), has ACCEPTED the above identified international application for national patentability examination in the United States Patent and Trademark Office.

The United States Application Number assigned to the application is shown above. A Filing Receipt will be issued for the present application in due course. THE DATE APPEARING ON THE FILING RECEIPT AS THE "FILING DATE or 371(c) DATE" IS THE DATE ON WHICH THE LAST OF THE 35 U.S.C. 371 (c)(1) and (c)(2) REQUIREMENTS HAS BEEN RECEIVED IN THE OFFICE. THIS DATE IS SHOWN BELOW. The filing date of the above identified application is the international filing date of the international application (Article 11(3) and 35 U.S.C. 363)

01/12/2015
DATE OF RECEIPT OF 35 U.S.C.
371(c)(1) and (c)(2) REQUIREMENTS

The following items have been received:

- Copy of the International Application filed on 01/12/2015
• Copy of the International Search Report filed on 01/12/2015
• Preliminary Amendments filed on 01/12/2015
• Information Disclosure Statements filed on 01/12/2015
• Inventor's Oath or Declaration filed on 01/12/2015
• Request for Immediate Examination filed on 01/12/2015
• U.S. Basic National Fees filed on 01/12/2015
• Assignee Statement for PGPUB filed on 01/12/2015
• Priority Documents filed on 01/12/2015
• Power of Attorney filed on 01/12/2015
• Application Data Sheet (37 CFR 1.76) filed on 01/12/2015

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.495(c).

- The inventor's oath or declaration submitted for **Leonardo Dagum, Philip Bednarz, Marc Goldberg, Ardavan Maleki Tehrani, and Wonjong Rhee** does not state that the above-identified application was made or authorized to be made by the person executing the oath or declaration.

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

MARY-ANN R FOSTER

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Table with 8 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY. DOCKET NO, TOT CLAIMS, IND CLAIMS. Values: 14/414,436, 01/12/2015, 6280, 8241P073, 72, 4

CONFIRMATION NO. 4662

FILING RECEIPT

8791
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1279 Oakmead Parkway
Sunnyvale, CA 94085-4040



Date Mailed: 04/15/2015

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

Inventor(s)

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Marc Goldberg, Redwood City, CA;
Ardavan Maleki Tehrani, Menlo Park, CA;
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Applicant(s)

ADAPTIVE SPECTRUM AND SIGNAL ALIGNMENT, INC., Redwood City, CA

Assignment For Published Patent Application

Adaptive Spectrum and Signal Alignment, Inc., Redwood City, CA

Power of Attorney:

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Joshua Walsh-Benson--54692
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Domestic Priority data as claimed by applicant

This application is a 371 of PCT/US2012/057152 09/25/2012
which claims benefit of 61/671,672 07/13/2012

Foreign Applications for which priority is claimed (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

If Required, Foreign Filing License Granted: 04/06/2015

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/414,436**

Projected Publication Date: 07/23/2015

Non-Publication Request: No

Early Publication Request: No
Title

METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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 (1-866-999-4258).

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 Assets Control, 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).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number
14/414,436

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	280
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	480
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720
TOTAL CLAIMS (37 CFR 1.16(i))	72 minus 20 = *	52			OR	x 80 =	4160
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4 minus 3 = *	1			OR	x 420 =	420
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	6060

APPLICATION AS AMENDED - PART II

AMENDMENT A	(Column 1)	(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	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))						OR		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						OR		
			TOTAL ADD'L FEE			OR	TOTAL ADD'L FEE	
AMENDMENT B	(Column 1)	(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	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))						OR		
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 found in the appropriate box in column 1.

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET							Application Number		Filing Date				
Substitute for Form PTO-1360 (For use with Form PTO/SB/06)							14414436						
							Applicant(s) Leonardo Dagum						
							* May be used for additional claims or amendments						
CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT			*		*		*	
	Indep	Depend	Indep	Depend	Indep	Depend		Indep	Depend	Indep	Depend	Indep	Depend
1	1		1				51		1		1		
2		1		1			52		1		1		
3		1		1			53		2	---	---		
4		1		1			54		1		1		
5		1		1			55		1		1		
6		1		1			56		1		1		
7		1	---	---			57		1		1		
8		1		1			58		1		1		
9		1		1			59		1		1		
10		1		1			60		1		1		
11		1		1			61		1		1		
12		1		1			62		1	---	---		
13		1		1			63		1	---	---		
14		1		1			64		1	---	---		
15		1		1			65		1	---	---		
16		1		1			66		1	---	---		
17		1		1			67		1	---	---		
18		1		1			68		1	---	---		
19		1		1			69		1	---	---		
20		19	---	---			70		1	---	---		
21	1		1				71		1	---	---		
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23		1		1			73		1	---	---		
24		1		1			74		1	---	---		
25		1		1			75		(1)	---	---		
26		1		1			76		(1)	---	---		
27		1		1			77		(1)	---	---		
28		1		1			78		(1)	---	---		
29		1		1			79		(1)	---	---		
30		1		1			80		(1)	---	---		
31		1		1			81		(1)	---	---		
32		1		1			82		(1)	---	---		
33		1		1			83		(1)	---	---		
34		1		1			84		(1)	---	---		
35		1		1			85		(1)	---	---		
36		1		1			86		(1)	---	---		
37		1		1			87		(1)	---	---		
38		1		1			88	1		1			
39		1		1			89		1		1		
40		1		1			90		1	---	---		
41	1		1				91		1	---	---		
42		1		1			92		1	---	---		
43		1		1			93		1	---	---		
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46		1		1			96		1	---	---		
47		1		1			97		1		1		
48		1		1			98		1		1		
49		1		1			99		1		1		
50		1		1			100		1		1		

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET							Application Number		Filing Date				
Substitute for Form PTO-1360 (For use with Form PTO/SB/06)							14414436						
							Applicant(s) Leonardo Dagum						
							* May be used for additional claims or amendments						
CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT								
	Indep	Depend	Indep	Depend	Indep	Depend	Indep	Depend	Indep	Depend	Indep	Depend	
101		1		1									
102		2	---	---									
103		1		1									
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Total Claims	130		72		0								
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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

Table with 4 columns: APPLICATION NUMBER (14/414,436), FILING OR 371(C) DATE (01/12/2015), FIRST NAMED APPLICANT (Leonardo Dagum), ATTY. DOCKET NO./TITLE (8241P073)

CONFIRMATION NO. 4662

8791
BLAKELY SOKOLOFF TAYLOR & ZAFMAN
1279 Oakmead Parkway
Sunnyvale, CA 94085-4040

PUBLICATION NOTICE



Title:METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK

Publication No.US-2015-0207720-A1

Publication Date:07/23/2015

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

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REQUEST FOR WITHDRAWAL AS ATTORNEY OR AGENT AND CHANGE OF CORRESPONDENCE ADDRESS	Application Number	14/414,436
	Filing Date	01-12-2015
	First Named Inventor	Leonardo Dagum
	Art Unit	2464
	Examiner Name	NGO, RICKY QUOC
	Practitioner Docket Number	8241P073

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

Please withdraw me as attorney or agent for the above-identified patent application, and

- all the practitioners of record;
- the practitioners (with registration numbers) of record listed on the attached paper(s); or
- the practitioners of record associated with Customer Number: _____

NOTE: The immediately preceding box should only be marked when the practitioners were appointed using the listed Customer Number.

The reason(s) for this request are those described in 37 CFR:

- | | | |
|---|--|--|
| <input type="checkbox"/> 11.116(a)(1) | <input type="checkbox"/> 11.116(a)(2) | <input type="checkbox"/> 11.116(a)(3) |
| <input type="checkbox"/> 11.116(b)(1) | <input type="checkbox"/> 11.116(b)(2) | <input type="checkbox"/> 11.116(b)(3) |
| <input type="checkbox"/> 11.116(b)(4) | <input checked="" type="checkbox"/> 11.116(b)(5) | <input checked="" type="checkbox"/> 11.116(b)(6) |
| <input type="checkbox"/> 11.116(b)(7) Please explain below: | | |

Certifications

Check each box below that is factually correct. WARNING: If a box is left unchecked, the request will likely not be approved.

1. I/We have given reasonable notice to the client, prior to the expiration of the response period, that the practitioner(s) intend to withdraw from employment.
2. I/We have delivered to the client or a duly authorized representative of the client all papers and property (including funds) to which the client is entitled.
3. I/We have notified the client of any responses that may be due and the time frame within which the client must respond.

Please provide an explanation, if necessary:

This collection of information is required by 37 CFR 1.36. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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**REQUEST FOR WITHDRAWAL AS ATTORNEY OR AGENT
AND CHANGE OF CORRESPONDENCE ADDRESS**

Complete the following section only when the correspondence address will change. Changes of address will only be accepted to an applicant.

Change the correspondence address and direct all future correspondence to:

A. The address of the applicant associated with Customer Number: _____

OR

B. Applicant

Address Adaptive Spectrum and Signal Alignment, Inc., 333 Twin Dolphin Drive

City Redwood City	State CA	Zip 94065-1417	Country US
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Telephone 650-654-3400	Email
------------------------	-------

I am authorized to sign on behalf of myself and all withdrawing practitioners.

Signature /Spencer K. Hunter/

Name Spencer K. Hunter	Registration No. 67,337
------------------------	-------------------------

Address 1279 Oakmead Parkway

City Sunnyvale	State CA	Zip 94085-4040	Country US
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Date November 24, 2015	Telephone No. 503-439-8778
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NOTE: Withdrawal is effective when approved rather than when received.

[Page 2 of 2]

This collection of information is required by 37 CFR 1.36. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Electronic Acknowledgement Receipt

EFS ID:	24184022
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	8791
Filer:	Spencer K. Hunter/Lisa Bennett
Filer Authorized By:	Spencer K. Hunter
Attorney Docket Number:	8241P073
Receipt Date:	24-NOV-2015
Filing Date:	12-JAN-2015
Time Stamp:	19:01:41
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Petition to withdraw attorney or agent (SB83)	8241P073_RFW.pdf	59487 4d96305d69bd8d77063e26e1745c8e498c d1a237	no	2

Warnings:

Information:

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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(c).

I hereby appoint:

Practitioners associated with Customer Number: 136402

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 assignments documents attached to this form in accordance with 37 CFR 3.73(c).

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

The address associated with Customer Number: 136402

OR

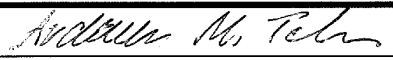
<input type="checkbox"/>	Firm or Individual Name			
	Address			
	City	State	Zip	
	Country			
	Telephone	Email		

Assignee Name and Address: Adaptive Spectrum and Signal Alignment, Inc.
 333 Twin Dolphin Drive
 Redwood City, CA 94065 US

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of The practitioners appointed in this form, 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	Nov 4, 2015
Name	Ardavan Maleki Tehrani	Telephone	650-264-2629
Title	CTO		

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.

Electronic Acknowledgement Receipt

EFS ID:	24707110
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	8791
Filer:	Usman Mughal/Katherine Campbell
Filer Authorized By:	Usman Mughal
Attorney Docket Number:	8241P073
Receipt Date:	25-JAN-2016
Filing Date:	12-JAN-2015
Time Stamp:	16:01:12
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	03P073_SADS.pdf	1280298 <small>bbc0d1585ac42645c98f8e839bbcb82a90b3227</small>	no	6

Warnings:

Information:

This is not an USPTO supplied ADS fillable form

2	Power of Attorney	3_ASSIA_GHM_POA.pdf	1877487	no	1
			e96df65000bb11516069106fa44f49e961505bb1		

Warnings:

Information:

Total Files Size (in bytes): 3157785

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.

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	[8241P073] 03.P073US
		Application Number	14/414,436
Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1				
Applicant Authority <input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117		<input type="radio"/> Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix
	Leonardo		Dagum	
Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service				
City	Redwood City	State/Province	CA	Country of Residence
				US
Citizenship under 37 CFR 1.41(b)		US		
Mailing Address of Applicant:				
Address 1	133 Woodsworth Avenue			
Address 2				
City	Redwood City	State/Province	CA	
Postal Code	94062	Country	US	
Applicant 2				
Applicant Authority <input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117		<input type="radio"/> Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix
	Philip		Bednarz	
Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service				
City	Palo Alto	State/Province	CA	Country of Residence
				US
Citizenship under 37 CFR 1.41(b)		US		
Mailing Address of Applicant:				
Address 1	731 Holly Oak			
Address 2				
City	Palo Alto	State/Province	CA	
Postal Code	94303	Country	US	
Applicant 3				
Applicant Authority <input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117		<input type="radio"/> Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix
	Marc		Goldburg	
Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service				
City	Redwood City	State/Province	CA	Country of Residence
				US

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	[[8241P073]] 03.P073US	
		Application Number	14/414,436	
Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
Citizenship under 37 CFR 1.41(b)	US			
Mailing Address of Applicant:				
Address 1	226 Hillsdale Way			
Address 2				
City	Redwood City	State/Province	CA	
Postal Code	94062	Country	US	
Applicant 4				
Applicant Authority	<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117	
			<input type="radio"/> Party of Interest under 35 U.S.C. 118	
Prefix	Given Name	Middle Name	Family Name	Suffix
	Ardavan	Maleki	Tehrani	
Residence Information (Select One)	<input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service			
City	Menlo Park	State/Province	CA	Country of Residence
				US
Citizenship under 37 CFR 1.41(b)	US			
Mailing Address of Applicant:				
Address 1	350 Sharon Park Drive, R-24			
Address 2				
City	Menlo Park	State/Province	CA	
Postal Code	94025	Country	US	
Applicant 5				
Applicant Authority	<input checked="" type="radio"/> Inventor		<input type="radio"/> Legal Representative under 35 U.S.C. 117	
			<input type="radio"/> Party of Interest under 35 U.S.C. 118	
Prefix	Given Name	Middle Name	Family Name	Suffix
	Wonjong		Rhee	
Residence Information (Select One)	<input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service			
City	San Francisco	State/Province	CA	Country of Residence
				US
Citizenship under 37 CFR 1.41(b)	KR			
Mailing Address of Applicant:				
Address 1	235 Berry Street, Apt. 606			
Address 2				
City	San Francisco	State/Province	CA	
Postal Code	94158	Country	US	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add				

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

An Address is being provided for the correspondence information of this application.

Customer Number [[08791]] 136402

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	[[8241P073]] 03.P073US
		Application Number	14/414,436
Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK		
Email Address	[[MAIL@BSTZ.com]] docketing@ghmip.com	<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

Application Information:

Title of the Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK		
Attorney Docket Number	[[8241P073]] 03.P073US	Small Entity Status Claimed	<input type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	11	Suggested Figure for Publication (if any)	

Publication Information:

<input type="checkbox"/>	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
<input type="checkbox"/>	Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.			
Please Select One:	<input checked="" type="radio"/> Customer Number	<input type="radio"/> US Patent Practitioner	<input type="radio"/> Limited Recognition (37 CFR 11.9)
Customer Number	[[08791]] 136402		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.			
Prior Application Status	Pending	<input type="button" value="Remove"/>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
14/414,436	a 371 of international	PCT/US2012/057152	2012-09-25
Prior Application Status	Expired	<input type="button" value="Remove"/>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
PCT/US2012/057152	non provisional of	61671672	2012-07-13

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	[8241P073] 03.P073US
		Application Number	14/414,436
Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK		

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Remove			
Application Number	Country ¹	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			<input checked="" type="radio"/> Yes <input type="radio"/> No
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1

If the Assignee is an Organization check here.

Organization Name Adaptive Spectrum and Signal Alignment, Inc.

Mailing Address Information:

Address 1	333 Twin Dolphin Drive		
Address 2			
City	Redwood City	State/Province	CA
Country	US	Postal Code	94065-1417
Phone Number		Fax Number	
Email Address	docketing@ghmip.com		
Additional Assignee Data may be generated within this form by selecting the Add button.			

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/Usman A. Mughal/		Date (YYYY-MM-DD)	2015-01-23	
First Name	Usman	Last Name	Mughal	Registration Number	62887

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.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	[[8241P073]] <u>03.P073US</u>
	Application Number	14/414,436
Title of Invention	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK	

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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 records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



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
14/414,436	01/12/2015	Leonardo Dagum	03.P073US

CONFIRMATION NO. 4662

POA ACCEPTANCE LETTER



136402
Green, Howard, & Mughal LLP
5 Centerpointe Dr.
Suite 400
LAKE OSWEGO, OR 97035

Date Mailed: 02/08/2016

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/25/2016.

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

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/cnguyen/



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
14/414,436	01/12/2015	Leonardo Dagum	8241P073

8791
BLAKELY SOKOLOFF TAYLOR & ZAFMAN
1279 Oakmead Parkway
Sunnyvale, CA 94085-4040

CONFIRMATION NO. 4662
POWER OF ATTORNEY NOTICE



Date Mailed: 02/08/2016

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/25/2016.

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

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/cnguyen/



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

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes application details for Leonardo Dagum and examination information for Moore Jr, Michael J.

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):

docketing@ghmip.com

Office Action Summary	Application No. 14/414,436	Applicant(s) DAGUM ET AL.	
	Examiner Michael J. Moore, Jr.	Art Unit 2467	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 2 MONTHS 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 1/12/2015.
 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) 1-6,8-19,21-52,54-61,88,89,97-101 and 103-109 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) _____ is/are rejected.
- 8) Claim(s) _____ is/are objected to.
- 9) Claim(s) 1-6,8-19,21-52,54-61,88,89,97-101 and 103-109 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/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date _____.
- 3) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 4) Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Election/Restrictions

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims **1-6, 8-19, 21-40, and 109**, drawn to a method and a system for performing WAN performance information collection by a downloadable agent, and reporting of this information to a broadband subscriber and/or a service provider, classified in H04L 43/14 (arrangements for monitoring packet switching networks using software).

II. Claims **41-52, 54-61, 88, 89, 97-101, and 103-108**, drawn to methods for receiving first and second information from multiple downloadable agents, analyzing the received information with reference to stored database data, and reporting of the information to a management entity, classified in H04L 41/5032 (network service management by generating service level reports).

The inventions are distinct, each from the other because of the following reasons:

3. Inventions I and II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct if they do not overlap in scope and are not obvious variants, and if it is shown that at least one subcombination is separately usable. In the instant case, subcombination II has separate utility such as

reporting of received information that has been compared to historical data. See MPEP § 806.05(d).

The examiner has required restriction between subcombinations usable together. Where applicant elects a subcombination and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

4. Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and/or examination burden if restriction were not required because one or more of the following reasons apply:

- (a) the inventions have acquired a separate status in the art in view of their different classification;
- (b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;
- (c) the inventions require a different field of search (for example, searching different classes/groups/subgroups or electronic resources, or employing different search queries);

(d) the prior art applicable to one invention would not likely be applicable to another invention;

(e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of an invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be corrected in compliance with 37 CFR 1.48(a) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. A request to correct inventorship under 37 CFR 1.48(a) must be accompanied by an application data sheet in accordance with 37 CFR 1.76 that identifies each inventor by his or her legal name and by the processing fee required under 37 CFR 1.17(i).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Moore, Jr., whose telephone number is (571)272-3168. The examiner can normally be reached on Monday-Friday (7:30am - 4:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan A. Phillips can be reached at (571) 272-3940. 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


Application/Control Number: 14/414,436

Page 6

Art Unit: 2467

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.

/Michael J. Moore, Jr./
Primary Examiner, Art Unit 2467

<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
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CLAIM		DATE									
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	35	+									
	36	+									

<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
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<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
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Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE							
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<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant		<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47			
CLAIM		DATE							
Final	Original	04/12/2016							
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Leonardo Dagum

Application No.: 14/414,436

Filed: January 12, 2015

For: METHOD AND SYSTEM FOR USING A
DOWNLOADABLE AGENT FOR A
COMMUNICATION SYSTEM, DEVICE, OR
LINK

Examiner:
Michael J. Moore, Jr.

Art Group: 2467

Confirmation No.: 4662

Docket No.: 03.P073US

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

RESPONSE TO RESTRICTION REQUIREMENT

Dear Examiner:

This Amendment is in response to the Restriction Requirement notified 18 April 2016. Applicants respectfully request the Examiner to enter this Amendment and consider the following remarks.

LISTING OF CLAIMS

1. (Original) A method performed by a downloadable agent, the method comprising:
 - collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
 - transmitting the WAN performance information to a machine, wherein the machine is operable to:
 - store the WAN performance information in a database associated with the machine,
 - analyze the WAN performance information to generate an analysis result;
 - and
 - report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

2. (Original) The method of claim 1, wherein the other device is a router.

3. (Original) The method of claim 1, wherein the machine is operable to store the WAN performance information with an associated timestamp.

4. (Original) The method of claim 1 wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.

5. (Original) The method of claim 4 further comprises transmitting by the downloadable agent the LAN performance data to the machine.

6. (Original) The method of claim 1, wherein the downloadable agent is executable in a virtual machine on the computing device.

7. (Canceled)

8. (Original) The method of claim 1 further comprises receiving the analysis result, wherein receiving the analysis result comprises at least one of:

- receiving statistical analysis including throughput;
- receiving availability of higher bandwidth for operating a DSL service;
- receiving service product information for improving DSL service performance; or
- receiving utilization information for optimizing a consumers DSL service cost.

9. (Original) The method of claim 1, wherein the WAN performance information includes at least one of:

- topological information,
- geographical information,
- throughput,
- latency,
- jitter,
- packet loss,
- time,
- type of communication device,
- device network identification,
- manufacturer and model of equipment,
- equipment characteristics,
- firmware,
- user's network usage pattern,
- user's provisioned WAN service,
- RF characteristics including at least one of: signal power, frequency bands and mode of operation,
- environment statistics, or
- data on operation of communication devices.

10. (Original) The method of claim 1 further comprises:

- sending an on-demand change request associated with at least one of: throughput, or latency.

11. (Original) The method of claim 1, wherein the machine is a server that resides in a cloud.

12. (Original) The method of claim 1, wherein the computing device is one of:
 - tablet computing device;
 - a personal computer;
 - a gaming console;
 - an access point (AP);
 - a base station;
 - a wireless smartphone device;
 - a wireless LAN device;
 - an access gateway;
 - a router;
 - a performance enhancement device;
 - a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
 - a cable CPE modem;
 - an in-home powerline device;
 - a Home Phoneline Network Alliance (HPNA) based device;
 - an in-home coax distribution device;
 - a G.hn (Global Home Networking Standard) compatible device;
 - an in-home metering communication device;
 - an in-home appliance communicatively interfaced with the LAN;
 - a wireless femtocell base station;
 - a wireless Wi-Fi compatible base station;
 - a wireless mobile device repeater;
 - a wireless mobile device base station;
 - nodes within an ad-hoc/mesh network;
 - a set-top box (STB)/set-top unit (STU) customer electronics device;
 - an Internet Protocol (IP) enabled television;
 - an IP enabled media player;
 - an IP enabled gaming console;
 - an Ethernet gateway;
 - a computing device connected to the LAN;

an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; and
internet enabled cameras.

13. (Original) The method of claim 1, wherein the downloadable agent is executable on an Internet browser.

14. (Original) The method of claim 1, wherein the downloadable agent is accessible remotely via the Internet.

15. (Original) The method of claim 1 further comprises periodically sending collected WAN performance information to the machine.

16. (Original) The method of claim 1 further comprises waiting for a predetermined condition or threshold to be satisfied before sending collected WAN performance information to the machine.

17. (Original) The method of claim 16, where the predetermined condition or threshold is at least one of:

a function of a type of data collected, or
limit or threshold on a performance level associated with the collected data.

18. (Original) The method of claim 1, wherein the machine is operable to collect WAN performance information by polling or scheduled based system.

19. (Original) The method of claim 1 further comprises collecting data from at least one of:
National Weather Service;
radio station; or
operator.

20. (Canceled)
21. (Original) A system comprising:
a database; and
a server coupled to the database, the server operable to:
receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
store the WAN performance information in the database associated with the server,
analyze the WAN performance information to generate an analysis result; and
report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.
22. (Original) The system of claim 21, wherein the server resides in a cloud.
23. (Original) The system of claim 21, wherein the server is operable to store the WAN performance information with an associated timestamp.
24. (Original) The system of claim 21, wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.
25. (Original) The system of claim 24, wherein the server is operable to receive from the downloadable agent the LAN performance data.
26. (Original) The system of claim 25, wherein the server comprises:
a first module for collecting the WAN performance information;
a second module for performing statistical analysis using the first WAN performance information; and
a third module for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber

and the access equipment of the service provider..

27. (Original) The system of claim 26, wherein the modules that receive the instruction and command from the third module are accessible by internet.
28. (Original) The system of claim 26, wherein the server comprises:
 - a management interface for communicating with the downloadable agent via internet.
29. (Original) The system of claim 26, wherein the server comprises:
 - a user interface module for providing access and for displaying information associated with the first, second, third modules.
30. (Original) The system of claim 21, wherein the server is operable to compute throughput of DSL connection by collecting current performance metrics associated with DSL service.
31. (Original) The system of claim 30, wherein the server to perform throughput computation with reference to a website.
32. (Original) The system of claim 31, wherein the throughput computation comprises probing a network.
33. (Original) The system of claim 21, wherein the downloadable agent is executable in a virtual machine on the computing device.
34. (Original) The system of claim 21, wherein the downloadable agent is dynamically downloaded to the computing device.
35. (Original) The system of claim 21, wherein the server is operable to report the analysis result by performing at least one of:
 - sending statistical analysis including throughput;
 - sending availability of higher bandwidth for operating a DSL service;

sending service product information for improving DSL service performance; or
sending utilization information for optimizing a consumers DSL service cost.

36. (Original) The system of claim 21, wherein the WAN performance information includes at least one of:

topological information,
geographical information,
time,
throughput,
latency,
jitter,
packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency bands and
mode of operation,
environment statistics, or
data on operation of communication devices.

37. (Original) The system of claim 21, wherein the server is operable to receive an on-demand change request associated with at least one of: throughput, or latency.

38. (Original) The system of claim 21, wherein the computing device is one of:

tablet computing device;
an access point (AP);
a base station;
a wireless smartphone device;
a wireless LAN device;

an access gateway;
a router,
a performance enhancement device;
a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; and
internet enabled cameras.

39. (Original) The system of claim 21, wherein the server is operable to provide a marketplace of ideas for the communication devices for trading bandwidth for media services.

40. (Original) The system of claim 21, wherein the server is operable to collect WAN performance information by polling or scheduled based system.
41. (Withdrawn) A method comprising:
receiving first information from a first downloadable agent;
receiving second information from a second downloadable agent;
storing the first and second information in a database;
analyzing the first and second information with reference to data already stored in the database; and
reporting the analyzed first and second information to a management entity.
42. (Withdrawn) The method of claim 41, wherein the first and second information are time stamped.
43. (Withdrawn) The method of claim 41, wherein the first and second agents are executable on multiple computing machines.
44. (Withdrawn) The method of claim 41, wherein the first downloadable agent is communicatively coupled to a first LAN device.
45. (Withdrawn) The method of claim 44, wherein the first downloadable agent is operable to collect information from multiple computing entities coupled to the first LAN device.
46. (Withdrawn) The method of claim 44, wherein the second downloadable agent is communicatively coupled to a second LAN device.
47. (Withdrawn) The method of claim 46, wherein the second downloadable agent is operable to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.
48. (Withdrawn) The method of claim 47, wherein the first and second LAN devices comprise at least one of:

an access point (AP);
a base station;
a wireless smartphone device;
a wireless LAN device;
a router
an access gateway;
a performance enhancement device;
a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; and

internet enabled cameras.

49. **(Withdrawn)** The method of claim 41, wherein the first and second downloadable agents execute on devices coupled to the same LAN.
50. **(Withdrawn)** The method of claim 41, wherein the first and second downloadable agents execute on devices coupled to distinct LANs.
51. **(Withdrawn)** The method of claim 50 further comprises:
processing data from the distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by corresponding first or second downloadable agents.
52. **(Withdrawn)** The method of claim 50 further comprises:
processing data from the distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN.
53. **(Canceled)**
54. **(Withdrawn)** The method of claim 41 further comprises:
determining control information for a DSL operator, the control information according to the analyzed first and second information; and
recommending the DSL operator with the control information to improve performance of a DSL service.
55. **(Withdrawn)** The method of claim 54, wherein the control information includes at least one or more of signals or commands related to:
power,
spectrum control,

margin, data rate,
latency/delay, or
coding.

56. **(Withdrawn)** The method of claim 54, wherein the control information relates to on-demand change in performance of the DSL service.

57. **(Withdrawn)** The method of claim 56, wherein the on-demand change is associated with at least one of:

throughput,
latency,
packet loss, or
jitter.

58. **(Withdrawn)** The method of claim 41, wherein reporting comprises at least one of:
providing statistical analysis including throughput;
providing availability of higher bandwidth for operating a DSL service;
providing service product information for improving DSL service performance; or
providing utilization information for optimizing a consumers DSL service cost.

59. **(Withdrawn)** The method of claim 41, wherein receiving the first and second information is via Internet.

60. **(Withdrawn)** The method of claim 41, wherein the first and second information includes at least one of:

topological information,
geographical information,
time,
throughput,
latency,
jitter,
packet loss,
type of communication device,

device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency bands and
mode of operation,
environment statistics, or
data on operation of communication devices.

61. **(Withdrawn)** The method of claim 41, wherein analyzing the first information with reference to the second information comprises at least one of:

performing statistical analysis including throughput;
determining availability of higher bandwidth for operating a DSL service;
determining service product information for improving DSL service performance;
determining utilization information for optimizing a consumers DSL service cost;

or

grouping data in the database according to at least one of geographical location,
services type, service provider, or time.

62. – 87. (Canceled)

88. **(Withdrawn)** A method performed by a downloadable agent on a processor, the method comprising:

collecting first information related to performance of a network device associated
with the downloadable agent;

sending the first information to a machine, wherein the first information is stored
in a database coupled to the machine, and wherein the machine is operable to:

receive second information from another downloadable agent; and

analyze the first and second information with reference to data already
stored in the database; and

receiving a report of the analyzed first and second information.

89. **(Withdrawn)** The method of claim 88, wherein the first and second information is time stamped.

90. – 96. (Canceled)

97. **(Withdrawn)** The method of claim 88, wherein the first and second information include at least one of:

- topological information,
- geographical information,
- time,
- throughput,
- latency,
- jitter,
- packet loss,
- type of communication device,
- device network identification,
- manufacturer and model of equipment,
- equipment characteristics,
- firmware,
- user's network usage pattern,
- RF characteristics including at least one of: signal power, frequency bands and mode of operation,
- environment statistics, or
- data on operation of communication devices.

98. **(Withdrawn)** The method of claim 88 further comprises:

- sending an on-demand change request associated with at least one of: throughput, or latency.

99. **(Withdrawn)** The method of claim 88, wherein receiving the report comprises at least one of:

- receiving statistical analysis including throughput;

receiving availability of higher bandwidth for operating a DSL service;
receiving service product information for improving DSL service performance; or
receiving utilization information for optimizing a consumers DSL service cost.

100. **(Withdrawn)** The method of claim 88, wherein the machine is operable to:
process data from distinct LANs separately to produce analyses and
recommendations for each LAN, among the distinct LANs, according to measurements
made by respective downloadable agents coupled to respective distinct LANs.
101. **(Withdrawn)** The method of claim 88, wherein the machine is operable to:
process data from distinct LANs jointly to produce analyses and
recommendations for each LAN, among the distinct LANs, according to data reported
from each LAN for which analyses and recommendations are being created and from
other LANs different from that LAN.
102. **(Canceled)**
103. **(Withdrawn)** The method of claim 88, wherein the downloadable agent is executable on
an Internet browser.
104. **(Withdrawn)** The method of claim 88, wherein the downloadable agent is accessible
remotely via the Internet.
105. **(Withdrawn)** The method of claim 88 further comprises periodically sending collected
first information to the machine.
106. **(Withdrawn)** The method of claim 88 further comprises waiting for a predetermined
condition or threshold to be satisfied before sending the first information to the machine.
107. **(Withdrawn)** The method of claim 106, where the predetermined condition or threshold
is at least one of:
a function of a type of data collected, or
limit or threshold on a performance level associated with the collected data.

108. **(Withdrawn)** The method of claim 88, wherein the machine is operable the first information by polling or scheduled based system.

109. **(Original)** The method of claim 1 further comprises collecting data from at least one of:
National Weather Service;
radio station; or
operator.

110. **(Canceled)**

REMARKS

In the Office Action mailed April 18, 2016, the Examiner has required that Applicants elect one of the following groups for examination:

- I. Invention I. Claims 1-6, 8-19, 21-40 and 109 which are allegedly drawn to a method/system for performing WAN performance information collection by a downloadable agent, and reporting of this information to a broadband subscriber and/or a service provider, classified in H14L 43/14; and
- II. Invention II. Claims 41-52, 54-61, 88, 89, 97-101, and 103-108 which are allegedly drawn to methods for receiving first and second information from multiple downloadable agents, analyzing the received information with reference to stored database data, and reporting of the information to a management entity, classified in H04L 41/5032.

ELECTION WITHOUT TRAVERSE

Applicants elect without traverse, to prosecute the claims of **Invention I**, which corresponds to Claims 1-6, 8-19, 21-40 and 109. Applicants have withdrawn the remaining claims 41-52, 54-61, 88, 89, 97-101 and 103-108, corresponding to Invention II.

CONCLUSION

Applicants submit that they have overcome Examiner's objections to and rejections of the claims and that they have the right to claim the invention as listed in the listing of claims. Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

Pursuant to 37 C.F.R. § 1.136(a)(3), Applicants request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. § 1.16 and § 1.17, to Deposit Account No. 50-6925.

Respectfully submitted,
GREEN, HOWARD, & MUGHAL, LLP

June 20, 2016

Date

/Usman A. Mughal/

Usman A. Mughal
Reg. No. 62,887
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docketing@ghmip.com

Electronic Acknowledgement Receipt

EFS ID:	26120486
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	136402
Filer:	Usman Mughal/Katherine Campbell
Filer Authorized By:	Usman Mughal
Attorney Docket Number:	03.P073US
Receipt Date:	20-JUN-2016
Filing Date:	12-JAN-2015
Time Stamp:	22:25:12
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		P073US_RRR.pdf	135771 <small>97d6508be322af06653455edfee6652b66d2383d</small>	yes	19

Multipart Description/PDF files in .zip description		
Document Description	Start	End
Response to Election / Restriction Filed	1	1
Claims	2	17
Applicant Arguments/Remarks Made in an Amendment	18	19
Warnings:		
Information:		
Total Files Size (in bytes):		135771
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>		

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 14/414,436	Filing Date 01/12/2015	<input type="checkbox"/> To be Mailed
ENTITY: <input checked="" type="checkbox"/> LARGE <input type="checkbox"/> SMALL <input type="checkbox"/> MICRO					
APPLICATION AS FILED – PART I					
(Column 1)		(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$ =		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =		
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).				
<input type="checkbox"/> 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		

APPLICATION AS AMENDED – PART II						
(Column 1)		(Column 2)		(Column 3)		
AMENDMENT	06/20/2016	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 72	Minus ** 72	= 0	X \$80 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus *** 4	= 0	X \$420 =	0
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
					TOTAL ADD'L FEE	0

(Column 1)		(Column 2)		(Column 3)		
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus **	=	X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus ***	=	X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
					TOTAL ADD'L FEE	
<p>* 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.</p>						

LIE
/DENISE T. LILES/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes application details for Leonardo Dagum and examination information for Michael J. Moore.

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):

docketing@ghmip.com

Office Action Summary	Application No. 14/414,436	Applicant(s) DAGUM ET AL.	
	Examiner Michael J. Moore, Jr.	Art Unit 2467	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 MONTHS 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 6/20/2016.
 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) 1-6,8-19,21-52,54-61,88,89,97-101 and 103-109 is/are pending in the application.
5a) Of the above claim(s) 41-52,54-61,88,89,97-101 and 103-108 is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) 1-6,8-19,21-40 and 109 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 1/12/2015 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/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date _____.
- 3) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 4) Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 1/12/15 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Election/Restrictions

3. Applicant's election without traverse of group I claims **1-6, 8-19, 21-40, and 109** in the reply filed on 6/20/16 is acknowledged. Accordingly, group II claims **41-52, 54-61, 88, 89, 97-101, and 103-108** have been withdrawn from further consideration as being directed to a non-elected invention. It is requested that Applicant cancel the non-elected claims in response to this Office Action.

Claim Objections

4. Claims **19, 30, and 31** are objected to because of the following informalities:

Regarding claim **19**, on line 2, the word "the" is missing before the word "National". Also, on line 3, the word "a" is missing before the word "radio". Also, on line 4, the word "an" is missing before the word "operator".

Regarding claim **30**, on line 2, the word "a" is missing before the term "DSL".

Regarding claim **31**, on line 1, it appears that the phrase "the server to perform" should instead be "the server performs".

Appropriate correction is required.

Double Patenting

5. Applicant is advised that should claim **19** be found allowable, claim **109** will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(f):

(f) Element in Claim for a Combination. – An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The following is a quotation of pre-AIA 35 U.S.C. 112, sixth paragraph:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

Use of the word “means” (or “step for”) in a claim with functional language

creates a rebuttable presumption that the claim element is to be treated in accordance with 35 U.S.C. 112(f) (pre-AIA 35 U.S.C. 112, sixth paragraph). The presumption that 35 U.S.C. 112(f) (pre-AIA 35 U.S.C. 112, sixth paragraph) is invoked is rebutted when

the function is recited with sufficient structure, material, or acts within the claim itself to entirely perform the recited function.

Absence of the word “means” (or “step for”) in a claim creates a rebuttable presumption that the claim element is not to be treated in accordance with 35 U.S.C. 112(f) (pre-AIA 35 U.S.C. 112, sixth paragraph). The presumption that 35 U.S.C. 112(f) (pre-AIA 35 U.S.C. 112, sixth paragraph) is not invoked is rebutted when the claim element recites function but fails to recite sufficiently definite structure, material or acts to perform that function.

Claim elements in this application that use the word “means” (or “step for”) are presumed to invoke 35 U.S.C. 112(f) except as otherwise indicated in an Office action. Similarly, claim elements that do not use the word “means” (or “step for”) are presumed not to invoke 35 U.S.C. 112(f) except as otherwise indicated in an Office action.

6. Regarding claims **26-29**, claim limitations “a first module”, “a second module”, “a third module”, “a management interface”, and “a user interface module” has/have been interpreted under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, because it uses/they use a generic placeholder “module” and “interface” coupled with functional language “for collecting”, “for performing statistical analysis”, “for generating instruction and commands”, “for communicating”, and “for providing access” without reciting sufficient structure to achieve the function. Furthermore, the generic placeholder is not preceded by a structural modifier.

Since the claim limitation(s) invokes 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph, claim(s) **26-29** has/have been interpreted to cover the corresponding structure described in the specification that achieves the claimed function, and equivalents thereof.

A review of the specification shows that the following appears to be the corresponding structure described in the specification for the 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph limitation: Elements 202-205 and 207 of Figure 2.

7. The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims **26-29** are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Claim elements “a first module”, “a second module”, “a third module”, “a management interface”, and “a user interface module” are limitations that each invoke 35 U.S.C. 112, sixth paragraph. However, the written description fails to disclose the corresponding structure, material, or acts for the claimed function. While Figure 2 (and accompanying disclosure) provides a general description of module and interface elements 202-205 and 207, no further disclosure of the specific internal structure of these “black box” elements is provided.

Applicant may:

(a) Amend the claim so that the claim limitation will no longer be interpreted as a limitation under 35 U.S.C. 112, sixth paragraph; or

(b) Amend the written description of the specification such that it expressly recites what structure, material, or acts perform the claimed function without introducing any new matter (35 U.S.C. 132(a)).

If applicant is of the opinion that the written description of the specification already implicitly or inherently discloses the corresponding structure, material, or acts so that one of ordinary skill in the art would recognize what structure, material, or acts perform the claimed function, applicant should clarify the record by either:

(a) Amending the written description of the specification such that it expressly recites the corresponding structure, material, or acts for performing the claimed function and clearly links or associates the structure, material, or acts to the claimed function, without introducing any new matter (35 U.S.C. 132(a)); or

(b) Stating on the record what the corresponding structure, material, or acts, which are implicitly or inherently set forth in the written description of the specification, perform the claimed function. For more information, see 37 CFR 1.75(d) and MPEP §§ 608.01(o) and 2181.

9. Claims **18 and 40** are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and

distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Regarding claim **18**, there is some confusion regarding the limitation “by polling or scheduled based system”. It is unclear what this limitation is referring to.

Regarding claim **40**, there is some confusion regarding the limitation “by polling or scheduled based system”. It is unclear what this limitation is referring to.

Claim Rejections - 35 USC § 102

10. 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.

11. Claim(s) **1-6, 8-19, 21-40, and 109** is/are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Zhao et al. (U.S. 2002/0174421) (hereinafter “Zhao”) cited in Applicant’s submitted IDS. *Zhao* teaches all of the limitations of the specified claims with the reasoning that follows.

Regarding claim **1**, “a method performed by a downloadable agent, the method comprising: collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and

transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as well as the enterprise computing environment shown in Figure 2 including end user devices 110, 112, 114, 118 (broadband subscribers) connected via a LAN 104 and WAN 102.

Lastly, “transmitting the WAN performance information to a machine, wherein the machine is operable to: store the WAN performance information in a database associated with the machine, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber’s service provider” is anticipated by the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Regarding claim **2**, “wherein the other device is a router” is anticipated by the clients 11, 17 that are connected via firewall devices 13, 15 (routers) as shown in Figure 1.

Regarding claim **3**, “wherein the machine is operable to store the WAN performance information with an associated timestamp” is anticipated by the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], as well as where a timestamp is saved (stored) and utilized to compute performance data as spoken of on page 17, claim 8.

Regarding claim **4**, “wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (LAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **5**, “transmitting by the downloadable agent the LAN performance data to the machine” is anticipated by the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information (LAN performance data) relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **6**, “wherein the downloadable agent is executable in a virtual machine on the computing device” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) as a Java applet (virtual machine) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **8**, “receiving the analysis result, wherein receiving the analysis result comprises at least one of: receiving statistical analysis including throughput; receiving availability of higher bandwidth for operating a DSL service; receiving service product information for improving DSL service performance, or receiving utilization information for optimizing a consumers DSL service cost” is anticipated by the site monitor system that provides service summary information (for improving service performance) of managed services within a domain as spoken of on page 2, paragraphs [0045]-[0046].

Regarding claim **9**, “wherein the WAN performance information includes at least one of: user’s network usage pattern” is anticipated by the gathered JARTA data providing an integrated, end-to-end view of web browsing activities (users network usage pattern) as spoken of on page 1, paragraph [0009], lines 10-16.

Regarding claim **10**, “sending an on-demand change request associated with at least one of: throughput or latency” is anticipated by the servicing of received requests

from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064].

Regarding claim **11**, “wherein the machine is a server that resides in a cloud” is anticipated by site monitor 503 that runs on a management server 10 as shown in Figure 1 and spoken of on page 4, paragraph [0067].

Regarding claim **12**, “wherein the computing device is one of: a personal computer” is anticipated by the computer system 150 shown in Figure 3.

Regarding claim **13**, “wherein the downloadable agent is executable on an Internet browser” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) along with one or more web pages from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **14**, “wherein the downloadable agent is accessible remotely via the Internet” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) along with one or more web pages from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as

well as the client communication with web server 12 via the Internet as shown in Figure 1.

Regarding claim **15**, “periodically sending collected WAN performance information to the machine” is anticipated by the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients (collected WAN performance information) within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **16**, “waiting for a predetermined condition or threshold to be satisfied before sending collected WAN performance information to the machine” is anticipated by the selective transmission of the XML performance report to the site monitor (machine) based upon a returned success/failure status message (predetermined condition) as spoken of on page 8, paragraph [0175].

Regarding claim **17**, “where the predetermined condition or threshold is at least one of: a function of a type of data collected, or limit or threshold on a performance level associated with the collected data” is anticipated by the selective transmission of the XML performance report to the site monitor (machine) based upon a returned success/failure status message (condition based on type of data collected) as spoken of on page 8, paragraph [0175].

Regarding claim **18**, “wherein the machine is operable to collect WAN performance information by polling or scheduled based system” is anticipated by the

site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients (WAN performance information) within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **19**, "collecting data from at least one of: National Weather Service; radio station; or operator" is anticipated by the collection of data from server 502 using an agent 508 (operator) as spoken of on page 4, paragraph [0066].

Regarding claim **21**, "a system comprising: a database; and a server coupled to the database, the server operable to: receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN" is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) to a site monitor (database) of a server as spoken of on page 1, paragraphs [0009] and [0010], as well as the enterprise computing environment shown in Figure 2 including end user devices 110, 112, 114, 118 (broadband subscribers) connected via a LAN 104 and WAN 102.

Lastly, "store the WAN performance information in the database associated with the server, analyze the WAN performance information to generate an analysis result;

and report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider" is anticipated by the site monitor (of server) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Regarding claim **22**, "wherein the server resides in a cloud" is anticipated by site monitor 503 that runs on a management server 10 as shown in Figure 1 and spoken of on page 4, paragraph [0067].

Regarding claim **23**, "wherein the server is operable to store the WAN performance information with an associated timestamp" is anticipated by the site monitor (of server) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], as well as where a timestamp is saved (stored) and utilized to compute performance data as spoken of on page 17, claim 8.

Regarding claim **24**, “wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (LAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **25**, “wherein the server is operable to receive from the downloadable agent the LAN performance data” is anticipated by the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information (LAN performance data) relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **26**, “wherein the server comprises: a first module for collecting the WAN performance information; a second module for performing statistical analysis using the first WAN performance information; and a third module for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber’s premises, the service provider of the broadband subscriber and the access equipment of the service provider” is anticipated by the site monitor (of server) shown in Figure 7 that includes a data collector 220 (first module), site monitor processor 224 (second

module), site monitor knowledge module 226 (third module), and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Regarding claim **27**, "wherein the modules that receive the instruction and command from the third module are accessible by internet" is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) along with one or more web pages from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as well as the client communication with web server 12 via the Internet as shown in Figure 1.

Regarding claim **28**, "a management interface for communicating with the downloadable agent via internet" is anticipated by the site monitor (of server) shown in Figure 7 that includes a data collector 220 (first module), site monitor processor 224 (second module), site monitor knowledge module 226 (third module), and interface module 228 (management interface) used for the collection, processing, storage,

organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **29**, “a user interface module for providing access and for displaying information associated with the first, second, third modules” is anticipated by the site monitor (of server) shown in Figure 7 that includes a data collector 220 (first module), site monitor processor 224 (second module), site monitor knowledge module 226 (third module), and interface module 228 (user interface module) used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **30**, “wherein the server is operable to compute throughput of DSL connection by collecting current performance metrics associated with DSL service” is anticipated by the site monitor system that provides service summary information (for improving service performance) of managed services within a domain as spoken of on page 2, paragraphs [0045]-[0046], as well as the site monitor (of server) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **31**, “wherein the server to perform throughput computation with reference to a website” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer

(computing device) along with one or more web pages (of a website) from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **32**, "wherein the throughput computation comprises probing a network" is anticipated by the site monitor processor 214 that performs analysis of the received performance data (probed network information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Regarding claim **33**, "wherein the downloadable agent is executable in a virtual machine on the computing device" is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) as a Java applet (virtual machine) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **34**, "wherein the downloadable agent is dynamically downloaded to the computing device" is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated

with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **35**, “wherein the server is operable to report the analysis result by performing at least one of: sending statistical analysis including throughput; sending availability of higher bandwidth for operating a DSL service; sending service product information for improving DSL service performance; or sending utilization information for optimizing a consumers DSL service cost” is anticipated by the site monitor system that provides service summary information (for improving service performance) of managed services within a domain as spoken of on page 2, paragraphs [0045]-[0046].

Regarding claim **36**, “wherein the WAN performance information includes at least one of: user’s network usage pattern” is anticipated by the gathered JARTA data providing an integrated, end-to-end view of web browsing activities (users network usage pattern) as spoken of on page 1, paragraph [0009], lines 10-16.

Regarding claim **37**, “wherein the server is operable to receive an on-demand change request associated with at least one of: throughput or latency” is anticipated by the servicing of received requests from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064].

Regarding claim **38**, “wherein the computing device is one of: a computing device connected to the LAN” is anticipated by the computer system 150 shown in Figure 3.

Regarding claim **39**, “wherein the server is operable to provide a marketplace of ideas for the communication devices for trading bandwidth for media services” is anticipated by the servicing of received requests from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064].

Regarding claim **40**, “wherein the server is operable to collect WAN performance information by polling or scheduled based system” is anticipated by the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients (WAN performance information) within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **109**, “collecting data from at least one of: National Weather Service; radio station; or operator” is anticipated by the collection of data from server 502 using an agent 508 (operator) as spoken of on page 4, paragraph [0066].

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Additional references considered relevant to this application are listed in the attached “Notice of References Cited” (PTO-892).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Moore, Jr., whose telephone number is

(571)272-3168. The examiner can normally be reached on Monday-Friday (7:30am - 4:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan A. Phillips can be reached at (571) 272-3940. 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.

/Michael J. Moore, Jr./
Primary Examiner, Art Unit 2467

Application/Control Number: 14/414,436
Art Unit: 2467

Page 22

Notice of References Cited	Application/Control No. 14/414,436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.	
	Examiner Michael J. Moore, Jr.	Art Unit 2467	Page 1 of 1

U.S. PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A US-2012/0257535 A1	10-2012	DeWath; Edward J.	H04L43/10	370/253
*	B US-2014/0047100 A1	02-2014	Lachapelle; Luc	G06F11/3495	709/224
*	C US-2005/0114500 A1	05-2005	Monk, John M.	H04L12/2602	709/224
	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	CPC Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

NON-PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
	U				
	V				
	W				
	X				

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

Search Notes 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Inventorship Search (PALM/EAST)	7/22/16	MM
General EAST Keyword Search - See Search History Printout	7/22/16	MM

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

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Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>	<i>Complete if Known</i>	
	Application Number	14/414436
	Filing Date	
	First Named Inventor	Dagum, Leonardo
	Group Art Unit	2467
	Examiner Name	Michael J. Moore, Jr.
Sheet 1 of 1	Attorney Docket No: 8241P073	

US PATENT DOCUMENTS					
Examiner Initial *	Cite No ¹	USP Document Number	Publication or Issue Date MM-DD-YYYY	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US-2002/0174421	11-21-2002	ZHAO et al.	
		US-2012/0096143	04-19-2012	SUIT	
		US-2009/0207985	08-20-2009	CIOFFI et al.	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No ¹	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	T ²
		WO-2012/091725	07-05-2012	ADAPTIVE SPECTRUM AND SIGNAL ALIGNMENT, INC.		

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No ¹	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
		International Search Report and Written Opinion for International Patent Application No. PCT/US2012/057152 (Attorney Docket No. 8241P073PCT), mailed 3/5/2013.	

EXAMINER	/Michael Moore Jr/	DATE CONSIDERED	07/22/2016
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Based on PTO/SB/06A(09-06) - Substitute Disclosure Statement Form (PTO-1449) as modified by BSTZ 03/26/07
 * EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 809. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional) 2 Applicant is to place a check mark here if English language Translation is attached

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /MM/

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

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	119	dagum-leonardo.in. or bednarz-philip.in. or goldburg-marc.in. or tehrani-ardavan.in. or rhee-wonjong.in.	US-PGPUB; USPAT	OR	OFF	2016/07/22 09:51
L2	4	L1 and (agent and (WAN same performance) and repor\$4)	US-PGPUB; USPAT	OR	OFF	2016/07/22 09:52
L3	3	((("20020174421") or ("20120096143") or ("20090207985")).PN.	US-PGPUB	OR	OFF	2016/07/22 09:58
L4	2	L3 and (timestamp or "time stamp")	US-PGPUB	OR	OFF	2016/07/22 10:46
L5	0	(agent same measur\$6 same WAN same performance) and (repor\$4 same (subscriber or subscribers))	US-PGPUB; USPAT	OR	OFF	2016/07/22 11:12
L6	0	(agent same measur\$6 same WAN same performance) and (repor\$4 same (subscriber or subscribers or provider or providers))	US-PGPUB; USPAT	OR	OFF	2016/07/22 11:13
L7	18	(agent same measur\$6 same WAN) and (repor\$4 same (subscriber or subscribers or provider or providers))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	OFF	2016/07/22 11:14
L8	55	(agent same measur\$6 same WAN) and analy\$4 and repor\$4	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	OFF	2016/07/22 11:18

EAST Search History (Interference)

<This search history is empty>

7/ 22/ 2016 11:28:43 AM**C:\Users\mmore5\Documents\EAST\Workspaces\mike14414436.wsp**




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BIB DATA SHEET

CONFIRMATION NO. 4662

SERIAL NUMBER 14/414,436	FILING or 371(c) DATE 01/12/2015	CLASS 370	GROUP ART UNIT 2467	ATTORNEY DOCKET NO. 03.P073US		
APPLICANTS ADAPTIVE SPECTRUM AND SIGNAL ALIGNMENT, INC., Redwood City, CA INVENTORS Leonardo Dagum, Redwood City, CA; Philip Bednarz, Palo Alto, CA; Marc Goldberg, Redwood City, CA; Ardavan Maleki Tehrani, Menlo Park, CA; Wonjong Rhee, San Francisco, CA;						
** CONTINUING DATA ***** This application is a 371 of PCT/US2012/057152 09/25/2012 which claims benefit of 61/671,672 07/13/2012 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 04/06/2015						
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Met after Allowance	STATE OR COUNTRY CA	SHEETS DRAWINGS 11	TOTAL CLAIMS 72	INDEPENDENT CLAIMS 4
Verified and Acknowledged	/MICHAEL J MOORE JR/ Examiner's Signature	Initials				
ADDRESS Green, Howard, & Mughal LLP 5 Centerpointe Dr. Suite 400 LAKE OSWEGO, OR 97035 UNITED STATES						
TITLE METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK						
FILING FEE RECEIVED 6280	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit			

<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

✓	Rejected
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-	Cancelled
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N	Non-Elected
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A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
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 T.D.
 R.1.47

CLAIM		DATE							
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<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

✓	Rejected
=	Allowed


-	Cancelled
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A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
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<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

✓	Rejected
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A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
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 R.1.47

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	106	÷	N						
	107	÷	N						
	108	÷	N						

<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

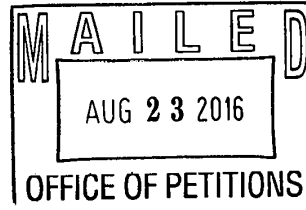
A	Appeal
O	Objected

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant		<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47			
CLAIM		DATE							
Final	Original	04/12/2016	07/22/2016						
	109	÷	✓						
	110	-	-						



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1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040**

In re Application of	:	
SIMU, et al	:	
Application No. 14/414,436	:	DECISION ON PETITION
Filed: January 12, 2015	:	TO WITHDRAW
Attorney Docket No. 03.P073US	:	FROM RECORD
	:	

This is a decision on the Request to Withdraw as attorney or agent of record under 37 C.F.R. § 1.36(b), filed November 24, 2015.

The request is **NOT APPROVED because it is moot.**

A review of the file record indicates that the request to withdraw the power of attorney to Spencer K. Hunter, has been revoked by the applicant on January 25, 2016. Accordingly, the request to withdraw under 37 C.F.R. § 1.36(b) is moot.

All future communications from the Office will continue to be directed to the address copied below until otherwise notified by the applicant.

Telephone inquiries concerning this decision should be directed to the undersigned at (571) 272-6735.

/Diane C. Goodwyn/
Diane C. Goodwyn
Paralegal Specialist
Office of Petitions

cc : GREEN, HOWARD, & MUGHAL LLP
5 CENTERPOINTE DR.
SUITE 400
LAKE OSWEGO, OR 97035

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Leonardo Dagum

Application No.: 14/414,436

Filed: January 12, 2015

For: METHOD AND SYSTEM FOR USING A
DOWNLOADABLE AGENT FOR A
COMMUNICATION SYSTEM, DEVICE, OR
LINK

Examiner:
Michael J. Moore, Jr.

Art Group: 2467

Confirmation No.: 4662

Docket No.: 03.P073US

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

AMENDMENT UNDER 37 C.F.R. § 1.111

Dear Examiner:

This Amendment is in response to the Non-Final Office Action of 28 July 2016. Applicants respectfully request the Examiner to enter this Amendment and consider the following remarks.

LISTING OF CLAIMS

1. (Original) A method performed by a downloadable agent, the method comprising:
 - collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
 - transmitting the WAN performance information to a machine, wherein the machine is operable to:
 - store the WAN performance information in a database associated with the machine,
 - analyze the WAN performance information to generate an analysis result;
 - and
 - report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

2. (Original) The method of claim 1, wherein the other device is a router.

3. (Original) The method of claim 1, wherein the machine is operable to store the WAN performance information with an associated timestamp.

4. (Original) The method of claim 1 wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.

5. (Original) The method of claim 4 further comprises transmitting by the downloadable agent the LAN performance data to the machine.

6. (Original) The method of claim 1, wherein the downloadable agent is executable in a virtual machine on the computing device.

7. (Canceled)

8. (Original) The method of claim 1 further comprises receiving the analysis result, wherein receiving the analysis result comprises at least one of:

- receiving statistical analysis including throughput;
- receiving availability of higher bandwidth for operating a DSL service;
- receiving service product information for improving DSL service performance; or
- receiving utilization information for optimizing a consumers DSL service cost.

9. (Original) The method of claim 1, wherein the WAN performance information includes at least one of:

- topological information,
- geographical information,
- throughput,
- latency,
- jitter,
- packet loss,
- time,
- type of communication device,
- device network identification,
- manufacturer and model of equipment,
- equipment characteristics,
- firmware,
- user's network usage pattern,
- user's provisioned WAN service,
- RF characteristics including at least one of: signal power, frequency bands and mode of operation,
- environment statistics, or
- data on operation of communication devices.

10. (Original) The method of claim 1 further comprises:

- sending an on-demand change request associated with at least one of: throughput, or latency.

11. (Original) The method of claim 1, wherein the machine is a server that resides in a cloud.

12. **(Currently Amended)** The method of claim 1, wherein the computing device is one of:
 - tablet computing device;
 - a personal computer;
 - a gaming console;
 - an access point (AP);
 - a base station;
 - a wireless smartphone device;
 - a wireless LAN device;
 - an access gateway;
 - a router;
 - a performance enhancement device;
 - a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
 - a cable CPE modem;
 - an in-home powerline device;
 - a Home Phoneline Network Alliance (HPNA) based device;
 - an in-home coax distribution device;
 - a G.hn (Global Home Networking Standard) compatible device;
 - an in-home metering communication device;
 - an in-home appliance communicatively interfaced with the LAN;
 - a wireless femtocell base station;
 - a wireless Wi-Fi compatible base station;
 - a wireless mobile device repeater;
 - a wireless mobile device base station;
 - nodes within an ad-hoc/mesh network;
 - a set-top box (STB)/set-top unit (STU) customer electronics device;
 - an Internet Protocol (IP) enabled television;
 - an IP enabled media player;
 - an IP enabled gaming console;
 - an Ethernet gateway;
 - a computing device connected to the LAN;

an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; [[and]]or
internet enabled cameras.

13. (Original) The method of claim 1, wherein the downloadable agent is executable on an Internet browser.

14. (Original) The method of claim 1, wherein the downloadable agent is accessible remotely via the Internet.

15. (Original) The method of claim 1 further comprises periodically sending collected WAN performance information to the machine.

16. (Original) The method of claim 1 further comprises waiting for a predetermined condition or threshold to be satisfied before sending collected WAN performance information to the machine.

17. (Original) The method of claim 16, where the predetermined condition or threshold is at least one of:

a function of a type of data collected, or
limit or threshold on a performance level associated with the collected data.

18. (Currently Amended) The method of claim 1, wherein the machine is operable to collect WAN performance information by polling or by a scheduled based system.

19. (Currently Amended) The method of claim 1 further comprises collecting data from at least one of:

The National Weather Service;
a radio station; or
an operator.

20. (Canceled)
21. (Original) A system comprising:
a database; and
a server coupled to the database, the server operable to:
receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
store the WAN performance information in the database associated with the server,
analyze the WAN performance information to generate an analysis result; and
report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.
22. (Original) The system of claim 21, wherein the server resides in a cloud.
23. (Original) The system of claim 21, wherein the server is operable to store the WAN performance information with an associated timestamp.
24. (Original) The system of claim 21, wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.
25. (Original) The system of claim 24, wherein the server is operable to receive from the downloadable agent the LAN performance data.
26. **(Currently Amended)** The system of claim 25, wherein the server comprises:
a first ~~module~~ logic for collecting the WAN performance information;
a second ~~module~~ logic for performing statistical analysis using the first WAN performance information; and
a third ~~module~~ logic for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at

the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider..

27. **(Currently Amended)** The system of claim 26, wherein the ~~modules~~logic that receive the instruction and command from the third module are accessible by internet.
28. **(Original)** The system of claim 26, wherein the server comprises:
 - a management interface for communicating with the downloadable agent via internet.
29. **(Currently Amended)** The system of claim 26, wherein the server comprises:
 - a user interface ~~module~~logic for providing access and for displaying information associated with the first, second, third modules.
30. **(Currently Amended)** The system of claim 21, wherein the server is operable to compute throughput of a DSL connection by collecting current performance metrics associated with DSL service.
31. **(Currently Amended)** The system of claim 30, wherein the server is to perform throughput computation with reference to a website.
32. **(Original)** The system of claim 31, wherein the throughput computation comprises probing a network.
33. **(Original)** The system of claim 21, wherein the downloadable agent is executable in a virtual machine on the computing device.
34. **(Original)** The system of claim 21, wherein the downloadable agent is dynamically downloaded to the computing device.
35. **(Original)** The system of claim 21, wherein the server is operable to report the analysis result by performing at least one of:

sending statistical analysis including throughput;
sending availability of higher bandwidth for operating a DSL service;
sending service product information for improving DSL service performance; or
sending utilization information for optimizing a consumers DSL service cost.

36. (Original) The system of claim 21, wherein the WAN performance information includes at least one of:

topological information,
geographical information,
time,
throughput,
latency,
jitter,
packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency bands and
mode of operation,
environment statistics, or
data on operation of communication devices.

37. (Original) The system of claim 21, wherein the server is operable to receive an on-demand change request associated with at least one of: throughput, or latency.

38. **(Currently Amended)** The system of claim 21, wherein the computing device is one of:

tablet computing device;
an access point (AP);
a base station;

a wireless smartphone device;
a wireless LAN device;
an access gateway;
a router,
a performance enhancement device;
a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; [[and]]or
internet enabled cameras.

39. (Original) The system of claim 21, wherein the server is operable to provide a marketplace of ideas for the communication devices for trading bandwidth for media services.
40. **(Currently Amended)** The system of claim 21, wherein the server is operable to collect WAN performance information by polling or by a scheduled based system.
41. (Withdrawn) A method comprising:
receiving first information from a first downloadable agent;
receiving second information from a second downloadable agent;
storing the first and second information in a database;
analyzing the first and second information with reference to data already stored in the database; and
reporting the analyzed first and second information to a management entity.
42. (Withdrawn) The method of claim 41, wherein the first and second information are time stamped.
43. (Withdrawn) The method of claim 41, wherein the first and second agents are executable on multiple computing machines.
44. (Withdrawn) The method of claim 41, wherein the first downloadable agent is communicatively coupled to a first LAN device.
45. (Withdrawn) The method of claim 44, wherein the first downloadable agent is operable to collect information from multiple computing entities coupled to the first LAN device.
46. (Withdrawn) The method of claim 44, wherein the second downloadable agent is communicatively coupled to a second LAN device.
47. (Withdrawn) The method of claim 46, wherein the second downloadable agent is operable to collect information from multiple computing entities coupled to the second LAN device, the second LAN device being different from the first LAN device.

48. (Withdrawn) The method of claim 47, wherein the first and second LAN devices comprise at least one of:

- an access point (AP);
- a base station;
- a wireless smartphone device;
- a wireless LAN device;
- a router
- an access gateway;
- a performance enhancement device;
- a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
- a cable CPE modem;
- an in-home powerline device;
- a Home Phoneline Network Alliance (HPNA) based device;
- an in-home coax distribution device;
- a G.hn (Global Home Networking Standard) compatible device;
- an in-home metering communication device;
- an in-home appliance communicatively interfaced with the LAN;
- a wireless femtocell base station;
- a wireless Wi-Fi compatible base station;
- a wireless mobile device repeater;
- a wireless mobile device base station;
- nodes within an ad-hoc/mesh network;
- a set-top box (STB)/set-top unit (STU) customer electronics device;
- an Internet Protocol (IP) enabled television;
- an IP enabled media player;
- an IP enabled gaming console;
- an Ethernet gateway;
- a computing device connected to the LAN;
- an Ethernet connected computer peripheral device;
- an Ethernet connected router;
- an Ethernet connected wireless bridge;
- an Ethernet connected network bridge;

an Ethernet connected network switch;
wearable device; and
internet enabled cameras.

49. (Withdrawn) The method of claim 41, wherein the first and second downloadable agents execute on devices coupled to the same LAN.

50. (Withdrawn) The method of claim 41, wherein the first and second downloadable agents execute on devices coupled to distinct LANs.

51. (Withdrawn) The method of claim 50 further comprises:
processing data from the distinct LANs separately to produce analyses and recommendations for each LAN, among the distinct LANs, according to measurements made by corresponding first or second downloadable agents.

52. (Withdrawn) The method of claim 50 further comprises:
processing data from the distinct LANs jointly to produce analyses and recommendations for each LAN, among the distinct LANs, according to data reported from each LAN for which analyses and recommendations are being created and from other LANs different from that LAN.

53. (Canceled)

54. (Withdrawn) The method of claim 41 further comprises:
determining control information for a DSL operator, the control information according to the analyzed first and second information; and
recommending the DSL operator with the control information to improve performance of a DSL service.

55. (Withdrawn) The method of claim 54, wherein the control information includes at least one or more of signals or commands related to:

power,
spectrum control,
margin, data rate,
latency/delay, or
coding.

56. (Withdrawn) The method of claim 54, wherein the control information relates to on-demand change in performance of the DSL service.

57. (Withdrawn) The method of claim 56, wherein the on-demand change is associated with at least one of:

throughput,
latency,
packet loss, or
jitter.

58. (Withdrawn) The method of claim 41, wherein reporting comprises at least one of:
providing statistical analysis including throughput;
providing availability of higher bandwidth for operating a DSL service;
providing service product information for improving DSL service performance; or
providing utilization information for optimizing a consumers DSL service cost.

59. (Withdrawn) The method of claim 41, wherein receiving the first and second information is via Internet.

60. (Withdrawn) The method of claim 41, wherein the first and second information includes at least one of:

topological information,
geographical information,
time,
throughput,
latency,
jitter,

packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency bands and
mode of operation,
environment statistics, or
data on operation of communication devices.

61. (Withdrawn) The method of claim 41, wherein analyzing the first information with reference to the second information comprises at least one of:

performing statistical analysis including throughput;
determining availability of higher bandwidth for operating a DSL service;
determining service product information for improving DSL service performance;
determining utilization information for optimizing a consumers DSL service cost;

or

grouping data in the database according to at least one of geographical location, services type, service provider, or time.

62. – 87. (Canceled)

88. (Withdrawn) A method performed by a downloadable agent on a processor, the method comprising:

collecting first information related to performance of a network device associated with the downloadable agent;

sending the first information to a machine, wherein the first information is stored in a database coupled to the machine, and wherein the machine is operable to:

receive second information from another downloadable agent; and

analyze the first and second information with reference to data already

stored in the database; and
receiving a report of the analyzed first and second information.

89. (Withdrawn) The method of claim 88, wherein the first and second information is time stamped.

90. – 96. (Canceled)

97. (Withdrawn) The method of claim 88, wherein the first and second information include at least one of:

topological information,
geographical information,
time,
throughput,
latency,
jitter,
packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency bands and mode of operation,
environment statistics, or
data on operation of communication devices.

98. (Withdrawn) The method of claim 88 further comprises:
sending an on-demand change request associated with at least one of: throughput,
or latency.

99. (Withdrawn) The method of claim 88, wherein receiving the report comprises at least

one of:

receiving statistical analysis including throughput;
receiving availability of higher bandwidth for operating a DSL service;
receiving service product information for improving DSL service performance; or
receiving utilization information for optimizing a consumers DSL service cost.

100. (Withdrawn) The method of claim 88, wherein the machine is operable to:
process data from distinct LANs separately to produce analyses and
recommendations for each LAN, among the distinct LANs, according to measurements
made by respective downloadable agents coupled to respective distinct LANs.
101. (Withdrawn) The method of claim 88, wherein the machine is operable to:
process data from distinct LANs jointly to produce analyses and
recommendations for each LAN, among the distinct LANs, according to data reported
from each LAN for which analyses and recommendations are being created and from
other LANs different from that LAN.
102. (Canceled)
103. (Withdrawn) The method of claim 88, wherein the downloadable agent is executable on
an Internet browser.
104. (Withdrawn) The method of claim 88, wherein the downloadable agent is accessible
remotely via the Internet.
105. (Withdrawn) The method of claim 88 further comprises periodically sending collected
first information to the machine.
106. (Withdrawn) The method of claim 88 further comprises waiting for a predetermined
condition or threshold to be satisfied before sending the first information to the machine.
107. (Withdrawn) The method of claim 106, where the predetermined condition or threshold
is at least one of:

a function of a type of data collected, or

limit or threshold on a performance level associated with the collected data.

108. (Withdrawn) The method of claim 88, wherein the machine is operable the first information by polling or scheduled based system.

109. (**Currently Amended**) The method of claim [[1]]88 further comprises collecting data from at least one of:

National Weather Service;
radio station; or
operator.

110. (Canceled)

REMARKS

This listing of claims will replace all prior versions and listings of claims in the application. Claims 12, 18, 19, 26, 27, 29-31, 38, and 40 are amended. No claims are added. No claims are cancelled in this response. Hence, claims 1-6, 8-19, 21-40, and 109 are pending. Applicants respectfully request reconsideration of claims in view of the amendments and arguments.

CLAIM OBJECTION

Claims 19, 30, and 31 were objected to due to alleged informalities. Appropriate correction are made. Accordingly, Applicants respectfully request Examiner to withdraw the rejection.

DOUBLE PATENTING REJECTION

Examiner notes that should claim 19 be found allowable, claim 109 will stand objected to under 37 C.F.R. § 1.75. Office Action, p. 3. Applicants amend claim 109. Claim 109 now depends from claim 88, which is withdrawn under restriction requirement.

REJECTION UNDER 35 U.S.C. § 112

Claims 26-29 stand rejected under 35 U.S.C. § 112(b). Office Action, p. 5, item 8. Applicants remove the objected to language of “module.” Further, these logic are part of a server which is a computer. A person skilled in the art would appreciate what a server is. The server when performing the various functions via the various logics of claim 26 becomes a specific machine. As such, sufficient structure is provided for those logic of claim 26.

Claims 18 and 40 stand rejected under 35 U.S.C. § 112(b). Office Action, p. 6, item 9. Applicants amend claims 18 and 40 to clarify them. Examiner is respectfully requested to withdraw the rejection and reconsider the claims in view of the above arguments.

REJECTION UNDER 35 U.S.C. § 102

Claims 1-6, 8-19, 21-40, and 109 stand rejected under 35 U.S.C. § 102(b) for allegedly being anticipated by U.S. Patent Publication No. 2002/0174421 of Zhao et al. (hereinafter “Zhao”). Office Action, p. 7, item 11.

The following arguments are presented with reference to independent claim 1. The same argument applies to other rejected independent claims.

M.P.E.P. § 2131 states that “[a] claim is anticipated only if **each and every element** as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.’ *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)” (emphasis added). “‘The identical invention must be shown in **as complete detail** as is contained in the ... claim.’ *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)” (emphasis added). Moreover, “[e]very element of the claimed invention must be literally present, **arranged as in the claim.**” *Id.* (emphasis added).

Zhao “relates generally to computer systems and software and more particularly to the management and monitoring of internet servers and services.” Zhao, paragraph [0002]. Zhao allegedly refers to WAN 102 and LAN 104 in general context of coupling computer devices. See, for example Zhao paragraphs [0053], [0054]. However, such disclosure is not related to any WAN performance information.

Here, the Office Action has not established that each element of the claims is disclosed in Zhao. The Office Action merely appends a paragraph number in the explanation with no reasonable reasoning or association with the claimed features. As such, Applicants cannot reasonably determine which “element” of the claim is believed to correspond with which section, figure or feature cited in the rejection. In other words, Applicant is not put on notice as to the rationale behind the rejection and cannot adequately determine whether such basis is proper.

For example, at paragraphs 0009 Zhao allegedly discloses A JARTA (Java Application Response Time Analyzer) component installed on an end user’s browser can collect various response time measurements as well as the client’s system information such as IP address, etc. On the Web server end, a JARTA utility can manage the actions (e.g., insert, modify, and delete) associated with web pages that are ear-marked for JARTA testing at the client browser. This strongly suggests that Zhao specifically addresses the problem instrumenting a web browser to gather information “associated with web pages”. Further at paragraph 0010 Zhao allegedly

discloses: One embodiment of the invention comprises a method wherein a software application is transmitted from a server to a client. The software application is configured to monitor one or more performance parameters of the client associated with client-server transactions that are executed. This further supports the suggestion that Zhao is teaching methods related to instrument “client-server transactions that are executed”.

Conversely, claim 1 recites “collecting WAN performance information” while as is shown above, Zhao allegedly discloses methods of gathering information from a web browser to monitor one or more parameters “associated with client-server transactions”. It is well known to those skilled in the art that client-server transactions are associated with communications between applications running on two computing devices, that is at the application layer of a communications stack, while the “WAN performance information” of claim 1 refers to gathering information related to the WAN. For example, information such as physical, link, IP, and TCP layers of a communications stack. Such data, for example, is data specifically related to the communications links within the WAN, and not the transactions at the application layer related to “client-server transactions that are executed”. See, for example, paragraph [0016] of the pending application.

Applicants further contend that Fig. 2 of Zhao is allegedly a generic depiction of computers networked together and contains no teachings regarding what is recited in claim 1. In fact the sole reference to Fig. 2 in Zhao is at paragraph 0015 which specifically states that the figure is simply illustrative of a typical network--[0015] FIG. 2 is a network diagram of an illustrative enterprise computing environment according to one embodiment.

Further nothing in Zhao discloses transmitting the WAN performance information to a machine, wherein the machine is operable to: store the WAN performance information in a database associated with the machine, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber’s service provider.

Examiner appears to combine at least three limitations of claim 1 into a single grouping in his argument, and it is thus not reasonably possible to associate Examiner’s reasoning with

any particular limitation. Despite that, Applicants note that paragraphs 0074 through 0076 of Zhao are simply explaining the meaning of Fig. 7 of Zhao. Although the Examiner places in parenthesis (WAN Performance information), (reporting) and (subscriber), concepts recited by claim 1, at no place do paragraphs 0074, 0075, 0076 of Zhao mention these concepts at all. Nor is there any mention of these concepts in the legends of Fig. 7 of Zhao. Similarly, paragraph 0131 of Zhao allegedly fails to teach any concepts related to these parenthetical concepts, or to the gathering or analysis of WAN Performance information.

Additionally, it appears that the United States Supreme Court values “reasons” in a rejection, and would likely require that such reasoning be applied to rejections under 35 U.S.C. § 102 if presented with the issue, rather than just rejections under 35 U.S.C. § 103. For instance, MPEP § 2143, citing *KSR*, states that “[t]he key to supporting any rejection under 35 U.S.C. 103 is the **clear articulation** of the reason(s) why the claimed invention would have been obvious. The Supreme Court in *KSR* noted that the analysis supporting a rejection under 35 U.S.C. 103 should be **made explicit**” (emphasis added, see also *KSR Intl Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1395-97 (2007)). While *KSR* and the cited section of the MPEP are directed to obviousness rejections under 35 U.S.C. § 103, it is apparent that the Supreme Court believes that a clear articulation of reasons is “the key” to supportable rejections by the USPTO.

Further, failure to specifically identify which features of Zhao are believed to disclose each element of the claims likely renders the Office Action “arbitrary and capricious”, and therefore invalid, under the Administrative Procedure Act (5 U.S.C. § 706), a standard to which all Actions by the USPTO must adhere (see *Dickenson v. Zurko*, 527 U.S. 150 (1999)). Without proper guidance as to which “element” of the claim is believed to correspond with which section cited in the rejection, Applicants are forced to guess which features in the cited art the Examiner believed to disclose each of the claimed features.

Because reasons for the rejection were not presented in the Office Action and Applicants cannot reasonably determine which feature of Zhao is believed to correspond with which feature recited in the claims, it is respectfully submitted that the rejection is improper and must be withdrawn.

Accordingly, Applicants respectfully request reconsideration of pending claims in view of the amendments.

Note that merely because Applicants do not specifically argue that certain limitations of a claim are not in the references is not a concession that a reference or combination of references includes the limitations. That Applicants do not contradict a particular statement made in the Office action is not a concession that Applicants agree with it. Further, merely because Applicants do not separately argue the patentability of every dependent claim is not a concession that there are not additional reasons for patentability of these dependent claims.

Applicants believe every assertion by the Office Action has been addressed. However, in the interest of clarity and brevity, Applicants may not have asserted every available argument for each assertion made in the Office Action. Applicants' silence regarding any such assertion does not constitute any admission or acquiescence. Applicants reserve all rights not exercised in connection with this response, such as the right to challenge or rebut any tacit or explicit characterization of any reference or of any of the present claims, the right to challenge or rebut any asserted factual or legal basis of any of the rejections, the right to swear behind any cited reference such as provided under 37 C.F.R. § 1.131 or otherwise, or the right to assert co-ownership of any cited reference.

Applicants do not admit that any of the cited references or any other references of record is relevant to the present claims, or that they constitute prior art. To the extent that any rejection or assertion is based upon the Examiner's personal knowledge, rather than any objection evidence of record as manifested by a cited prior art reference, Applicants timely object to such reliance on Official Notice, and reserve all rights to request that the Examiner provide a reference or affidavit in support of such assertion, as required by M.P.E.P. § 2144.03. Applicants reserve all rights to pursue any cancelled claims in a subsequent patent application claiming the benefit of priority of the present patent application, and to request rejoinder of any withdrawn claim, as required by M.P.E.P. § 821.04.

Based on the amendments and arguments, Applicants respectfully request the Examiner to allow all pending claims.

CONCLUSION

Applicants submit that they have overcome Examiner's objections to and rejections of the claims and that they have the right to claim the invention as listed in the listing of claims. Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

Pursuant to 37 C.F.R. § 1.136(a)(3), Applicants request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. § 1.16 and § 1.17, to Deposit Account No. 50-6925.

Respectfully submitted,
GREEN, HOWARD, & MUGHAL, LLP

12/28/16

Date

/Usman A. Mughal/

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Electronic Patent Application Fee Transmittal				
Application Number:	14414436			
Filing Date:	12-Jan-2015			
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
First Named Inventor/Applicant Name:	Leonardo Dagum			
Filer:	Usman Mughal/Katherine Campbell			
Attorney Docket Number:	03.P073US			
Filed as Small Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
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(\$)
Extension - 2 months with \$0 paid	2252	1	300	300
Miscellaneous:				
Total in USD (\$)				300

Electronic Acknowledgement Receipt

EFS ID:	27922974
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	136402
Filer:	Usman Mughal/Katherine Campbell
Filer Authorized By:	Usman Mughal
Attorney Docket Number:	03.P073US
Receipt Date:	28-DEC-2016
Filing Date:	12-JAN-2015
Time Stamp:	20:54:32
Application Type:	U.S. National Stage under 35 USC 371

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Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$300
RAM confirmation Number	122916INTEFSW20560600
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The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Extension of Time	03P073US_EOT.pdf	162948	no	2
			c6cef54c26a8649f765185e444cfd7302bba4935		
Warnings:					
Information:					
2		03P073US_ROA.pdf	165686	yes	23
			f787572061cdc88559fd7f9ae34b6f2caea02588		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	17	
	Applicant Arguments/Remarks Made in an Amendment		18	23	
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	31048	no	2
			9d7a7a5463ba95d7490cbb955396d79c31225ac7		
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)		Docket Number (Optional) 03.P073US																														
Application Number 14/414,436	Filed 2015-01-12																															
For METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK																																
Art Unit 2467	Examiner Michael J. Moore, Jr.																															
<p>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.</p> <p>The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;"></th> <th style="text-align: center;"><u>Fee</u></th> <th style="text-align: center;"><u>Small Entity Fee</u></th> <th style="text-align: center;"><u>Micro Entity Fee</u></th> <th style="width: 10%;"></th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> One month (37 CFR 1.17(a)(1))</td> <td style="text-align: center;">\$200</td> <td style="text-align: center;">\$100</td> <td style="text-align: center;">\$50</td> <td style="text-align: right;">\$ _____</td> </tr> <tr> <td><input checked="" type="checkbox"/> Two months (37 CFR 1.17(a)(2))</td> <td style="text-align: center;">\$600</td> <td style="text-align: center;">\$300</td> <td style="text-align: center;">\$150</td> <td style="text-align: right;">\$ <u>300</u></td> </tr> <tr> <td><input type="checkbox"/> Three months (37 CFR 1.17(a)(3))</td> <td style="text-align: center;">\$1,400</td> <td style="text-align: center;">\$700</td> <td style="text-align: center;">\$350</td> <td style="text-align: right;">\$ _____</td> </tr> <tr> <td><input type="checkbox"/> Four months (37 CFR 1.17(a)(4))</td> <td style="text-align: center;">\$2,200</td> <td style="text-align: center;">\$1,100</td> <td style="text-align: center;">\$550</td> <td style="text-align: right;">\$ _____</td> </tr> <tr> <td><input type="checkbox"/> Five months (37 CFR 1.17(a)(5))</td> <td style="text-align: center;">\$3,000</td> <td style="text-align: center;">\$1,500</td> <td style="text-align: center;">\$750</td> <td style="text-align: right;">\$ _____</td> </tr> </tbody> </table> <p><input type="checkbox"/> Applicant asserts small entity status. See 37 CFR 1.27.</p> <p><input type="checkbox"/> Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.</p> <p><input type="checkbox"/> A check in the amount of the fee is enclosed.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> The Director has already been authorized to charge fees in this application to a Deposit Account.</p> <p><input type="checkbox"/> The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number _____.</p> <p><input checked="" type="checkbox"/> Payment made via EFS-Web.</p> <p>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.</p> <p>I am the</p> <p><input type="checkbox"/> applicant.</p> <p><input checked="" type="checkbox"/> attorney or agent of record. Registration number <u>62887</u>.</p> <p><input type="checkbox"/> attorney or agent acting under 37 CFR 1.34. Registration number _____.</p> <p><u>/Usman A. Mughal/</u> <u>2016-12-28</u> <small>Signature Date</small></p> <p><u>Usman A. Mughal</u> <u>503-968-8233</u> <small>Typed or printed name Telephone Number</small></p> <p>NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.</p>				<u>Fee</u>	<u>Small Entity Fee</u>	<u>Micro Entity Fee</u>		<input type="checkbox"/> One month (37 CFR 1.17(a)(1))	\$200	\$100	\$50	\$ _____	<input checked="" type="checkbox"/> Two months (37 CFR 1.17(a)(2))	\$600	\$300	\$150	\$ <u>300</u>	<input type="checkbox"/> Three months (37 CFR 1.17(a)(3))	\$1,400	\$700	\$350	\$ _____	<input type="checkbox"/> Four months (37 CFR 1.17(a)(4))	\$2,200	\$1,100	\$550	\$ _____	<input type="checkbox"/> Five months (37 CFR 1.17(a)(5))	\$3,000	\$1,500	\$750	\$ _____
	<u>Fee</u>	<u>Small Entity Fee</u>	<u>Micro Entity Fee</u>																													
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<input type="checkbox"/> Five months (37 CFR 1.17(a)(5))	\$3,000	\$1,500	\$750	\$ _____																												
<input type="checkbox"/> * Total of _____ forms are submitted.																																

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, 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 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.

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 14/414,436	Filing Date 01/12/2015	<input type="checkbox"/> To be Mailed
ENTITY: <input checked="" type="checkbox"/> LARGE <input type="checkbox"/> SMALL <input type="checkbox"/> MICRO					
APPLICATION AS FILED – PART I					
(Column 1)		(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A		
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A		
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A		
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	minus 20 =	*	X \$ =		
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =		
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).				
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>					
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL		

APPLICATION AS AMENDED – PART II								
(Column 1)		(Column 2)		(Column 3)				
AMENDMENT	12/28/2016	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 72	Minus	** 72	= 0	X \$80 =	0	
	Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X \$420 =	0	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
TOTAL ADD'L FEE						0		

(Column 1)		(Column 2)		(Column 3)				
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
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.

LIE
TONI HAKIM

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.

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	14/414,436
Filing Date	2015-01-12
First Named Inventor	Leonardo Dagum
Title	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Art Unit	2467
Examiner Name	Michael J. Moore Jr.
Attorney Docket Number	20145-073US

SIGNATURE of Applicant or Patent Practitioner			
Signature	/Michael V. North/	Date (Optional)	2017-03-14
Name	Michael V. North	Registration Number	46963
Title (if Applicant is a juristic entity)	Attorney		
Applicant Name (if Applicant is a juristic entity)	Adaptive Spectrum and Signal Alignment, Inc.		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

*Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 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.

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above:

146571

OR

I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

The address associated with the above-mentioned Customer Number

OR

The address associated with Customer Number:

OR

Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone	Email		

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Adaptive Spectrum and Signal Alignment, Inc.

Inventor or Joint Inventor (title not required below)

Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	2/24/2017
Name	Mary Fuller		
Title	General Counsel and Corporate Secretary		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 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.

Electronic Acknowledgement Receipt

EFS ID:	28626796
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	136402
Filer:	Michael V. North
Filer Authorized By:	
Attorney Docket Number:	03.P073US
Receipt Date:	16-MAR-2017
Filing Date:	12-JAN-2015
Time Stamp:	19:01:49
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	073US_POA.pdf	1871754 <small>920ddf4ae668bbc78c71443447d34d93fb09f675</small>	no	2

Warnings:

Information:	
Total Files Size (in bytes):	1871754
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>	



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
14/414,436	01/12/2015	Leonardo Dagum	20145-073US

146571
North Weber & Baugh LLP - ASSIA
3260 Hillview Avenue
Palo Alto, CA 94304

CONFIRMATION NO. 4662
POA ACCEPTANCE LETTER



Date Mailed: 03/21/2017

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/16/2017.

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

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/dtinh/



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
14/414,436	01/12/2015	Leonardo Dagum	03.P073US

CONFIRMATION NO. 4662

POWER OF ATTORNEY NOTICE



136402
Green, Howard, & Mughal LLP
5 Centerpointe Dr.
Suite 400
LAKE OSWEGO, OR 97035

Date Mailed: 03/21/2017

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/16/2017.

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

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/dtdinh/



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

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
14/414,436 01/12/2015 Leonardo Dagum 20145-073US 4662

146571 7590 03/28/2017
North Weber & Baugh LLP - ASSIA
3260 Hillview Avenue
Palo Alto, CA 94304

Table with 1 column: EXAMINER

MOORE JR, MICHAEL J

Table with 2 columns: ART UNIT, PAPER NUMBER

2467

Table with 2 columns: MAIL DATE, DELIVERY MODE

03/28/2017

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. 14/414,436	Applicant(s) DAGUM ET AL.	
	Examiner Michael J. Moore, Jr.	Art Unit 2467	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 MONTHS 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 12/28/2016.
 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) 1-6,8-19,21-52,54-61,88,89,97-101 and 103-109 is/are pending in the application.
5a) Of the above claim(s) 41-52,54-61,88,89,97-101 and 103-109 is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) 1-6,8-19 and 21-40 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/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date _____.
- 3) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 4) Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Election/Restrictions

2. Claims **41-52, 54-61, 88, 89, 97-101, and 103-109** are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 6/20/16. It is requested that Applicant cancel the non-elected claims in response to this Office Action.

Claim Objections

The current amendments made by Applicant to claims **19, 30, and 31** to obviate the claim objections presented in the previous Office Action are proper and have been entered. These objections have been withdrawn.

Double Patenting

The current amendment made by Applicant to claim **109** to obviate this claim objection presented in the previous Office Action is proper and has been entered. This objection has been withdrawn.

Claim Rejections - 35 USC § 112

The current amendments made by Applicant to claims **18, 26-29, and 40** to obviate the claim rejections under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second

paragraph, presented in the previous Office Action are proper and have been entered. These particular rejections have been withdrawn.

Claim Rejections - 35 USC § 102

3. 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.

4. Claim(s) **1-6, 8-19, and 21-40** is/are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Zhao et al. (U.S. 2002/0174421) (hereinafter “Zhao”) cited in Applicant’s submitted IDS. *Zhao* teaches all of the limitations of the specified claims with the reasoning that follows.

Regarding claim **1**, “a method performed by a downloadable agent, the method comprising: collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as well as the enterprise computing environment shown in Figure 2 including end user devices 110, 112, 114, 118 (broadband subscribers) connected via a LAN 104 and WAN 102.

Lastly, “transmitting the WAN performance information to a machine, wherein the machine is operable to: store the WAN performance information in a database associated with the machine, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber’s service provider” is anticipated by the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Regarding claim **2**, “wherein the other device is a router” is anticipated by the clients 11, 17 that are connected via firewall devices 13, 15 (routers) as shown in Figure 1.

Regarding claim **3**, “wherein the machine is operable to store the WAN performance information with an associated timestamp” is anticipated by the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information

relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], as well as where a timestamp is saved (stored) and utilized to compute performance data as spoken of on page 17, claim 8.

Regarding claim **4**, "wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN" is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (LAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **5**, "transmitting by the downloadable agent the LAN performance data to the machine" is anticipated by the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information (LAN performance data) relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **6**, "wherein the downloadable agent is executable in a virtual machine on the computing device" is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) as a Java applet (virtual machine) and used to monitor performance parameters associated with client-server transactions as well as collecting

and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **8**, "receiving the analysis result, wherein receiving the analysis result comprises at least one of: receiving statistical analysis including throughput; receiving availability of higher bandwidth for operating a DSL service; receiving service product information for improving DSL service performance, or receiving utilization information for optimizing a consumers DSL service cost" is anticipated by the site monitor system that provides service summary information (for improving service performance) of managed services within a domain as spoken of on page 2, paragraphs [0045]-[0046].

Regarding claim **9**, "wherein the WAN performance information includes at least one of: user's network usage pattern" is anticipated by the gathered JARTA data providing an integrated, end-to-end view of web browsing activities (users network usage pattern) as spoken of on page 1, paragraph [0009], lines 10-16.

Regarding claim **10**, "sending an on-demand change request associated with at least one of: throughput or latency" is anticipated by the servicing of received requests from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064].

Regarding claim **11**, "wherein the machine is a server that resides in a cloud" is anticipated by site monitor 503 that runs on a management server 10 as shown in Figure 1 and spoken of on page 4, paragraph [0067].

Regarding claim **12**, “wherein the computing device is one of: a personal computer” is anticipated by the computer system 150 shown in Figure 3.

Regarding claim **13**, “wherein the downloadable agent is executable on an Internet browser” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) along with one or more web pages from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **14**, “wherein the downloadable agent is accessible remotely via the Internet” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) along with one or more web pages from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as well as the client communication with web server 12 via the Internet as shown in Figure 1.

Regarding claim **15**, “periodically sending collected WAN performance information to the machine” is anticipated by the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing,

storage, organization, and display of information relating to the various servers and clients (collected WAN performance information) within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **16**, “waiting for a predetermined condition or threshold to be satisfied before sending collected WAN performance information to the machine” is anticipated by the selective transmission of the XML performance report to the site monitor (machine) based upon a returned success/failure status message (predetermined condition) as spoken of on page 8, paragraph [0175].

Regarding claim **17**, “where the predetermined condition or threshold is at least one of: a function of a type of data collected, or limit or threshold on a performance level associated with the collected data” is anticipated by the selective transmission of the XML performance report to the site monitor (machine) based upon a returned success/failure status message (condition based on type of data collected) as spoken of on page 8, paragraph [0175].

Regarding claim **18**, “wherein the machine is operable to collect WAN performance information by polling or scheduled based system” is anticipated by the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients (WAN performance information) within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **19**, "collecting data from at least one of: National Weather Service; radio station; or operator" is anticipated by the collection of data from server 502 using an agent 508 (operator) as spoken of on page 4, paragraph [0066].

Regarding claim **21**, "a system comprising: a database; and a server coupled to the database, the server operable to: receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN" is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) to a site monitor (database) of a server as spoken of on page 1, paragraphs [0009] and [0010], as well as the enterprise computing environment shown in Figure 2 including end user devices 110, 112, 114, 118 (broadband subscribers) connected via a LAN 104 and WAN 102.

Lastly, "store the WAN performance information in the database associated with the server, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider" is anticipated by the site monitor (of server) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the

various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Regarding claim **22**, “wherein the server resides in a cloud” is anticipated by site monitor 503 that runs on a management server 10 as shown in Figure 1 and spoken of on page 4, paragraph [0067].

Regarding claim **23**, “wherein the server is operable to store the WAN performance information with an associated timestamp” is anticipated by the site monitor (of server) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], as well as where a timestamp is saved (stored) and utilized to compute performance data as spoken of on page 17, claim 8.

Regarding claim **24**, “wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions

as well as collecting and transmitting performance data (LAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **25**, “wherein the server is operable to receive from the downloadable agent the LAN performance data” is anticipated by the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information (LAN performance data) relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **26**, “wherein the server comprises: a first logic for collecting the WAN performance information; a second logic for performing statistical analysis using the first WAN performance information; and a third logic for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber’s premises, the service provider of the broadband subscriber and the access equipment of the service provider” is anticipated by the site monitor (of server) shown in Figure 7 that includes a data collector 220 (first logic), site monitor processor 224 (second logic), site monitor knowledge module 226 (third logic), and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the

analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Regarding claim **27**, “wherein the logic that receive the instruction and command from the third module are accessible by internet” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) along with one or more web pages from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as well as the client communication with web server 12 via the Internet as shown in Figure 1.

Regarding claim **28**, “a management interface for communicating with the downloadable agent via internet” is anticipated by the site monitor (of server) shown in Figure 7 that includes a data collector 220 (first module), site monitor processor 224 (second module), site monitor knowledge module 226 (third module), and interface module 228 (management interface) used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **29**, “a user interface logic for providing access and for displaying information associated with the first, second, third modules” is anticipated by the site monitor (of server) shown in Figure 7 that includes a data collector 220 (first

module), site monitor processor 224 (second module), site monitor knowledge module 226 (third module), and interface module 228 (user interface module) used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **30**, “wherein the server is operable to compute throughput of DSL connection by collecting current performance metrics associated with DSL service” is anticipated by the site monitor system that provides service summary information (for improving service performance) of managed services within a domain as spoken of on page 2, paragraphs [0045]-[0046], as well as the site monitor (of server) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **31**, “wherein the server to perform throughput computation with reference to a website” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) along with one or more web pages (of a website) from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **32**, “wherein the throughput computation comprises probing a network” is anticipated by the site monitor processor 214 that performs analysis of the received performance data (probed network information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Regarding claim **33**, “wherein the downloadable agent is executable in a virtual machine on the computing device” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) as a Java applet (virtual machine) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **34**, “wherein the downloadable agent is dynamically downloaded to the computing device” is anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **35**, “wherein the server is operable to report the analysis result by performing at least one of: sending statistical analysis including throughput; sending availability of higher bandwidth for operating a DSL service; sending service product

information for improving DSL service performance; or sending utilization information for optimizing a consumers DSL service cost" is anticipated by the site monitor system that provides service summary information (for improving service performance) of managed services within a domain as spoken of on page 2, paragraphs [0045]-[0046].

Regarding claim **36**, "wherein the WAN performance information includes at least one of: user's network usage pattern" is anticipated by the gathered JARTA data providing an integrated, end-to-end view of web browsing activities (users network usage pattern) as spoken of on page 1, paragraph [0009], lines 10-16.

Regarding claim **37**, "wherein the server is operable to receive an on-demand change request associated with at least one of: throughput or latency" is anticipated by the servicing of received requests from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064].

Regarding claim **38**, "wherein the computing device is one of: a computing device connected to the LAN" is anticipated by the computer system 150 shown in Figure 3.

Regarding claim **39**, "wherein the server is operable to provide a marketplace of ideas for the communication devices for trading bandwidth for media services" is anticipated by the servicing of received requests from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064].

Regarding claim **40**, "wherein the server is operable to collect WAN performance information by polling or scheduled based system" is anticipated by the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients (WAN performance information) within the site as spoken of on page 5, paragraphs [0074]-[0076].

Response to Arguments

5. Applicant's arguments filed 12/28/16 have been fully considered but they are not persuasive.

Regarding claim **1**, Applicant argues that *Zhao* does not teach "collecting of WAN performance information" as claimed. Applicant further argues that the monitoring and collection of performance parameters associated with client-server transactions taught in *Zhao* does not correspond to the claimed "collecting of WAN performance information". Applicant further describes information such as physical, link, IP, and TCP layers of a communications stack as examples of "WAN performance information", and refers to paragraph [0016] of the specification of the pending application.

Referring to paragraph [0016], it describes the collection of information associated with a communication device and then sending the collected information to another machine for analysis. This paragraph does not appear to recite further definition of the above "WAN performance information".

Applicant further argues that *Zhao* does not disclose transmitting the WAN performance information to a machine, wherein the machine is operable to: store the WAN performance information in a database associated with the machine, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider. Examiner respectfully disagrees.

As provided in the previous Office Action and reiterated above, *Zhao* teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as well as the enterprise computing environment shown in Figure 2 including end user devices 110, 112, 114, 118 (broadband subscribers) connected via a LAN 104 and WAN 102.

Zhao also teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page

6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Examiner maintains that the monitoring and collection of performance parameters associated with client-server transactions taught in *Zhao* corresponds to the claimed “*WAN performance information*” as this information indicates performance measures between nodes in the network, where the network includes clients interconnected via a local area network (LAN) 104 as well as a wide area network (WAN) 102 as shown in Figure 2 and spoken of on page 3, paragraphs [0051]-[0052].

Examiner also maintains that *Zhao* teaches the storage, analysis, and presentation (reporting) of the collected (received via network) performance data by the site monitor processor 214 as described above.

Furthermore, the above claim language is rather broad in that it does not provide any further description of what particular performance information of a wide area network is being collected.

Further, referring to Applicant's claim **9**, numerous alternatives of “WAN performance information” is claimed including “user's network usage pattern” information, which *Zhao* teaches via the gathered JARTA data providing an integrated, end-to-end view of web browsing activities (users network usage pattern) as spoken of on page 1, paragraph [0009], lines 10-16.

Giving a broadest reasonable interpretation of the claim language, *Zhao* teaches the above collection, storage, analysis, and reporting of “WAN performance information”.

Conclusion

6. **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 Michael J. Moore, Jr., whose telephone number is (571)272-3168. The examiner can normally be reached on Monday-Friday (7:30am - 4:00pm).


Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan A. Phillips can be reached at (571) 272-3940. 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.

/Michael J. Moore, Jr./
Primary Examiner, Art Unit 2467

<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE							
Final	Original	04/12/2016	07/22/2016	03/23/2017					
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	2	+	✓	✓					
	3	+	✓	✓					
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	35	+	✓	✓					
	36	+	✓	✓					

<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

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Claims renumbered in the same order as presented by applicant
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CLAIM		DATE				
Final	Original	04/12/2016	07/22/2016	03/23/2017		
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	38	+	✓	✓		
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<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467


✓	Rejected
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-	Cancelled
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N	Non-Elected
I	Interference

A	Appeal
O	Objected

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant		<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47			
CLAIM		DATE							
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	94	-	-	-					
	95	-	-	-					
	96	-	-	-					
	97	÷	N	N					
	98	÷	N	N					
	99	÷	N	N					
	100	÷	N	N					
	101	÷	N	N					
	102	-	-	-					
	103	÷	N	N					
	104	÷	N	N					
	105	÷	N	N					
	106	÷	N	N					
	107	÷	N	N					
	108	÷	N	N					

<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant		<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47			
CLAIM		DATE							
Final	Original	04/12/2016	07/22/2016	03/23/2017					
	109	÷	✓	N					
	110	-	-	-					

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No.: 4662
Appl. No. : 14/414,436
Filed : September 25, 2012
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR
A COMMUNICATION SYSTEM, DEVICE, OR LINK
Examiner : MOORE JR, MICHAEL J
Art Unit : 2467
Docket No. : 20145-073US

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: June 1, 2017 By: /Romita Piroyan/
Romita Piroyan

RESPONSE TO FINAL OFFICE ACTION

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

Examiner Moore:

This paper is responsive to the Final Office Action mailed March 28, 2017, and having a shortened statutory period ending June 28, 2017. Accordingly, this paper is timely filed. Reconsideration is respectfully requested in view of the Amendments and Remarks below.

Amendments to the Claims appear in the complete Listing of Claims which may be found beginning at page **2** of this paper.

Remarks/Arguments may be found at page **12** of this paper.

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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application, and reflects the Examiner's renumbering:

Listing of Claims:

1. (Original) A method performed by a downloadable agent, the method comprising:

collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and

transmitting the WAN performance information to a machine, wherein the machine is operable to:

store the WAN performance information in a database associated with the machine,

analyze the WAN performance information to generate an analysis result; and

report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.
2. (Original) The method of claim 1, wherein the other device is a router.
3. (Original) The method of claim 1, wherein the machine is operable to store the WAN performance information with an associated timestamp.
4. (Original) The method of claim 1 wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.
5. (Original) The method of claim 4 further comprises transmitting by the downloadable agent the LAN performance data to the machine.

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6. (Original) The method of claim 1, wherein the downloadable agent is executable in a virtual machine on the computing device.

7. (Canceled)

8. (Original) The method of claim 1 further comprises receiving the analysis result, wherein receiving the analysis result comprises at least one of:

receiving statistical analysis including throughput;

receiving availability of higher bandwidth for operating a DSL service;

receiving service product information for improving DSL service performance; or

receiving utilization information for optimizing a consumers DSL service cost.

9. (Original) The method of claim 1, wherein the WAN performance information includes at least one of:

topological information,

geographical information,

throughput,

latency,

jitter,

packet loss,

time,

type of communication device,

device network identification,

manufacturer and model of equipment,

equipment characteristics,

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Office Action Date : March 28, 2017
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firmware,
user's network usage pattern,
user's provisioned WAN service,
RF characteristics including at least one of: signal power, frequency bands and mode of operation,

environment statistics, or
data on operation of communication devices.

10. (Original) The method of claim 1 further comprises:
sending an on-demand change request associated with at least one of:
throughput, or latency.
11. (Original) The method of claim 1, wherein the machine is a server that resides in a cloud.
12. (Previously Presented) The method of claim 1, wherein the computing device is one of:
tablet computing device;
a personal computer;
a gaming console;
an access point (AP);
a base station;
a wireless smartphone device;
a wireless LAN device;
an access gateway;
a router;
a performance enhancement device;

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a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;

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an Ethernet connected network bridge;

an Ethernet connected network switch;

wearable device; or

internet enabled cameras.

13. (Original) The method of claim 1, wherein the downloadable agent is executable on an Internet browser.

14. (Original) The method of claim 1, wherein the downloadable agent is accessible remotely via the Internet.

15. (Original) The method of claim 1 further comprises periodically sending collected WAN performance information to the machine.

16. (Original) The method of claim 1 further comprises waiting for a predetermined condition or threshold to be satisfied before sending collected WAN performance information to the machine.

17. (Original) The method of claim 16, where the predetermined condition or threshold is at least one of:

a function of a type of data collected, or

limit or threshold on a performance level associated with the collected data.

18. (Previously Presented) The method of claim 1, wherein the machine is operable to collect WAN performance information by polling or by a scheduled based system.

19. (Previously Presented) The method of claim 1 further comprises collecting data from at least one of:

The National Weather Service;

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a radio station; or

an operator.

20. (Canceled)

21. (Original) A system comprising:

a database; and

a server coupled to the database, the server operable to:

receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and

store the WAN performance information in the database associated with the server,

analyze the WAN performance information to generate an analysis result; and

report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

22. (Original) The system of claim 21, wherein the server resides in a cloud.

23. (Original) The system of claim 21, wherein the server is operable to store the WAN performance information with an associated timestamp.

24. (Original) The system of claim 21, wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.

25. (Original) The system of claim 24, wherein the server is operable to receive from the downloadable agent the LAN performance data.

26. (Previously Presented) The system of claim 25, wherein the server comprises:

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a first logic for collecting the WAN performance information;

a second logic for performing statistical analysis using the first WAN performance information; and

a third logic for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider.

27. (Previously Presented) The system of claim 26, wherein the logic that receive the instruction and command from the third module are accessible by internet.

28. (Original) The system of claim 26, wherein the server comprises:
a management interface for communicating with the downloadable agent via internet.

29. (Previously Presented) The system of claim 26, wherein the server comprises:
a user interface logic for providing access and for displaying information associated with the first, second, third modules.

30. (Previously Presented) The system of claim 21, wherein the server is operable to compute throughput of a DSL connection by collecting current performance metrics associated with DSL service.

31. (Previously Presented) The system of claim 30, wherein the server is to perform throughput computation with reference to a website.

32. (Original) The system of claim 31, wherein the throughput computation comprises probing a network.

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33. (Original) The system of claim 21, wherein the downloadable agent is executable in a virtual machine on the computing device.

34. (Original) The system of claim 21, wherein the downloadable agent is dynamically downloaded to the computing device.

35. (Original) The system of claim 21, wherein the server is operable to report the analysis result by performing at least one of:

 sending statistical analysis including throughput;

 sending availability of higher bandwidth for operating a DSL service;

 sending service product information for improving DSL service performance; or

 sending utilization information for optimizing a consumers DSL service cost.

36. (Original) The system of claim 21, wherein the WAN performance information includes at least one of:

 topological information,

 geographical information,

 time,

 throughput,

 latency,

 jitter,

 packet loss,

 type of communication device,

 device network identification,

 manufacturer and model of equipment,

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equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency bands and mode of operation,
environment statistics, or
data on operation of communication devices.

37. (Original) The system of claim 21, wherein the server is operable to receive an on-demand change request associated with at least one of: throughput, or latency.

38. (Previously Presented) The system of claim 21, wherein the computing device is one of:
tablet computing device;
an access point (AP);
a base station;
a wireless smartphone device;
a wireless LAN device;
an access gateway;
a router,
a performance enhancement device;
a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;

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an in-home coax distribution device;

a G.hn (Global Home Networking Standard) compatible device;

an in-home metering communication device;

an in-home appliance communicatively interfaced with the LAN;

a wireless femtocell base station;

a wireless Wi-Fi compatible base station;

a wireless mobile device repeater;

a wireless mobile device base station;

nodes within an ad-hoc/mesh network;

a set-top box (STB)/set-top unit (STU) customer electronics device;

an Internet Protocol (IP) enabled television;

an IP enabled media player;

an IP enabled gaming console;

an Ethernet gateway;

a computing device connected to the LAN;

an Ethernet connected computer peripheral device;

an Ethernet connected router;

an Ethernet connected wireless bridge;

an Ethernet connected network bridge;

an Ethernet connected network switch;

wearable device; or

internet enabled cameras.

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39. (Original) The system of claim 21, wherein the server is operable to provide a marketplace of ideas for the communication devices for trading bandwidth for media services.

40. (Previously Presented) The system of claim 21, wherein the server is operable to collect WAN performance information by polling or by a scheduled based system.

41.-110. (Cancelled)

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REMARKS/ARGUMENTS

In the Final Office Action (hereinafter, "Office Action"), mailed March 28, 2017, the Examiner rejected claims 1-6, 8-19 and 21-40; and withdrew claims 41-52, 54-61, 88, 89, 97-101 and 103-109 from consideration. By this response, claims 41-52, 54-61, 88, 89, 97-101 and 103-109 are cancelled and no claims are added. Following entry of this response, claims 1-6, 8-19 and 21-40 will be pending in the application.

Election/Restrictions

In the Office Action, the Examiner notes that "Claims **41-52, 54-61, 88, 89, 97-101, and 103-109** are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 6/20/16. It is requested that Applicant cancel the non-elected claims in response to this Office Action."

Per the Examiner's request, claims 41-52, 54-61, 88, 89, 97-101 and 103-109 are cancelled.

Claim Rejections

I. Rejection of Claims under pre-AIA 35 U.S.C. § 102

The Examiner rejected claims 1-6, 8-19, and 21-40, under 35 U.S.C. 102(b) as being anticipated by U.S. Publication No. 2002/0174421 to Zhao *et al.* (hereinafter "Zhao"). Applicant respectfully disagrees.

Applicant respectfully makes reference to MPEP §§ 2131 and 2131.02, which state in part:

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. (MPEP § 2131, citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). The identical invention must be shown in as complete detail as is contained in the ... claim. (MPEP § 2131.02, citing *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)).

Claim 1 states in art (*emphasis added*):

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“A method performed by a downloadable agent, the method comprising:
collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
transmitting the WAN performance information to a machine, wherein the machine is operable to:
store the WAN performance information in a database associated with the machine,
analyze the WAN performance information to generate an analysis result;
and
report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.”

Applicant respectfully asserts that Zhao does not disclose every element in claim 1, especially the emphasized element of “**collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN**”.

On page 3 of the Office Action, the Examiner notes that the limitation is “*anticipated by the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as well as the enterprise computing environment shown in Figure 2 including end user devices 110, 112, 114, 118 (broadband subscribers) connected via a LAN 104 and WAN 102.*”

Applicant respectfully disagrees and asserts the “performance data” disclosed by Zhao is patentably distinct from the “WAN performance information” in Applicant’s claim 1.

The performance data disclosed by Zhao is related to a client instead of WAN. For example, Zhao discloses in [0010] that “The software application is configured to monitor one or more **performance parameters of the client associated with client-server transactions** that are executed. The application may simply collect and transmit performance data back to the server, or it may perform one or more computations on the monitored performance parameters and transmit results of the computations to the server.” Zhao further discloses in [0069] that “The

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present invention is described herein in the context of an e-business management system. An exemplary system may include three components interoperably coupled together: a site monitor which is designed to provide site-wide views of performance data to a user; **a java application response time analyzer (JARTA) which is designed to monitor the performance of client-server transactions** executed by a client;” Zhao discloses in [0064] that “According to the present disclosure, performance parameters which are measured at client sites 411-414 can be transmitted up through the hierarchy to the respective servers **402-4040.**” (*emphasis added*)

It is obvious that the “performance parameters” in Zhao is generated at a client by an application software installed at the client. The “performance parameters” are associated with client-server transactions.

While on the contrary, in Applicant’s claim 1, the downloadable agent just collects the WAN performance information. **The WAN performance is related to the performance of the WAN network instead of the performance of a client.** Applicant explicitly discloses the term “performance” in WAN performance in [0021]: “The term “performance” herein refers generally to network throughput (e.g., TCP/UDP), latency, jitter, connectivity, error rates, power consumption, transmit power, etc.” Also, in Applicant’s claim 1, the downloadable agent collects the WAN performance information instead of generating the WAN performance information. Furthermore, the WAN performance information in Applicant’s claim 1 is distinct from performance parameters associated with client-server transactions.

Therefore, based at least on the above remarks, Applicant respectfully asserts that claim 1 is patentable over Zhao.

The above mentioned remarks in regarding to independent claim 1 are also applicable to amended independent claim 21. Therefore, independent claim 21 is also patentably distinct from Zhao.

Dependent claims 2-6, 8-19, and 22-40 depend from independent claims 1 and 21 respectively, and thus follow the allowability of independent claims 1 and 21.

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CONCLUSION

In view of the above arguments, Applicant believes that pending claims 1-23 are allowable and respectfully requests that a Notice of Allowance be issued for this application in its current state. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned may be reached by telephone at 520-288-8876.

If any fees are due in connection with this filing the Commissioner is authorized to charge such fees to Deposit Account 50-2776.

Respectfully submitted,

Date: June 1, 2017

By: /Xin Dai/
Xin Dai
Reg. No. 72,098



Electronic Acknowledgement Receipt

EFS ID:	29368572
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Romita Piroyan
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	01-JUN-2017
Filing Date:	12-JAN-2015
Time Stamp:	14:25:51
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		20145-073US_FOA_Res.pdf	90327 <small>bb356d810b006b4d679291c0b989493eac 526314</small>	yes	16

Multipart Description/PDF files in .zip description		
Document Description	Start	End
Response After Final Action	1	1
Claims	2	12
Applicant Arguments/Remarks Made in an Amendment	13	16

Warnings:

Information:

Total Files Size (in bytes):	90327
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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 14/414,436	Filing Date 01/12/2015	<input type="checkbox"/> To be Mailed
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ENTITY: LARGE SMALL MICRO

APPLICATION AS FILED – PART I

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).			
<input type="checkbox"/> 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	

APPLICATION AS AMENDED – PART II

AMENDMENT	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	06/01/2017	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			
	Total (37 CFR 1.16(i))	* 38	Minus ** 72	= 0	X \$80 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus *** 4	= 0	X \$420 =	0
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
					TOTAL ADD'L FEE	0

AMENDMENT	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			
	Total (37 CFR 1.16(i))	*	Minus **	=	X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus ***	=	X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
					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.

LIE
MYRTLE LEIGH

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
 If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
14/414,436 01/12/2015 Leonardo Dagum 20145-073US 4662

146571 7590 06/21/2017
North Weber & Baugh LLP - ASSIA
3260 Hillview Avenue
Palo Alto, CA 94304

Table with 1 column: EXAMINER

MOORE JR, MICHAEL J

Table with 2 columns: ART UNIT, PAPER NUMBER

2467

Table with 2 columns: NOTIFICATION DATE, DELIVERY MODE

06/21/2017

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):

docket1@northweber.com

Advisory Action Before the Filing of an Appeal Brief	Application No. 14/414,436	Applicant(s) DAGUM ET AL.	
	Examiner Michael J. Moore, Jr.	Art Unit 2467	AIA (First Inventor to File) Status No

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

THE REPLY FILED 01 June 2017 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.
NO NOTICE OF APPEAL FILED

1. The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance;
(2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
- a) The period for reply expires _____ months from the mailing date of the final rejection.
- b) The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
- c) A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires _____ months from the mailing date of the prior Advisory Action or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.

Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT'S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
- a) They raise new issues that would require further consideration and/or search (see NOTE below);
- b) They raise the issue of new matter (see NOTE below);
- c) They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
- d) They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).

4. The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. Applicant's reply has overcome the following rejection(s): _____.
6. Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. For purposes of appeal, the proposed amendment(s): (a) will not be entered, or (b) will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
9. The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. The request for reconsideration has been considered but does NOT place the application in condition for allowance because:
See Continuation Sheet.

13. Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____

14. Other: _____.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: _____
 Claim(s) objected to: _____
 Claim(s) rejected: 1-6,8-19 and 21-40.
 Claim(s) withdrawn from consideration: _____

/Michael J. Moore, Jr./
Primary Examiner, Art Unit 2467

Continuation of 12. does NOT place the application in condition for allowance because:

Regarding claim 1, Applicant argues that Zhao does not teach "collecting of WAN performance information" as claimed. Applicant further argues that the monitoring and collection of performance parameters associated with client-server transactions taught in Zhao does not correspond to the claimed "collecting of WAN performance information". Applicant further argues that the performance data of Zhao is related to a client instead of a WAN. Applicant further refers to paragraph [0021] of the specification of the pending application, where it describes the term "performance" refers generally to network throughput, latency, jitter, connectivity, error rates, power consumption, transmit power, etc.

Referring to paragraph [0021], these are "examples" of what the term performance refers to (in a similar fashion to the alternatives claimed in Applicant's claim 9).

Applicant further argues that Zhao does not disclose transmitting the WAN performance information to a machine, wherein the machine is operable to: store the WAN performance information in a database associated with the machine, analyze the WAN performance information to generate an analysis result; and report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider. Examiner respectfully disagrees.

As provided in the previous Office Action and reiterated above, Zhao teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as well as the enterprise computing environment shown in Figure 2 including end user devices 110, 112, 114, 118 (broadband subscribers) connected via a LAN 104 and WAN 102.

Zhao also teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Examiner maintains that the monitoring and collection of performance parameters associated with client-server transactions taught in Zhao corresponds to the claimed "WAN performance information" as this information indicates performance measures between nodes in the network, where the network includes clients interconnected via a local area network (LAN) 104 as well as a wide area network (WAN) 102 as shown in Figure 2 and spoken of on page 3, paragraphs [0051]-[0052].

Examiner also maintains that Zhao teaches the storage, analysis, and presentation (reporting) of the collected (received via network) performance data by the site monitor processor 214 as described above.

Furthermore, the above claim language is rather broad in that it does not provide any further description of what particular performance information of a wide area network is being collected.

Further, referring to Applicant's claim 9, numerous alternatives of "WAN performance information" is claimed including "user's network usage pattern" information, which Zhao teaches via the gathered JARTA data providing an integrated, end-to-end view of web browsing activities (users network usage pattern) as spoken of on page 1, paragraph [0009], lines 10-16.

Giving a broadest reasonable interpretation of the claim language, Zhao teaches the above collection, storage, analysis, and reporting of "WAN performance information".

OK TO ENTER: /M.J.M/

06/13/2017

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No.: 4662
Appl. No. : 14/414,436
Filed : September 25, 2012
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR
A COMMUNICATION SYSTEM, DEVICE, OR LINK
Examiner : MOORE JR, MICHAEL J
Art Unit : 2467
Docket No. : 20145-073US

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: June 1, 2017 By: /Romita Piroyan/
Romita Piroyan

RESPONSE TO FINAL OFFICE ACTION

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

Examiner Moore:

This paper is responsive to the Final Office Action mailed March 28, 2017, and having a shortened statutory period ending June 28, 2017. Accordingly, this paper is timely filed. Reconsideration is respectfully requested in view of the Amendments and Remarks below.

Amendments to the Claims appear in the complete Listing of Claims which may be found beginning at page **2** of this paper.

Remarks/Arguments may be found at page **12** of this paper.

**REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
 (Submitted Only via EFS-Web)**

Application Number	14/414,436	Filing Date	2012-09-25	Docket Number (if applicable)	20145-073US	Art Unit	2467
First Named Inventor	Leonardo Dagum			Examiner Name	Michael J. Moore Jr.		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application. Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

Other _____

Enclosed

Amendment/Reply

Information Disclosure Statement (IDS)

Affidavit(s)/ Declaration(s)

Other _____

MISCELLANEOUS

Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

Other _____

FEES

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.
 The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 506925

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Patent Practitioner Signature
 Applicant Signature

Doc code: RCEX

Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (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.

Signature of Registered U.S. Patent Practitioner			
Signature	Michael North/	Date (YYYY-MM-DD)	2017-06-28
Name	Michael North	Registration Number	46963

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

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

Privacy Act Statement

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

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

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

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No.: 4662
Appl. No. : 14/414,436
Filed : September 25, 2012
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Examiner : Michael J Moore Jr.
Art Unit : 2467
Docket No. : 20145-073US

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: 2017-06-28 By: /Nita Miller/
Nita Miller

**AMENDMENT FILED WITH A REQUEST FOR CONTINUED
EXAMINATION (RCE) UNDER 37 CFR 1.114**

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

Examiner Moore Jr.:

This paper is responsive to the Final Office Action mailed March 28, 2017, and having a shortened statutory period ending June 28, 2017. Accordingly, this paper is timely filed. Hereby, Applicant files this RCE under 37 CFR 1.114 and respectfully requests further examination and reconsideration in view of the Amendments and Remarks set forth below.

Amendments to the Claims appear in the complete Listing of Claims which may be found beginning at page **2** of this paper.

Remarks/Arguments may be found at page **13** of this paper.

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Docket No. : 20145-073US
Office Action Date : March 28, 2017
Response Date : June 28, 2017

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application, and reflects the Examiner's renumbering:

Listing of Claims:

1. (Currently amended) A method performed by a downloadable agent, the method comprising:

collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and

transmitting the WAN performance information to a machine, wherein the machine is operable to:

store the WAN performance information in a database associated with the machine,

analyze the WAN performance information to generate an analysis result, the analysis result comprises at least throughput; and

report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

2. (Original) The method of claim 1, wherein the other device is a router.

3. (Original) The method of claim 1, wherein the machine is operable to store the WAN performance information with an associated timestamp.

4. (Original) The method of claim 1 wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.

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5. (Original) The method of claim 4 further comprises transmitting by the downloadable agent the LAN performance data to the machine.

6. (Original) The method of claim 1, wherein the downloadable agent is executable in a virtual machine on the computing device.

7. (Canceled)

8. (Currently amended) The method of claim 1 further comprises receiving the analysis result, wherein receiving the analysis result comprises at least one of:

~~receiving statistical analysis including throughput;~~

receiving availability of higher bandwidth for operating a DSL service;

receiving service product information for improving DSL service performance; or

receiving utilization information for optimizing a consumers DSL service cost.

9. (Currently amended) The method of claim 1, wherein the WAN performance information includes at least one of:

topological information,

geographical information,

~~throughput,~~

latency,

jitter,

packet loss,

time,

type of communication device,

device network identification,

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manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
user's provisioned WAN service,
RF characteristics including at least one of: signal power, frequency bands and mode of
operation,
environment statistics, or
data on operation of communication devices.

10. (Original) The method of claim 1 further comprises:
sending an on-demand change request associated with at least one of:
throughput, or latency.
11. (Original) The method of claim 1, wherein the machine is a server that resides in a cloud.
12. (Previously presented) The method of claim 1, wherein the computing device is one of:
tablet computing device;
a personal computer;
a gaming console;
an access point (AP);
a base station;
a wireless smartphone device;
a wireless LAN device;
an access gateway;

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a router;

a performance enhancement device;

a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;

a cable CPE modem;

an in-home powerline device;

a Home Phoneline Network Alliance (HPNA) based device;

an in-home coax distribution device;

a G.hn (Global Home Networking Standard) compatible device;

an in-home metering communication device;

an in-home appliance communicatively interfaced with the LAN;

a wireless femtocell base station;

a wireless Wi-Fi compatible base station;

a wireless mobile device repeater;

a wireless mobile device base station;

nodes within an ad-hoc/mesh network;

a set-top box (STB)/set-top unit (STU) customer electronics device;

an Internet Protocol (IP) enabled television;

an IP enabled media player;

an IP enabled gaming console;

an Ethernet gateway;

a computing device connected to the LAN;

an Ethernet connected computer peripheral device;

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an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; or
internet enabled cameras.

13. (Original) The method of claim 1, wherein the downloadable agent is executable on an Internet browser.

14. (Original) The method of claim 1, wherein the downloadable agent is accessible remotely via the Internet.

15. (Original) The method of claim 1 further comprises periodically sending collected WAN performance information to the machine.

16. (Original) The method of claim 1 further comprises waiting for a predetermined condition or threshold to be satisfied before sending collected WAN performance information to the machine.

17. (Original) The method of claim 16, where the predetermined condition or threshold is at least one of:

a function of a type of data collected, or
limit or threshold on a performance level associated with the collected data.

18. (Previously presented) The method of claim 1, wherein the machine is operable to collect WAN performance information by polling or by a scheduled based system.

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19. (Previously presented) The method of claim 1 further comprises collecting data from at least one of:

The National Weather Service;

a radio station; or

an operator.

20. (Canceled)

21. (Currently amended) A system comprising:

a database; and

a server coupled to the database, the server operable to:

receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and

store the WAN performance information in the database associated with the server,

analyze the WAN performance information to generate an analysis result, the analysis result comprises at least throughput; and

report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.

22. (Original) The system of claim 21, wherein the server resides in a cloud.

23. (Original) The system of claim 21, wherein the server is operable to store the WAN performance information with an associated timestamp.

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24. (Original) The system of claim 21, wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.

25. (Original) The system of claim 24, wherein the server is operable to receive from the downloadable agent the LAN performance data.

26. (Previously presented) The system of claim 25, wherein the server comprises:
a first logic for collecting the WAN performance information;
a second logic for performing statistical analysis using the first WAN performance information; and
a third logic for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider.

27. (Previously presented) The system of claim 26, wherein the logic that receive the instruction and command from the third module are accessible by internet.

28. (Original) The system of claim 26, wherein the server comprises:
a management interface for communicating with the downloadable agent via internet.

29. (Previously presented) The system of claim 26, wherein the server comprises:
a user interface logic for providing access and for displaying information associated with the first, second, third modules.

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30. (Previously presented) The system of claim 21, wherein the server is operable to compute throughput of a DSL connection by collecting current performance metrics associated with DSL service.

31. (Previously presented) The system of claim 30, wherein the server is to perform throughput computation with reference to a website.

32. (Original) The system of claim 31, wherein the throughput computation comprises probing a network.

33. (Original) The system of claim 21, wherein the downloadable agent is executable in a virtual machine on the computing device.

34. (Original) The system of claim 21, wherein the downloadable agent is dynamically downloaded to the computing device.

35. (Currently amended) The system of claim 21, wherein the server is operable to report the analysis result by performing at least one of:

- ~~sending statistical analysis including throughput;~~
- sending availability of higher bandwidth for operating a DSL service;
- sending service product information for improving DSL service performance; or
- sending utilization information for optimizing a consumers DSL service cost.

36. (Currently amended) The system of claim 21, wherein the WAN performance information includes at least one of:

- topological information,
- geographical information,
- time,

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Response Date : June 28, 2017

~~throughput,~~

latency,

jitter,

packet loss,

type of communication device,

device network identification,

manufacturer and model of equipment,

equipment characteristics,

firmware,

user's network usage pattern,

RF characteristics including at least one of: signal power, frequency bands and mode of operation,

environment statistics, or

data on operation of communication devices.

37. (Original) The system of claim 21, wherein the server is operable to receive an on-demand change request associated with at least one of: throughput, or latency.

38. (Previously presented) The system of claim 21, wherein the computing device is one of:

tablet computing device;

an access point (AP);

a base station;

a wireless smartphone device;

a wireless LAN device;

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Office Action Date : March 28, 2017
Response Date : June 28, 2017

an access gateway;

a router,

a performance enhancement device;

a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;

a cable CPE modem;

an in-home powerline device;

a Home Phoneline Network Alliance (HPNA) based device;

an in-home coax distribution device;

a G.hn (Global Home Networking Standard) compatible device;

an in-home metering communication device;

an in-home appliance communicatively interfaced with the LAN;

a wireless femtocell base station;

a wireless Wi-Fi compatible base station;

a wireless mobile device repeater;

a wireless mobile device base station;

nodes within an ad-hoc/mesh network;

a set-top box (STB)/set-top unit (STU) customer electronics device;

an Internet Protocol (IP) enabled television;

an IP enabled media player;

an IP enabled gaming console;

an Ethernet gateway;

a computing device connected to the LAN;

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an Ethernet connected computer peripheral device;

an Ethernet connected router;

an Ethernet connected wireless bridge;

an Ethernet connected network bridge;

an Ethernet connected network switch;

wearable device; or

internet enabled cameras.

39. (Original) The system of claim 21, wherein the server is operable to provide a marketplace of ideas for the communication devices for trading bandwidth for media services.

40. (Previously presented) The system of claim 21, wherein the server is operable to collect WAN performance information by polling or by a scheduled based system.

41.-110. (Cancelled)

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Response Date : June 28, 2017

REMARKS/ARGUMENTS

In the Advisory Office Action (hereinafter, “Advisory Action”), mailed June 21, 2017, the Examiner notes that the argument made in the Response After Final have been considered but do not place the application in condition for allowance.

By this response, claims 1, 8-9, 21, and 35-36 are amended and no claims are added. Following entry of this response, claims 1-6, 8-19 and 21-40 will be pending in the application.

Claim Amendments

Independent claims 1 and 21 are amended with incorporation of “. the analysis result comprises at least throughput”. Dependent claims 8-9 and 35-36 are also amended to reflect the changes in independent claims 1 and 21.

The amendments are fully supported by the specifications. For example, [0022] discloses that “The embodiments herein allow a user of a communication device to install (download) an agent on their communication device, for example, personal computer, tablet computer, laptop, network gateway, smart phone, smart device, computer, DSL (Digital Subscriber Line) access equipment, router, etc) so that the communication device is able to collect performance related information for analysis by another machine (e.g., a server on a cloud) and then **receive at least one of several statistical and commercial analyses including throughput and other measures** of communications performance...”(*emphasis added*).

Therefore, the amendment is enabled and no new matter is entered.

Claim Rejections

I. Rejection of Claims under pre-AIA 35 U.S.C. § 102

The Examiner rejected claims 1-6, 8-19, and 21-40, under 35 U.S.C. 102(b) as being anticipated by U.S. Publication No. 2002/0174421, to Zhao *et al.* (hereinafter “Zhao”). Applicant has amended claims 1 and 21 for further clarification and respectfully asserts that the claims, as amended, are not anticipated by Zhao.

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Response Date : June 28, 2017

Applicant respectfully makes reference to MPEP §§ 2131 and 2131.02, which state in part:

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. (MPEP § 2131, citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). The identical invention must be shown in as complete detail as is contained in the ... claim. (MPEP § 2131.02, citing *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)).

Claim 1, as amended, states in part (*emphasis added*):

“A method performed by a downloadable agent, the method comprising:
collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
transmitting the WAN performance information to a machine, wherein the machine is operable to:
store the WAN performance information in a database associated with the machine,
analyze the WAN performance information to generate an analysis result, the analysis result comprises at least throughput; and
.....”

Applicant respectfully asserts that Zhao does not disclose every element in claim 1, especially the emphasized element of “**analyze the WAN performance information to generate an analysis result, the analysis result comprises at least throughput**”.

In the Advisory action, the Examiner notes that “*Zhao also teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].*” (*emphasis added*):

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Office Action Date : March 28, 2017
Response Date : June 28, 2017

Zhao discloses in [0131] that “*Site monitor processor 214 performs the main processing of the received XML data. This processing is focused on the analysis of the data and processing other than categorization. **For example, the site monitor processor may perform the following functions:***” Zhao discloses in [0176] that “*Site monitor processor 214 generates data files for use by knowledge module agent 226. The knowledge module agent is responsible for preparing the information in the knowledge module data files so that it can be presented to a user of assistant. **The knowledge module agent is required to perform the following functions:***”

The various functions disclosed by Zhao in [0132]-[0141] and [0177]-[0183] are all related to specific **parameters of the client associated with client-server transactions that are executed**, as summarized in [0010]. Zhao does not disclose or suggest a function related to “throughput”.

Therefore, based at least on the above remarks, Applicant respectfully asserts that claim 1, as amended, is patentable over Zhao.

The above mentioned remarks in regarding to independent claim 1 are also applicable to amended independent claim 21. Therefore, independent claim 21 is also patentable over Zhao.

Dependent claims 2-6, 8-19, and 22-40 depend from independent claims 1 and 21 respectively, and thus follow the allowability of independent claims 1 and 21.

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CONCLUSION

In view of the above arguments, Applicant believes that pending claims 1-23 are allowable and respectfully requests that a Notice of Allowance be issued for this application in its current state. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned may be reached by telephone at 520-288-8876.

If any fees are due in connection with this filing the Commissioner is authorized to charge such fees to Deposit Account 50-6925.

Respectfully submitted,

Date: 2017-06-28

By: /Xin Dai/
Xin Dai, Ph.D.
Reg. No. 72,098



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No. : 4662
Appl. No. : 14/414,436
Filing Date : 2012-09-25
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Art Unit : 2467
Examiner : Michael J. Moore Jr.
Docket No. : 20145-073US

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: 2016-06-28 By: /Nita Miller/

INFORMATION DISCLOSURE STATEMENT

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

SIR or MADAM:

Filed herewith, in accordance with the provisions of 37 CFR §§ 1.56 and 1.97–1.98, listing various references for consideration by the Examiner, is an Information Disclosure Statement (“IDS”).

The filing of this IDS shall not be construed as a representation that a search has been made, or regarding the completeness of the list of references, or that no other material information exists. Furthermore, the filing of this IDS shall not be construed as a representation that inclusion of a reference in this list is an admission that it is prior art or is pertinent to this application, or as an admission that the information listed is, or may be considered to be, material to the patentability of the above referenced application. The filing of this IDS shall not be construed in any manner as an admission against interest.

PATENT

This IDS is being filed:

- within three months of the filing date of a national application, other than a continued prosecution application under § 1.53(d);
- within three months of the date of entry of the national stage as set forth in § 1.491 in an international application;
- before the mailing of a first Office Action on the merits;
- before the mailing of a first Office Action after the filing of a request for continued examination under § 1.114;
- after three months of the filing date or entry into the national stage or after the mailing of a first Office action on the merits, but before the mailing date of any final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

OR

- Applicant certifies pursuant to 37 CFR § 1.97(e):
 - That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement;

OR

- That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- on or before the payment of the issue fee but after the mailing of a final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

AND

- Applicant certifies pursuant to 37 CFR § 1.97(e):

PATENT

That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement;

OR

That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

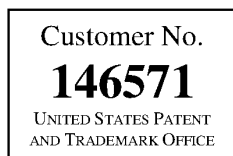
- Applicant submits that the enclosed Information Disclosure Statement is timely; therefore, no fee is required.
- Except as provided for under 37 CFR § 1.98(a)(2), Applicant has enclosed a copy of each listed reference.
- The above referenced application relies upon Application No. _____, filed _____ for an earlier effective filing date under 35 U.S.C. 120. Although, pursuant to 37 CFR § 1.98(d), the references submitted herein are not required to be submitted for the Examiner to consider them, Applicant submits the references herein so that the information will be printed on the patent issuing from this application.
- Pursuant to 37 CFR § 1.704(d), Applicant certifies that each of the references cited herein were first cited in a communication from a foreign patent office in a counterpart application and that this communication was not received by any individual designated in 37 CFR § 1.56(c) more than thirty days prior to the filing of this Information Disclosure Statement.

Consideration of the listed references and favorable action are requested. If any additional fees are due in connection with the filing of this Information Disclosure Statement, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-2776.

Respectfully submitted,

Date: 2016-06-28

By: /Michael V. North/
Michael V. North
Reg. No. 46963



INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2012-09-25
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore Jr.
	Attorney Docket Number	20145-073US

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2012-09-25
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore Jr.
	Attorney Docket Number	20145-073US

1	Office Action dated 2017-05-18, in Chinese Patent Application No. 201280075818.9 (38pgs).	✗
2	Office Action dated 2016-08-12, in Korean Patent Application No. 10-2015-7002636 (26pgs).	☒
3	Response filed 2017-03-08, in Korean Patent Application No. 10-2015-7002636 (55pgs).	☒

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	
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*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	14414436
	Filing Date	2012-09-25
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore Jr.
	Attorney Docket Number	20145-073US

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	/Michael North/	Date (YYYY-MM-DD)	2017-06-28
Name/Print	Michael North	Registration Number	46963

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

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

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

Electronic Patent Application Fee Transmittal				
Application Number:	14414436			
Filing Date:	12-Jan-2015			
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
First Named Inventor/Applicant Name:	Leonardo Dagum			
Filer:	Michael V. North/Nita Miller			
Attorney Docket Number:	20145-073US			
Filed as Small Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
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:				
RCE- 1st Request	2801	1	600	600
Total in USD (\$)				600

Electronic Acknowledgement Receipt	
EFS ID:	29633453
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	28-JUN-2017
Filing Date:	12-JAN-2015
Time Stamp:	13:20:25
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$600
RAM confirmation Number	062817INTEFSW00011582506925
Deposit Account	506925
Authorized User	Nita Miller

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)
 37 CFR 1.21 (Miscellaneous fees and charges)
 37 CFR 1.492 (National application filing, search, and examination fees)
 37 CFR 1.492(a) (Basic national fee only)

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)	073US_RCE.pdf	697605 d4195ec3404979d112d6298199585eb0e3e7d848	no	3

Warnings:

Information:

2		073US_RCE_Amdt.pdf	88081 ee3589cf74ca7b4d65439215c9102d24595251bc	yes	16
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Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment Submitted/Entered with Filing of CPA/RCE	1	1
Claims	2	12
Applicant Arguments/Remarks Made in an Amendment	13	16

Warnings:

Information:

3	Transmittal Letter	073US_SIDS_Trans.pdf	30059 a91145894f7fa7dccb90094c8fe360b20312cd42	no	3
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Warnings:

Information:

4	Information Disclosure Statement (IDS) Form (SB08)	073US_SIDS_SB08.pdf	612179 cc01aa82290bbc4fb973adf3ec20c99443cd4c34	no	4
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Warnings:

Information:

5	Non Patent Literature	073US_SIDS_NPL1.pdf	6481442 402fd692b407a14ba523e2a7d8a4702bc81fb00	no	38
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Warnings:					
Information:					
6	Non Patent Literature	073US_SIDS_NPL2.pdf	11980722	no	26
			2170a7f4c.d795bdd4c9623de922dc32d59661ba0		
Warnings:					
Information:					
7	Non Patent Literature	073US_SIDS_NPL3.pdf	4724533	no	55
			0142a6214406cf0a8c3fd7e61ca712c08c635321		
Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	30788	no	2
			fb12f419191b9ed71b425d36b5aecbae6b09e73		
Warnings:					
Information:					
Total Files Size (in bytes):			24645409		
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>					

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875			Application or Docket Number 14/414,436	Filing Date 01/12/2015	<input type="checkbox"/> To be Mailed
ENTITY: <input checked="" type="checkbox"/> LARGE <input type="checkbox"/> SMALL <input type="checkbox"/> MICRO					
APPLICATION AS FILED – PART I					
(Column 1)		(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		
TOTAL CLAIMS (37 CFR 1.16(j))	38 minus 20 =	*	X \$ =		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	X \$ =		
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).				
<input type="checkbox"/> 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		

APPLICATION AS AMENDED – PART II							
(Column 1)		(Column 2)		(Column 3)			
AMENDMENT	06/28/2017	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 38	Minus	** 72	=	X \$ =	
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 4	=	X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

(Column 1)		(Column 2)		(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						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.

LIE
 PEGGY S. YARBOROUGH

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
14/414,436 01/12/2015 Leonardo Dagum 20145-073US 4662

146571 7590 09/07/2017
North Weber & Baugh LLP - ASSIA
3260 Hillview Avenue, 1st Floor
Palo Alto, CA 94304

Table with 1 column: EXAMINER

MOORE JR, MICHAEL J

Table with 2 columns: ART UNIT, PAPER NUMBER

2467

Table with 2 columns: NOTIFICATION DATE, DELIVERY MODE

09/07/2017

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):

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Office Action Summary	Application No. 14/414,436	Applicant(s) DAGUM ET AL.	
	Examiner Michael J. Moore, Jr.	Art Unit 2467	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 MONTHS 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 6/28/2017.
 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) 1-6,8-19 and 21-40 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) 1-6,8-19 and 21-40 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/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date _____.
- 3) Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 4) Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/28/17 has been entered.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 6/28/17 was filed after the mailing date of the Final Office Action on 3/28/17. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 103

4. The following is a quotation of pre-AIA 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, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under pre-AIA 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of pre-AIA 35 U.S.C. 103(c) and potential pre-AIA 35 U.S.C. 102(e), (f) or (g) prior art under pre-AIA 35 U.S.C. 103(a).

6. Claims **1-6, 8-19, and 21-40** is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Zhao et al. (U.S. 2002/0174421) (hereinafter "Zhao") cited in Applicant's submitted IDS in view of Burnette et al. (U.S. 2012/0244863) (hereinafter "Burnette").

Regarding claim **1**, *Zhao* teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as well as the enterprise computing environment shown in Figure 2 including end user devices 110, 112, 114, 118 (broadband subscribers) connected via a LAN 104 and WAN 102.

Zhao also teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge

module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Zhao does not explicitly teach where “the analysis result comprises at least throughput”.

However, *Burnette* teaches a system and method for dynamic service offering based on available resources, where a service sending system 102 (service provider) receives reports on the network performance and conditions (analysis results) at any time from various receivers 108, 112, 124 (machines) and where the performance information includes measured link throughput as shown in Figures 1 and 2, and spoken of on page 2, paragraph [0023].

At the time of the invention, it would have been obvious to someone of ordinary skill in the art, given these references, to apply the throughput measurement and reporting of *Burnette* to the performance parameter monitoring system of *Zhao* in order to provide real-time metrics pertaining to a WAN such that a determination can be made as to what level of service offering can be presented to subscribers, thereby improving

the subscriber quality of service as spoken of on page 2, paragraph [0023], lines 13-16 of *Burnette*.

Regarding claim **2**, *Zhao* further teaches the clients 11, 17 that are connected via firewall devices 13, 15 (routers) as shown in Figure 1.

Regarding claim **3**, *Zhao* further teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], as well as where a timestamp is saved (stored) and utilized to compute performance data as spoken of on page 17, claim 8.

Regarding claim **4**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (LAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **5**, *Zhao* further teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information (LAN performance data) relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **6**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) as a Java applet (virtual machine) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **8**, *Zhao* further teaches the site monitor system that provides service summary information (for improving service performance) of managed services within a domain as spoken of on page 2, paragraphs [0045]-[0046].

Regarding claim **9**, *Zhao* further teaches the gathered JARTA data providing an integrated, end-to-end view of web browsing activities (users network usage pattern) as spoken of on page 1, paragraph [0009], lines 10-16.

Regarding claim **10**, *Zhao* further teaches the servicing of received requests from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064].

Regarding claim **11**, *Zhao* further teaches site monitor 503 that runs on a management server 10 as shown in Figure 1 and spoken of on page 4, paragraph [0067].

Regarding claim **12**, *Zhao* further teaches the computer system 150 (personal computer) shown in Figure 3.

Regarding claim **13**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client

computer (computing device) along with one or more web pages from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **14**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) along with one or more web pages from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as well as the client communication with web server 12 via the Internet as shown in Figure 1.

Regarding claim **15**, *Zhao* further teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients (collected WAN performance information) within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **16**, *Zhao* further teaches the selective transmission of the XML performance report to the site monitor (machine) based upon a returned success/failure status message (predetermined condition) as spoken of on page 8, paragraph [0175].

Regarding claim **17**, *Zhao* further teaches the selective transmission of the XML performance report to the site monitor (machine) based upon a returned success/failure status message (condition based on type of data collected) as spoken of on page 8, paragraph [0175].

Regarding claim **18**, *Zhao* further teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display (scheduled based system) of information relating to the various servers and clients (WAN performance information) within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **19**, *Zhao* further teaches the collection of data from server 502 using an agent 508 (operator) as spoken of on page 4, paragraph [0066].

Regarding claim **21**, *Zhao* teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) to a site monitor (database) of a server as spoken of on page 1, paragraphs [0009] and [0010], as well as the enterprise computing environment shown in Figure 2 including end user devices 110, 112, 114, 118 (broadband subscribers) connected via a LAN 104 and WAN 102.

Zhao also teaches the site monitor (of server) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge

module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Zhao does not explicitly teach where “the analysis result comprises at least throughput”.

However, *Burnette* teaches a system and method for dynamic service offering based on available resources, where a service sending system 102 (service provider) receives reports on the network performance and conditions (analysis results) at any time from various receivers 108, 112, 124 (machines) and where the performance information includes measured link throughput as shown in Figures 1 and 2, and spoken of on page 2, paragraph [0023].

At the time of the invention, it would have been obvious to someone of ordinary skill in the art, given these references, to apply the throughput measurement and reporting of *Burnette* to the performance parameter monitoring system of *Zhao* in order to provide real-time metrics pertaining to a WAN such that a determination can be made as to what level of service offering can be presented to subscribers, thereby improving

the subscriber quality of service as spoken of on page 2, paragraph [0023], lines 13-16 of *Burnette*.

Regarding claim **22**, *Zhao* further teaches site monitor 503 that runs on a management server 10 as shown in Figure 1 and spoken of on page 4, paragraph [0067].

Regarding claim **23**, *Zhao* further teaches the site monitor (of server) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], as well as where a timestamp is saved (stored) and utilized to compute performance data as spoken of on page 17, claim 8.

Regarding claim **24**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (LAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **25**, *Zhao* further teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information (LAN performance data)

relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **26**, *Zhao* further teaches the site monitor (of server) shown in Figure 7 that includes a data collector 220 (first logic), site monitor processor 224 (second logic), site monitor knowledge module 226 (third logic), and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Regarding claim **27**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) along with one or more web pages from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as well as the client communication with web server 12 via the Internet as shown in Figure 1.

Regarding claim **28**, *Zhao* further teaches the site monitor (of server) shown in Figure 7 that includes a data collector 220 (first module), site monitor processor 224

(second module), site monitor knowledge module 226 (third module), and interface module 228 (management interface) used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **29**, *Zhao* further teaches the site monitor (of server) shown in Figure 7 that includes a data collector 220 (first module), site monitor processor 224 (second module), site monitor knowledge module 226 (third module), and interface module 228 (user interface module) used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **30**, *Zhao* further teaches the site monitor system that provides service summary information (for improving service performance) of managed services within a domain as spoken of on page 2, paragraphs [0045]-[0046], as well as the site monitor (of server) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **31**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) along with one or more web pages (of a website) from a web server (for execution on an Internet browser), and used to monitor performance

parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **32**, *Zhao* further teaches the site monitor processor 214 that performs analysis of the received performance data (probed network information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Regarding claim **33**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) as a Java applet (virtual machine) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **34**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **35**, *Zhao* further teaches the site monitor system that provides service summary information (for improving service performance) of managed services within a domain as spoken of on page 2, paragraphs [0045]-[0046].

Regarding claim **36**, *Zhao* further teaches the gathered JARTA data providing an integrated, end-to-end view of web browsing activities (users network usage pattern) as spoken of on page 1, paragraph [0009], lines 10-16.

Regarding claim **37**, *Zhao* further teaches the servicing of received requests from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064].

Regarding claim **38**, *Zhao* further teaches the computer system 150 (computing device) shown in Figure 3.

Regarding claim **39**, *Zhao* further teaches the servicing of received requests from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064].

Regarding claim **40**, *Zhao* further teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display (scheduled based system) of information relating to the various servers and clients (WAN performance information) within the site as spoken of on page 5, paragraphs [0074]-[0076].

Response to Arguments

7. Applicant's arguments with respect to *amended* claims **1-6, 8-19, and 21-40** have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Additional references considered relevant to this application are listed in the attached "Notice of References Cited" (PTO-892).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Moore, Jr., whose telephone number is (571)272-3168. The examiner can normally be reached on Monday-Friday (9am - 4:00pm).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan A. Phillips can be reached at (571) 272-3940. 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.

/Michael J. Moore, Jr./
Primary Examiner, Art Unit 2467

Notice of References Cited	Application/Control No. 14/414,436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.	
	Examiner Michael J. Moore, Jr.	Art Unit 2467	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2012/0244863 A1	09-2012	Burnette; John M.	H04W28/24	455/436
*	B	US-2006/0023638 A1	02-2006	Monaco; Jeffrey P.	H04L43/022	370/252
*	C	US-2008/0089347 A1	04-2008	Phillipi; Mark P.	H04L41/083	370/400
*	D	US-2004/0044761 A1	03-2004	Phillipi, Mark P.	H04L29/06	709/223
	E	US-				
	F	US-				
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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*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.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2012-09-25
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore Jr.
	Attorney Docket Number	20145-073US

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	1	2012091725	WO	A1	2012-07-05			

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2012-09-25
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore Jr.
	Attorney Docket Number	20145-073US

1	Office Action dated 2017-05-18, in Chinese Patent Application No. 201280075818.9 (38pgs).	✗
2	Office Action dated 2016-08-12, in Korean Patent Application No. 10-2015-7002636 (26pgs).	☒
3	Response filed 2017-03-08, in Korean Patent Application No. 10-2015-7002636 (55pgs).	☒

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/MICHAEL J MOORE JR/	Date Considered	08/23/2017
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*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	14414436
	Filing Date	2012-09-25
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore Jr.
	Attorney Docket Number	20145-073US

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	/Michael North/	Date (YYYY-MM-DD)	2017-06-28
Name/Print	Michael North	Registration Number	46963


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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
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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.

<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

✓	Rejected
=	Allowed


-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

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<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

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Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE										
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<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

✓	Rejected
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Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE							
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	108	÷	N	N	-				

<i>Index of Claims</i> 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

✓	Rejected
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<input type="checkbox"/> Claims renumbered in the same order as presented by applicant		<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47			
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EAST Search History**EAST Search History (Prior Art)**


Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	123	dagum-leonardo.in. or bednarz-philip.in. or goldburg-marc.in. or tehrani-ardavan.in. or rhee-wonjong.in.	US-PGPUB; USPAT	OR	OFF	2017/08/23 12:38
L2	5	L1 and (agent and (WAN same performance) and repor\$4)	US-PGPUB; USPAT	OR	OFF	2017/08/23 12:38
L3	3	((("20020174421") or ("20120096143") or ("20090207985")).PN.	US-PGPUB	OR	OFF	2017/08/23 13:09
L4	0	L3 and throughput	US-PGPUB	OR	OFF	2017/08/23 13:10
L5	0	(agent same measur\$6 same WAN same throughput) and (repor\$4 same (subscriber or subscribers or user or users))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	OFF	2017/08/23 13:11
L6	0	(measur\$6 same WAN same throughput) and (repor\$4 same (subscriber or subscribers))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	OFF	2017/08/23 13:12
L7	34	(measur\$6 same WAN same throughput) and (repor\$4 same (subscriber or subscribers or user or users))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	OFF	2017/08/23 13:12

EAST Search History (Interference)

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8/ 23/ 2017 2:58:42 PM

C:\Users\mmoore5\Documents\EAST\Workspaces\mike14414436.wsp

Search Notes 	Application/Control No. 14414436	Applicant(s)/Patent Under Reexamination DAGUM ET AL.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
Inventorship Search (PALM/EAST)	7/22/16	MM
General EAST Keyword Search - See Search History Printout	7/22/16	MM
Updated Inventorship Search (PALM/EAST)	8/23/17	MM
Updated General EAST Keyword Search - See Search History Printout	8/23/17	MM

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore, Jr.
	Attorney Docket Number	20145-073US

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					

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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	20020174421	A1	2002-11-21	Zhao et al.	
	2	20090207985	A1	2009-08-20	Cioffi et al.	
	3	20120091724	A1	2012-07-05	Chow et al.	
	4	20120096143	A1	2012-04-19	Suit	

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Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore, Jr.
	Attorney Docket Number	20145-073US

1						
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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	Office Action dated 2016-01-21, in Canadian Patent Application No. 2,879,047 (3pgs).	
	2	Office Action dated 2017-07-25, in Australian Patent Application No. 2016204716 (3pgs).	
	3	Office Action dated 2017-08-13, in Korean Patent Application No. 10-2015-7002636 (6pgs).	X

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	<input type="text"/>	Date Considered	<input type="text"/>
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

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	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore, Jr.
	Attorney Docket Number	20145-073US

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

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Signature	/Michael North/	Date (YYYY-MM-DD)	2017-09-19
Name/Print	Michael North	Registration Number	46963

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Electronic Patent Application Fee Transmittal				
Application Number:	14414436			
Filing Date:	12-Jan-2015			
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
First Named Inventor/Applicant Name:	Leonardo Dagum			
Filer:	Michael V. North/Nita Miller			
Attorney Docket Number:	20145-073US			
Filed as Large Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
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:	30413227
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	19-SEP-2017
Filing Date:	12-JAN-2015
Time Stamp:	18:07:23
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$180
RAM confirmation Number	092017INTEFSW00005388506925
Deposit Account	506925
Authorized User	Nita Miller

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)
 37 CFR 1.21 (Miscellaneous fees and charges)
 37 CFR 1.492 (National application filing, search, and examination fees)

37 CFR 1.492(a) (Basic national fee only)

File Listing:

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Information:					
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Information:					
Total Files Size (in bytes):				7191536	
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No. : 4662
Appl. No. : 14/414,436
Filing Date : 2012-09-25
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Art Unit : 2467
Examiner : Michael J. Moore Jr.
Docket No. : 20145-073US

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: 2017-09-19 By: /Nita Miller/
Nita Miller

INFORMATION DISCLOSURE STATEMENT

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

SIR or MADAM:

Filed herewith, in accordance with the provisions of 37 CFR §§ 1.56 and 1.97–1.98, listing various references for consideration by the Examiner, is an Information Disclosure Statement (“IDS”).

The filing of this IDS shall not be construed as a representation that a search has been made, or regarding the completeness of the list of references, or that no other material information exists. Furthermore, the filing of this IDS shall not be construed as a representation that inclusion of a reference in this list is an admission that it is prior art or is pertinent to this application, or as an admission that the information listed is, or may be considered to be, material to the patentability of the above referenced application. The filing of this IDS shall not be construed in any manner as an admission against interest.

PATENT

This IDS is being filed:

- within three months of the filing date of a national application, other than a continued prosecution application under § 1.53(d);
- within three months of the date of entry of the national stage as set forth in § 1.491 in an international application;
- before the mailing of a first Office Action on the merits;
- before the mailing of a first Office Action after the filing of a request for continued examination under § 1.114;
- after three months of the filing date or entry into the national stage or after the mailing of a first Office action on the merits, but before the mailing date of any final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

OR

- Applicant certifies pursuant to 37 CFR § 1.97(e):

- That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement;

OR

- That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- on or before the payment of the issue fee but after the mailing of a final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

AND

- Applicant certifies pursuant to 37 CFR § 1.97(e):

PATENT

That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement;

OR

That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- Applicant submits that the enclosed Information Disclosure Statement is timely; therefore, no fee is required.
- Except as provided for under 37 CFR § 1.98(a)(2), Applicant has enclosed a copy of each listed reference.
- The above referenced application relies upon Application No. _____, filed _____ for an earlier effective filing date under 35 U.S.C. 120. Although, pursuant to 37 CFR § 1.98(d), the references submitted herein are not required to be submitted for the Examiner to consider them, Applicant submits the references herein so that the information will be printed on the patent issuing from this application.
- Pursuant to 37 CFR § 1.704(d), Applicant certifies that each of the references cited herein were first cited in a communication from a foreign patent office in a counterpart application and that this communication was not received by any individual designated in 37 CFR § 1.56(c) more than thirty days prior to the filing of this Information Disclosure Statement.

Consideration of the listed references and favorable action are requested. If any additional fees are due in connection with the filing of this Information Disclosure Statement, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-6925.

Respectfully submitted,

Date: 2017-09-19

By: /Michael V. North/
Michael V. North
Reg. No. 46963



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.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		Complete if Known	
		Application Number	14/414,436
		Filing Date	2015-01-12
		First Named Inventor	Leonardo Dagum
		Art Unit	2467
		Examiner Name	Michael J. Moore Jr.
Sheet 1	of 1	Attorney Docket Number	20145-073US

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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
	1	Response as filed 2017-10-17, in Australian Patent Application No. 2016204716 (Docket No. 20145-073AUD) (34pgs).	

Examiner Signature		Date Considered	
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.
 1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.
 This collection of information is required by 37 CFR 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 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, 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 (1-800-786-9199) and select option 2.

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether 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 Patent Application Fee Transmittal				
Application Number:	14414436			
Filing Date:	12-Jan-2015			
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
First Named Inventor/Applicant Name:	Leonardo Dagum			
Filer:	Michael V. North/Nita Miller			
Attorney Docket Number:	20145-073US			
Filed as Large Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
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:	30707582
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	19-OCT-2017
Filing Date:	12-JAN-2015
Time Stamp:	16:54:38
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$180
RAM confirmation Number	102017INTEFSW16553800
Deposit Account	502776
Authorized User	Nita Miller

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)
 37 CFR 1.21 (Miscellaneous fees and charges)
 37 CFR 1.492 (National application filing, search, and examination fees)

37 CFR 1.492(a) (Basic national fee only)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	073US_SIDS_Trans.pdf	29804	no	3
			df033e0d7da1ca69c34948aaf259884daa2059b7		
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	073US_SIDS_sb08b.pdf	225989	no	2
			11d26ccadadd7ae27781683c95164016309e8d77		
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Non Patent Literature	073US_SIDS_NPL1.pdf	654247	no	34
			5879bd8c82e7c5231dcb05b4e95a187863d6ff17c		
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30892	no	2
			e6cbab524b8172b1e6fa4671ce38799ac884ffa		
Warnings:					
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Total Files Size (in bytes):			940932		

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(s) : Leonardo Dagum *et al.* Confirmation No. : 4662
Appl. No. : 14/414,436
Filing Date : 2012-09-25
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Art Unit : 2467
Examiner : Michael J. Moore Jr.
Docket No. : 20145-073US

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: 2017-10-19 By: /Nita Miller/
Nita Miller

INFORMATION DISCLOSURE STATEMENT

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

SIR or MADAM:

Filed herewith, in accordance with the provisions of 37 CFR §§ 1.56 and 1.97–1.98, listing various references for consideration by the Examiner, is an Information Disclosure Statement (“IDS”).

The filing of this IDS shall not be construed as a representation that a search has been made, or regarding the completeness of the list of references, or that no other material information exists. Furthermore, the filing of this IDS shall not be construed as a representation that inclusion of a reference in this list is an admission that it is prior art or is pertinent to this application, or as an admission that the information listed is, or may be considered to be, material to the patentability of the above referenced application. The filing of this IDS shall not be construed in any manner as an admission against interest.

This IDS is being filed:

PATENT

- within three months of the filing date of a national application, other than a continued prosecution application under § 1.53(d);
- within three months of the date of entry of the national stage as set forth in § 1.491 in an international application;
- before the mailing of a first Office Action on the merits;
- before the mailing of a first Office Action after the filing of a request for continued examination under § 1.114;
- after three months of the filing date or entry into the national stage or after the mailing of a first Office action on the merits, but before the mailing date of any final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

OR

- Applicant certifies pursuant to 37 CFR § 1.97(e):

- That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement;

OR

- That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- on or before the payment of the issue fee but after the mailing of a final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

AND

- Applicant certifies pursuant to 37 CFR § 1.97(e):

- That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application

PATENT

not more than three months prior to the filing of this information disclosure statement;

OR

That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- Applicant submits that the enclosed Information Disclosure Statement is timely; therefore, no fee is required.
- Except as provided for under 37 CFR § 1.98(a)(2), Applicant has enclosed a copy of each listed reference.
- The above referenced application relies upon Application No. _____, filed _____ for an earlier effective filing date under 35 U.S.C. 120. Although, pursuant to 37 CFR § 1.98(d), the references submitted herein are not required to be submitted for the Examiner to consider them, Applicant submits the references herein so that the information will be printed on the patent issuing from this application.
- Pursuant to 37 CFR § 1.704(d), Applicant certifies that each of the references cited herein were first cited in a communication from a foreign patent office in a counterpart application and that this communication was not received by any individual designated in 37 CFR § 1.56(c) more than thirty days prior to the filing of this Information Disclosure Statement.

Consideration of the listed references and favorable action are requested. If any additional fees are due in connection with the filing of this Information Disclosure Statement, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-6925.

Respectfully submitted,

Date: 2017-10-19

By: /Michael V. North/
Michael V. North
Reg. No. 46963



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No.: 4662
Appl. No. : 14/414,436
Filed : September 25, 2012
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Examiner : Michael J. Moore Jr.
Art Unit : 2467
Docket No. : 20145-073US

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: 2018-01-08 By: /Nita Miller/
Nita Miller

RESPONSE TO NON-FINAL OFFICE ACTION

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

Examiner Moore:

Applicant requests an extension for response within first month from December 7, 2017, to January 7, 2018, and submits herewith the requisite fee. This paper is responsive to the Non-Final Office Action mailed September 7, 2017, and having a shortened statutory period ending December 7, 2017. Accordingly, this paper is timely filed. Reconsideration is respectfully requested in view of the Amendments and Remarks below.

Amendments to the Claims appear in the complete Listing of Claims which may be found beginning at page **2** of this paper.

Remarks/Arguments may be found at page **13** of this paper.

Appl. No. : 14/414,436
Docket No. : 20145-073US
Office Action Date : September 7, 2017
Response Date : January 8, 2018

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application, and reflects the Examiner's renumbering:

Listing of Claims:

1. (Currently amended) A method performed by a downloadable agent, the method comprising:

collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; ~~and~~

transmitting the WAN performance information to a machine, wherein the machine is operable to:

store the WAN performance information in a database associated with the machine,

analyze the WAN performance information to generate an analysis result, the analysis result comprises at least throughput; and

report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider[.]; ~~and~~

sending an on-demand change request associated with at least one of throughput, or latency.

2. (Original) The method of claim 1, wherein the other device is a router.

3. (Original) The method of claim 1, wherein the machine is operable to store the WAN performance information with an associated timestamp.

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4. (Original) The method of claim 1 wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.

5. (Original) The method of claim 4 further comprises transmitting by the downloadable agent the LAN performance data to the machine.

6. (Original) The method of claim 1, wherein the downloadable agent is executable in a virtual machine on the computing device.

7. (Canceled)

8. (Previously presented) The method of claim 1 further comprises receiving the analysis result, wherein receiving the analysis result comprises at least one of:

receiving availability of higher bandwidth for operating a DSL service;

receiving service product information for improving DSL service performance; or

receiving utilization information for optimizing a consumers DSL service cost.

9. (Previously presented) The method of claim 1, wherein the WAN performance information includes at least one of:

topological information,

geographical information,

latency,

jitter,

packet loss,

time,

type of communication device,

Appl. No. : 14/414,436
Docket No. : 20145-073US
Office Action Date : September 7, 2017
Response Date : January 8, 2018

device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
user's provisioned WAN service,
RF characteristics including at least one of: signal power, frequency bands and mode of
operation,
environment statistics, or
data on operation of communication devices.

10. (Cancelled)
11. (Original) The method of claim 1, wherein the machine is a server that resides in a cloud.
12. (Previously presented) The method of claim 1, wherein the computing device is one of:
tablet computing device;
a personal computer;
a gaming console;
an access point (AP);
a base station;
a wireless smartphone device;
a wireless LAN device;
an access gateway;
a router;

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Docket No. : 20145-073US
Office Action Date : September 7, 2017
Response Date : January 8, 2018

a performance enhancement device;

a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;

a cable CPE modem;

an in-home powerline device;

a Home Phoneline Network Alliance (HPNA) based device;

an in-home coax distribution device;

a G.hn (Global Home Networking Standard) compatible device;

an in-home metering communication device;

an in-home appliance communicatively interfaced with the LAN;

a wireless femtocell base station;

a wireless Wi-Fi compatible base station;

a wireless mobile device repeater;

a wireless mobile device base station;

nodes within an ad-hoc/mesh network;

a set-top box (STB)/set-top unit (STU) customer electronics device;

an Internet Protocol (IP) enabled television;

an IP enabled media player;

an IP enabled gaming console;

an Ethernet gateway;

a computing device connected to the LAN;

an Ethernet connected computer peripheral device;

an Ethernet connected router;

Appl. No. : 14/414,436
Docket No. : 20145-073US
Office Action Date : September 7, 2017
Response Date : January 8, 2018

an Ethernet connected wireless bridge;

an Ethernet connected network bridge;

an Ethernet connected network switch;

wearable device; or

internet enabled cameras.

13. (Original) The method of claim 1, wherein the downloadable agent is executable on an Internet browser.

14. (Original) The method of claim 1, wherein the downloadable agent is accessible remotely via the Internet.

15. (Original) The method of claim 1 further comprises periodically sending collected WAN performance information to the machine.

16. (Original) The method of claim 1 further comprises waiting for a predetermined condition or threshold to be satisfied before sending collected WAN performance information to the machine.

17. (Original) The method of claim 16, where the predetermined condition or threshold is at least one of:

a function of a type of data collected, or

limit or threshold on a performance level associated with the collected data.

18. (Previously presented) The method of claim 1, wherein the machine is operable to collect WAN performance information by polling or by a scheduled based system.

19. (Previously presented) The method of claim 1 further comprises collecting data from at least one of:

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Docket No. : 20145-073US
Office Action Date : September 7, 2017
Response Date : January 8, 2018

The National Weather Service;

a radio station; or

an operator.

20. (Canceled)

21. (Currently amended) A system comprising:

a database; and

a server coupled to the database, the server operable to:

receive WAN performance information from a downloadable agent, wherein the

downloadable agent is executable on a computing device coupled to a LAN of a

broadband subscriber, wherein the LAN is coupled by another device to a WAN;

and

store the WAN performance information in the database associated with the server,

analyze the WAN performance information to generate an analysis result, the analysis

result comprises at least throughput; and

report the analysis result to at least one of the broadband subscriber and the broadband

subscriber's service provider[.];

wherein the server is operable to receive an on-demand change request associated with at

least one of: throughput, or latency.

22. (Original) The system of claim 21, wherein the server resides in a cloud.

23. (Original) The system of claim 21, wherein the server is operable to store the WAN performance information with an associated timestamp.

Appl. No. : 14/414,436
Docket No. : 20145-073US
Office Action Date : September 7, 2017
Response Date : January 8, 2018

24. (Original) The system of claim 21, wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.

25. (Original) The system of claim 24, wherein the server is operable to receive from the downloadable agent the LAN performance data.

26. (Previously presented) The system of claim 25, wherein the server comprises:
a first logic for collecting the WAN performance information;
a second logic for performing statistical analysis using the first WAN performance information; and
a third logic for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider.

27. (Previously presented) The system of claim 26, wherein the logic that receive the instruction and command from the third module are accessible by internet.

28. (Original) The system of claim 26, wherein the server comprises:
a management interface for communicating with the downloadable agent via internet.

29. (Previously presented) The system of claim 26, wherein the server comprises:
a user interface logic for providing access and for displaying information associated with the first, second, third modules.

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Office Action Date : September 7, 2017
Response Date : January 8, 2018

30. (Previously presented) The system of claim 21, wherein the server is operable to compute throughput of a DSL connection by collecting current performance metrics associated with DSL service.

31. (Previously presented) The system of claim 30, wherein the server is to perform throughput computation with reference to a website.

32. (Original) The system of claim 31, wherein the throughput computation comprises probing a network.

33. (Original) The system of claim 21, wherein the downloadable agent is executable in a virtual machine on the computing device.

34. (Original) The system of claim 21, wherein the downloadable agent is dynamically downloaded to the computing device.

35. (Previously presented) The system of claim 21, wherein the server is operable to report the analysis result by performing at least one of:

- sending availability of higher bandwidth for operating a DSL service;
- sending service product information for improving DSL service performance; or
- sending utilization information for optimizing a consumers DSL service cost.

36. (Previously presented) The system of claim 21, wherein the WAN performance information includes at least one of:

- topological information,
- geographical information,
- time,
- latency,

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Office Action Date : September 7, 2017
Response Date : January 8, 2018

jitter,

packet loss,

type of communication device,

device network identification,

manufacturer and model of equipment,

equipment characteristics,

firmware,

user's network usage pattern,

RF characteristics including at least one of: signal power, frequency bands and mode of
operation,

environment statistics, or

data on operation of communication devices.

37. (Cancelled)

38. (Previously presented) The system of claim 21, wherein the computing device is one of:

tablet computing device;

an access point (AP);

a base station;

a wireless smartphone device;

a wireless LAN device;

an access gateway;

a router,

a performance enhancement device;

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a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
a cable CPE modem;
an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;

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an Ethernet connected network bridge;

an Ethernet connected network switch;

wearable device; or

internet enabled cameras.

39. (Original) The system of claim 21, wherein the server is operable to provide a marketplace of ideas for the communication devices for trading bandwidth for media services.

40. (Previously presented) The system of claim 21, wherein the server is operable to collect WAN performance information by polling or by a scheduled based system.

41-110. (Cancelled)

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Office Action Date : September 7, 2017
Response Date : January 8, 2018

REMARKS/ARGUMENTS

In the Non-Final Office Action (hereinafter, "Office Action"), mailed September 7, 2017, the Examiner rejects all pending claims. By this response, claims 1 and 21, are amended, claims 10 and 37, are added. Following entry of this response, claims 1-6, 8-9, 11-19, 21-36 and 38-40, will be pending in the application.

Claim Amendments

Independent claims 1 and 21, are amended with incorporation of dependent claims 10 and 37, respectively.

Therefore, the amendment is enabled and no new matter is entered.

Claim Rejections

I. Rejection of Claims under pre-AIA 35 U.S.C. § 103(a)

The Examiner rejected claims 1-6, 8-19, and 21-40, under 35 U.S.C. 102(b) as being unpatentable over U.S. Publication No. 2002/0174421, to Zhao *et al.* (hereinafter "Zhao") in view of U.S. Publication No. 2012/0244863, to Burnette *et al.* (hereinafter "Burnette").

Applicant has amended claims 1 and 21, with incorporation of dependent claims 10 and 37, respectively for further clarification, and respectfully asserts that the claims, as amended, are patentable over Zhao in view of Burnette.

Applicant respectfully makes reference to MPEP §§ 2131 and 2131.02, which state in part:

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. (MPEP § 2131, citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). The identical invention must be shown in as complete detail as is contained in the ... claim. (MPEP § 2131.02, citing *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)).

Claim 1, as amended, states in part (*emphasis added*):

"A method performed by a downloadable agent, the method comprising:
collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a

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Docket No. : 20145-073US
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Response Date : January 8, 2018

broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
transmitting the WAN performance information to a machine, wherein the machine is operable to:
store the WAN performance information in a database associated with the machine,
analyze the WAN performance information to generate an analysis result, the analysis result comprises at least throughput;
report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider; and
sending an on-demand change request associated with at least one of throughput, or latency."

Applicant respectfully asserts that Zhao in view of Burnette does not disclose every element in claim 1, especially the emphasized element of "**sending an on-demand change request associated with at least one of throughput, or latency**".

The above emphasized element is incorporated from claim 10. In the Office Action, the Examiner states "*Regarding claim 10, Zhao further teaches the servicing of received requests from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064].*"

Applicant respectfully points out that Zhao only discloses in [0064] that "*Each of servers 402-404 may, at a given time, be servicing requests from one or more clients, 411-414.*" Zhao does not disclose or suggest that the requests from clients 411-414 are **change request**.

Furthermore, Zhao does not disclose limitation of "**change request associated with at least one of throughput, or latency.**" Actually Zhao does not have any explicit disclosure of "throughput," which is also acknowledged by the Examiner on second paragraph of page 4 in the Office Action.

Similarly, Burnette does not disclose the limitation of "**sending an on-demand change request associated with at least one of throughput, or latency.**"

Therefore, based at least on the above remarks, Applicant respectfully asserts that claim 1, as amended, is patentable over Zhao in view of Burnette.

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The above mentioned remarks in regarding to independent claim 1 are also applicable to amended independent claim 21. Therefore, independent claim 21 is also patentable over Zhao in view of Burnette.

Dependent claims 2-6, 8-9, 11-19, 22-36 and 38-40 depend from independent claims 1 and 21 respectively, and thus follow the allowability of independent claims 1 and 21.

CONCLUSION

In view of the above arguments, Applicant believes that pending claims 1-6, 8-9, 11-19, 21-36 and 38-40, are allowable and respectfully requests that a Notice of Allowance be issued for this application in its current state. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned may be reached by telephone at 520-288-8876.

If any fees are due in connection with this filing the Commissioner is authorized to charge such fees to Deposit Account 50-2776.

Respectfully submitted,

Date: 2018-01-08

By: /Xin Dai/
Xin Dai, Ph.D.
Reg. No. 72,098



Electronic Patent Application Fee Transmittal				
Application Number:	14414436			
Filing Date:	12-Jan-2015			
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
First Named Inventor/Applicant Name:	Leonardo Dagum			
Filer:	Michael V. North/Nita Miller			
Attorney Docket Number:	20145-073US			
Filed as Large Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
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(\$)
Extension - 1 month with \$0 paid	1251	1	200	200
Miscellaneous:				
Total in USD (\$)				200

Electronic Acknowledgement Receipt	
EFS ID:	31431703
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	08-JAN-2018
Filing Date:	12-JAN-2015
Time Stamp:	12:55:26
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$200
RAM confirmation Number	010818INTEFSW12583400
Deposit Account	502776
Authorized User	Nita Miller

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)					
37 CFR 1.21 (Miscellaneous fees and charges)					
37 CFR 1.492 (National application filing, search, and examination fees)					
37 CFR 1.492(a) (Basic national fee only)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		073US_RNFOA.pdf	79813	yes	15
			639185f5655860065e58fbb040a548fcb288d4		
Multipart Description/PDF files in .zip description					
Document Description			Start	End	
Amendment/Req. Reconsideration-After Non-Final Reject			1	1	
Claims			2	12	
Applicant Arguments/Remarks Made in an Amendment			13	15	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30994	no	2
			0031aea3b0ab9289b89e8aec50015fbc3743d9d		
Warnings:					
Information:					
Total Files Size (in bytes):			110807		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/414,436	Filing Date 01/12/2015	<input type="checkbox"/> To be Mailed
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ENTITY: LARGE SMALL MICRO

APPLICATION AS FILED – PART I

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).			
<input type="checkbox"/> 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	

APPLICATION AS AMENDED – PART II

AMENDMENT	(Column 1)	(Column 2)	(Column 3)	(Column 4)	(Column 5)	RATE (\$)	ADDITIONAL FEE (\$)
	01/08/2018	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA			
	Total (37 CFR 1.16(i))	* 38	Minus ** 72	= 0		X \$80 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus *** 4	= 0		X \$420 =	0
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT	(Column 1)	(Column 2)	(Column 3)	(Column 4)	(Column 5)	RATE (\$)	ADDITIONAL FEE (\$)
		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA			
	Total (37 CFR 1.16(i))	*	Minus **	=		X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus ***	=		X \$ =	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))						
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						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.

LIE
THERESA OKON

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.

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.

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>				Application Number	14414436
				Filing Date	2015-01-12
				First Named Inventor	Leonardo Dagum
				Art Unit	2467
				Examiner Name	Michael J. Moore Jr.
Sheet	1	of	1	Attorney Docket Number	20145-073US

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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
	1	Examination Report dated 2017-11-13, in Chinese Patent Application No. 12773454.9 (5pgs).	
	2	Office Action dated 2018-01-01, in Korean Patent Application No. 1020157002636 (8pgs).	✓

Examiner Signature	Date Considered	
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.
¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.
 This collection of information is required by 37 CFR 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 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, 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 (1-800-786-9199) and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	31489939
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	12-JAN-2018
Filing Date:	12-JAN-2015
Time Stamp:	15:17:12
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	073US_SIDS_Trans.pdf	29843 <small>7207661c4ab74263ae2905393358548e84b69244</small>	no	3

Warnings:

Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	073US_SIDS_SB08b.pdf	138533	no	1
			439a8c3b24e05145d7ce04cc307459054ad aec04		
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Non Patent Literature	073US_SIDS_NPL1.pdf	412207	no	5
			0fa9864a1a504556b2ed12b918f6a84aa02e a303		
Warnings:					
Information:					
4	Non Patent Literature	073US_SIDS_NPL2.pdf	1298077	no	8
			77352b840eb2a5006b1b3c1337f3f605100 21f0f		
Warnings:					
Information:					
Total Files Size (in bytes):			1878660		
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No. : 4662
Appl. No. : 14/414,436
Filing Date : 2012-09-25
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Art Unit : 2467
Examiner : Michael J. Moore Jr.
Docket No. : 20145-073US

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: 2018-01-12 By: /Nita Miller/
Nita Miller

INFORMATION DISCLOSURE STATEMENT

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

SIR or MADAM:

Filed herewith, in accordance with the provisions of 37 CFR §§ 1.56 and 1.97–1.98, listing various references for consideration by the Examiner, is an Information Disclosure Statement (“IDS”).

The filing of this IDS shall not be construed as a representation that a search has been made, or regarding the completeness of the list of references, or that no other material information exists. Furthermore, the filing of this IDS shall not be construed as a representation that inclusion of a reference in this list is an admission that it is prior art or is pertinent to this application, or as an admission that the information listed is, or may be considered to be, material to the patentability of the above referenced application. The filing of this IDS shall not be construed in any manner as an admission against interest.

This IDS is being filed:

PATENT

- within three months of the filing date of a national application, other than a continued prosecution application under § 1.53(d);
- within three months of the date of entry of the national stage as set forth in § 1.491 in an international application;
- before the mailing of a first Office Action on the merits;
- before the mailing of a first Office Action after the filing of a request for continued examination under § 1.114;
- after three months of the filing date or entry into the national stage or after the mailing of a first Office action on the merits, but before the mailing date of any final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

OR

- Applicant certifies pursuant to 37 CFR § 1.97(e):

- That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement;

OR

- That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- on or before the payment of the issue fee but after the mailing of a final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

AND

- Applicant certifies pursuant to 37 CFR § 1.97(e):

- That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application

PATENT

not more than three months prior to the filing of this information disclosure statement;

OR

That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- Applicant submits that the enclosed Information Disclosure Statement is timely; therefore, no fee is required.
- Except as provided for under 37 CFR § 1.98(a)(2), Applicant has enclosed a copy of each listed reference.
- The above referenced application relies upon Application No. _____, filed _____ for an earlier effective filing date under 35 U.S.C. 120. Although, pursuant to 37 CFR § 1.98(d), the references submitted herein are not required to be submitted for the Examiner to consider them, Applicant submits the references herein so that the information will be printed on the patent issuing from this application.
- Pursuant to 37 CFR § 1.704(d), Applicant certifies that each of the references cited herein were first cited in a communication from a foreign patent office in a counterpart application and that this communication was not received by any individual designated in 37 CFR § 1.56(c) more than thirty days prior to the filing of this Information Disclosure Statement.

Consideration of the listed references and favorable action are requested. If any additional fees are due in connection with the filing of this Information Disclosure Statement, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-6925.

Respectfully submitted,

Date: 2018-01-12

By: /Michael V. North/
Michael V. North
Reg. No. 46963

Customer No. 146571 UNITED STATES PATENT AND TRADEMARK OFFICE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore Jr.
	Attorney Docket Number	20145-073US

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		14414436
	Filing Date		2015-01-12
	First Named Inventor	Leonardo Dagum	
	Art Unit	2467	
	Examiner Name	Michael J. Moore Jr.	
	Attorney Docket Number	20145-073US	

1	English translation of Office Action dated 2018-02-09, in Chinese Patent Application No. 201280075818.9 (52pgs).	✕
2	Office Action dated 2018-02-19, and English translation thereof, in Korean Patent Application No. 10-2018-7002557 (9pgs).	☒

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	
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*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		14414436
	Filing Date		2015-01-12
	First Named Inventor	Leonardo Dagum	
	Art Unit		2467
	Examiner Name	Michael J. Moore Jr.	
	Attorney Docket Number		20145-073US

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)	
Name/Print		Registration Number	

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

Electronic Acknowledgement Receipt

EFS ID:	32042809
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	13-MAR-2018
Filing Date:	12-JAN-2015
Time Stamp:	18:34:08
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	073US_SIDS_Trans.pdf	29853 <small>1e1ebcecb4d4a68db0973e571218805a7d af6083</small>	no	3

Warnings:

Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	073US_SIDS_SB08.pdf	612196 461bfb4f591f01b86dea45121eb2303d95197b36	no	4
Warnings:					
Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
3	Non Patent Literature	073US_SIDS_NPL1.pdf	611612 cc616a741a0e6d5140f153f5dca7690140f63e7	no	52
Warnings:					
Information:					
4	Non Patent Literature	073US_SIDS_NPL2.pdf	4653256 3b190eea65c2d0c2a03542510d989f311cfd004c	no	9
Warnings:					
Information:					
Total Files Size (in bytes):			5906917		
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No. : 4662
Appl. No. : 14/414,436
Filing Date : 2012-09-25
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Art Unit : 2467
Examiner : Michael J. Moore Jr.
Docket No. : 20145-073US

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: 2018-03-13 By: /Nita Miller/
Nita Miller

INFORMATION DISCLOSURE STATEMENT

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

SIR or MADAM:

Filed herewith, in accordance with the provisions of 37 CFR §§ 1.56 and 1.97–1.98, listing various references for consideration by the Examiner, is an Information Disclosure Statement (“IDS”).

The filing of this IDS shall not be construed as a representation that a search has been made, or regarding the completeness of the list of references, or that no other material information exists. Furthermore, the filing of this IDS shall not be construed as a representation that inclusion of a reference in this list is an admission that it is prior art or is pertinent to this application, or as an admission that the information listed is, or may be considered to be, material to the patentability of the above referenced application. The filing of this IDS shall not be construed in any manner as an admission against interest.

This IDS is being filed:

PATENT

- within three months of the filing date of a national application, other than a continued prosecution application under § 1.53(d);
- within three months of the date of entry of the national stage as set forth in § 1.491 in an international application;
- before the mailing of a first Office Action on the merits;
- before the mailing of a first Office Action after the filing of a request for continued examination under § 1.114;
- after three months of the filing date or entry into the national stage or after the mailing of a first Office action on the merits, but before the mailing date of any final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

OR

- Applicant certifies pursuant to 37 CFR § 1.97(e):

- That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement;

OR

- That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- on or before the payment of the issue fee but after the mailing of a final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

AND

- Applicant certifies pursuant to 37 CFR § 1.97(e):

- That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application

PATENT

not more than three months prior to the filing of this information disclosure statement;

OR

That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

Applicant submits that the enclosed Information Disclosure Statement is timely; therefore, no fee is required.

Except as provided for under 37 CFR § 1.98(a)(2), Applicant has enclosed a copy of each listed reference.

The above referenced application relies upon Application No. _____, filed _____ for an earlier effective filing date under 35 U.S.C. 120. Although, pursuant to 37 CFR § 1.98(d), the references submitted herein are not required to be submitted for the Examiner to consider them, Applicant submits the references herein so that the information will be printed on the patent issuing from this application.

Pursuant to 37 CFR § 1.704(d), Applicant certifies that each of the references cited herein were first cited in a communication from a foreign patent office in a counterpart application and that this communication was not received by any individual designated in 37 CFR § 1.56(c) more than thirty days prior to the filing of this Information Disclosure Statement.

Consideration of the listed references and favorable action are requested. If any additional fees are due in connection with the filing of this Information Disclosure Statement, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-6925.

Respectfully submitted,

Date: 2018-03-13

By: /Michael North/
Michael North
Reg. No. 46963

Customer No.
146571
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AND TRADEMARK OFFICE



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Alexandria, Virginia 22313-1450
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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes application details for Leonardo Dagum and examiner information for Moore Jr, Michael J.

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):

docket1@northweber.com

Office Action Summary	Application No. 14/414,436	Applicant(s) Dagum et al.	
	Examiner MICHAEL J MOORE JR	Art Unit 2467	AIA 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 MONTHS 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 1/8/2018.
 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) 1-6,8-9,11-19,21-36 and 38-40 is/are pending in the application.
5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) Claim(s) ____ is/are allowed.
- 7) Claim(s) 1-6,8-9,11-19,21-36 and 38-40 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/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date ____.
- 3) Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 4) Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Information Disclosure Statement

2. The information disclosure statements (IDS) submitted on 3/13/18, 1/12/18, 10/19/17, and 9/19/17 were filed after the mailing date of the Non-Final Office Action on 9/7/17. The submissions are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

Claim Rejections - 35 USC § 103

3. The following is a quotation of pre-AIA 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, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under pre-AIA 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of pre-AIA 35 U.S.C. 103(c) and potential pre-AIA 35 U.S.C. 102(e), (f) or (g) prior art under pre-AIA 35 U.S.C. 103(a).

5. Claims **1-6, 8, 9, 11-19, 21-36, and 38-40** is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Zhao et al. (U.S. 2002/0174421) (hereinafter "Zhao") cited in Applicant's previously submitted IDS in view of Burnette et al. (U.S. 2012/0244863) (hereinafter "Burnette").

Regarding claim **1**, *Zhao* teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as well as the enterprise computing environment shown in Figure 2 including end user devices 110, 112, 114, 118 (broadband subscribers) connected via a LAN 104 and WAN 102.

Zhao also teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page

6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Zhao also teaches the servicing of received requests (change requests) from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064]. *Zhao* further describes where the measured performance parameters include latency data as spoken of on page 6, paragraph [0110].

Zhao does not explicitly teach where “the analysis result comprises at least throughput”.

However, *Burnette* teaches a system and method for dynamic service offering based on available resources, where a service sending system 102 (service provider) receives reports on the network performance and conditions (analysis results) at any time from various receivers 108, 112, 124 (machines) and where the performance information includes measured link throughput as shown in Figures 1 and 2, and spoken of on page 2, paragraph [0023].

At the time of the invention, it would have been obvious to someone of ordinary skill in the art, given these references, to apply the throughput measurement and reporting of *Burnette* to the performance parameter monitoring system of *Zhao* in order to provide real-time metrics pertaining to a WAN such that a determination can be made as to what level of service offering can be presented to subscribers, thereby improving the subscriber quality of service as spoken of on page 2, paragraph [0023], lines 13-16 of *Burnette*.

Regarding claim **2**, *Zhao* further teaches the clients 11, 17 that are connected via firewall devices 13, 15 (routers) as shown in Figure 1.

Regarding claim **3**, *Zhao* further teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], as well as where a timestamp is saved (stored) and utilized to compute performance data as spoken of on page 17, claim 8.

Regarding claim **4**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (LAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **5**, *Zhao* further teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information (LAN performance data) relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **6**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) as a Java applet (virtual machine) and used to monitor

performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **8**, *Zhao* further teaches the site monitor system that provides service summary information (for improving service performance) of managed services within a domain as spoken of on page 2, paragraphs [0045]-[0046].

Regarding claim **9**, *Zhao* further teaches the gathered JARTA data providing an integrated, end-to-end view of web browsing activities (users network usage pattern) as spoken of on page 1, paragraph [0009], lines 10-16.

Regarding claim **11**, *Zhao* further teaches site monitor 503 that runs on a management server 10 as shown in Figure 1 and spoken of on page 4, paragraph [0067].

Regarding claim **12**, *Zhao* further teaches the computer system 150 (personal computer) shown in Figure 3.

Regarding claim **13**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) along with one or more web pages from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **14**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client

computer (computing device) along with one or more web pages from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as well as the client communication with web server 12 via the Internet as shown in Figure 1.

Regarding claim **15**, *Zhao* further teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients (collected WAN performance information) within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **16**, *Zhao* further teaches the selective transmission of the XML performance report to the site monitor (machine) based upon a returned success/failure status message (predetermined condition) as spoken of on page 8, paragraph [0175].

Regarding claim **17**, *Zhao* further teaches the selective transmission of the XML performance report to the site monitor (machine) based upon a returned success/failure status message (condition based on type of data collected) as spoken of on page 8, paragraph [0175].

Regarding claim **18**, *Zhao* further teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display (scheduled based system) of information

relating to the various servers and clients (WAN performance information) within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **19**, *Zhao* further teaches the collection of data from server 502 using an agent 508 (operator) as spoken of on page 4, paragraph [0066].

Regarding claim **21**, *Zhao* teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) to a site monitor (database) of a server as spoken of on page 1, paragraphs [0009] and [0010], as well as the enterprise computing environment shown in Figure 2 including end user devices 110, 112, 114, 118 (broadband subscribers) connected via a LAN 104 and WAN 102.

Zhao also teaches the site monitor (of server) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Zhao further teaches the servicing of received requests (change requests) from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064]. *Zhao* further describes where the measured performance parameters include latency data as spoken of on page 6, paragraph [0110].

Zhao does not explicitly teach where “the analysis result comprises at least throughput”.

However, *Burnette* teaches a system and method for dynamic service offering based on available resources, where a service sending system 102 (service provider) receives reports on the network performance and conditions (analysis results) at any time from various receivers 108, 112, 124 (machines) and where the performance information includes measured link throughput as shown in Figures 1 and 2, and spoken of on page 2, paragraph [0023].

At the time of the invention, it would have been obvious to someone of ordinary skill in the art, given these references, to apply the throughput measurement and reporting of *Burnette* to the performance parameter monitoring system of *Zhao* in order to provide real-time metrics pertaining to a WAN such that a determination can be made as to what level of service offering can be presented to subscribers, thereby improving the subscriber quality of service as spoken of on page 2, paragraph [0023], lines 13-16 of *Burnette*.

Regarding claim **22**, *Zhao* further teaches site monitor 503 that runs on a management server 10 as shown in Figure 1 and spoken of on page 4, paragraph [0067].

Regarding claim **23**, *Zhao* further teaches the site monitor (of server) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076], as well as where a timestamp is saved (stored) and utilized to compute performance data as spoken of on page 17, claim 8.

Regarding claim **24**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (LAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **25**, *Zhao* further teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information (LAN performance data) relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **26**, *Zhao* further teaches the site monitor (of server) shown in Figure 7 that includes a data collector 220 (first logic), site monitor processor 224 (second logic), site monitor knowledge module 226 (third logic), and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5,

paragraphs [0074]-[0076], where the site monitor processor 214 performs analysis of the received performance data (WAN performance information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Regarding claim **27**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) along with one or more web pages from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010], as well as the client communication with web server 12 via the Internet as shown in Figure 1.

Regarding claim **28**, *Zhao* further teaches the site monitor (of server) shown in Figure 7 that includes a data collector 220 (first module), site monitor processor 224 (second module), site monitor knowledge module 226 (third module), and interface module 228 (management interface) used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **29**, *Zhao* further teaches the site monitor (of server) shown in Figure 7 that includes a data collector 220 (first module), site monitor processor 224 (second module), site monitor knowledge module 226 (third module), and interface module 228 (user interface module) used for the collection, processing, storage,

organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **30**, *Zhao* further teaches the site monitor system that provides service summary information (for improving service performance) of managed services within a domain as spoken of on page 2, paragraphs [0045]-[0046], as well as the site monitor (of server) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display of information relating to the various servers and clients within the site as spoken of on page 5, paragraphs [0074]-[0076].

Regarding claim **31**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) along with one or more web pages (of a website) from a web server (for execution on an Internet browser), and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **32**, *Zhao* further teaches the site monitor processor 214 that performs analysis of the received performance data (probed network information) and provides generation of various views of the analyzed information (analysis result) for presentation (reporting) to a user (subscriber) as spoken of on page 6, paragraph [0131], as well as page 7, paragraphs [0139]-[0140], and page 8, paragraphs [0176] and [0186].

Regarding claim **33**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) as a Java applet (virtual machine) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **34**, *Zhao* further teaches the Java Application Response Time Analyzer client software (downloadable agent) that may be downloaded to a client computer (computing device) and used to monitor performance parameters associated with client-server transactions as well as collecting and transmitting performance data (WAN performance information) as spoken of on page 1, paragraphs [0009] and [0010].

Regarding claim **35**, *Zhao* further teaches the site monitor system that provides service summary information (for improving service performance) of managed services within a domain as spoken of on page 2, paragraphs [0045]-[0046].

Regarding claim **36**, *Zhao* further teaches the gathered JARTA data providing an integrated, end-to-end view of web browsing activities (users network usage pattern) as spoken of on page 1, paragraph [0009], lines 10-16.

Regarding claim **38**, *Zhao* further teaches the computer system 150 (computing device) shown in Figure 3.

Regarding claim **39**, *Zhao* further teaches the servicing of received requests from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064].

Regarding claim **40**, *Zhao* further teaches the site monitor (machine) shown in Figure 7 that includes a data collector 220 (database), site monitor processor 224, site monitor knowledge module 226, and interface module 228 used for the collection, processing, storage, organization, and display (scheduled based system) of information relating to the various servers and clients (WAN performance information) within the site as spoken of on page 5, paragraphs [0074]-[0076].

Response to Arguments

6. Applicant's arguments filed 1/8/18 have been fully considered but they are not persuasive.

Regarding *amended* claims **1 and 21**, Applicant argues that *Zhao* in view of *Burnette* does not teach "sending an on-demand change request associated with at least one of throughput, or latency".

However, as provided in the previous Office Action and clarified above, *Zhao* further teaches the servicing of received requests (change requests) from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064]. *Zhao* further describes where the measured performance parameters include latency data as spoken of on page 6, paragraph [0110]. Giving a broadest reasonable interpretation, the above received service requests from clients are considered on-demand change requests that are associated with latency.

Furthermore, *Burnette* teaches the analyzing of throughput as a measurement parameter as described above.

For these reasons, it is maintained that *Zhao* in view of *Burnette* teaches the above limitation in question.

Conclusion

7. **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.


8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL J. MOORE, JR., whose telephone number is (571)272-3168. The examiner can normally be reached on M-F (9am-4pm).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan A Phillips can be reached at (571)272-3940. 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.

**/MICHAEL J MOORE JR/
Primary Examiner, Art Unit 2467**

Search Notes 	Application/Control No. 14/414,436	Applicant(s)/Patent Under Reexamination Dagum et al.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner


US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventorship Search (PALM/EAST)	7/22/16	MM
General EAST Keyword Search - See Search History Printout	7/22/16	MM
Updated Inventorship Search (PALM/EAST)	8/23/17	MM
Updated General EAST Keyword Search - See Search History Printout	8/23/17	MM
Updated Inventorship Search (PALM/EAST)	04/17/2018	MM
Updated General EAST Keyword Search - See Search History Printout	04/17/2018	MM


Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/MICHAEL J MOORE JR/ Primary Examiner, Art Unit 2467	
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	Examiner MICHAEL J MOORE JR	Art Unit 2467

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
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CLAIMS										
<input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47										
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	Examiner MICHAEL J MOORE JR	Art Unit 2467

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	Examiner MICHAEL J MOORE JR	Art Unit 2467

CLAIM		DATE							
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	132	dagum-leonardo.in. or bednarz-philip.in. or goldburg-marc.in. or tehrani-ardavan.in. or rhee-wonjong.in.	US-PGPUB; USPAT	OR	OFF	2018/04/19 10:37
L2	6	L1 and (agent and (WAN same performance) and repor\$4)	US-PGPUB; USPAT	OR	OFF	2018/04/19 10:37
L3	40	(measur\$6 same WAN same throughput) and (repor\$4 same (subscriber or subscribers or user or users))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	OFF	2018/04/19 10:39
L4	84	(agent same measur\$6 same WAN) and analy\$4 and repor\$4	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	OFF	2018/04/19 10:39

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore Jr.
	Attorney Docket Number	20145-073US

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		14414436
	Filing Date		2015-01-12
	First Named Inventor	Leonardo Dagum	
	Art Unit		2467
	Examiner Name	Michael J. Moore Jr.	
	Attorney Docket Number		20145-073US

1	English translation of Office Action dated 2018-02-09, in Chinese Patent Application No. 201280075818.9 (52pgs).	✕
2	Office Action dated 2018-02-19, and English translation thereof, in Korean Patent Application No. 10-2018-7002557 (9pgs).	☒

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/MICHAEL J MOORE JR/	Date Considered	04/19/2018
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*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		14414436
	Filing Date		2015-01-12
	First Named Inventor	Leonardo Dagum	
	Art Unit		2467
	Examiner Name	Michael J. Moore Jr.	
	Attorney Docket Number		20145-073US

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)	
Name/Print		Registration Number	

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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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.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore, Jr.
	Attorney Docket Number	20145-073US

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	2	20090207985	A1	2009-08-20	Cioffi et al.	
	3	20120091724	A1	2012-07-05	Chow et al.	
	4	20120096143	A1	2012-04-19	Suit	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
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	Attorney Docket Number	20145-073US

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	Office Action dated 2016-01-21, in Canadian Patent Application No. 2,879,047 (3pgs).	
	2	Office Action dated 2017-07-25, in Australian Patent Application No. 2016204716 (3pgs).	
	3	Office Action dated 2017-08-13, in Korean Patent Application No. 10-2015-7002636 (6pgs).	X

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EXAMINER SIGNATURE

Examiner Signature	/MICHAEL J MOORE JR/	Date Considered	04/19/2018
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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	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore, Jr.
	Attorney Docket Number	20145-073US

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	/Michael North/	Date (YYYY-MM-DD)	2017-09-19
Name/Print	Michael North	Registration Number	46963

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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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.
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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.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				Complete if Known			
		Application Number		14414436			
		Filing Date		2015-01-12			
		First Named Inventor		Leonardo Dagum			
		Art Unit		2467			
		Examiner Name		Michael J. Moore Jr.			
		Attorney Docket Number		20145-073US			
Sheet	1	of	1				

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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
	1	Examination Report dated 2017-11-13, in Chinese Patent Application No. 12773454.9 (5pgs).	
	2	Office Action dated 2018-01-01, in Korean Patent Application No. 1020157002636 (8pgs).	✓

Examiner Signature	/MICHAEL J MOORE JR/	Date Considered	04/19/2018
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 1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.
 This collection of information is required by 37 CFR 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 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, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>				Complete if Known			
		Application Number		14/414,436			
		Filing Date		2015-01-12			
		First Named Inventor		Leonardo Dagum			
		Art Unit		2467			
		Examiner Name		Michael J. Moore Jr.			
Sheet		1	of		1		
		Attorney Docket Number		20145-073US			

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Examiner Initials*	Cite No. ¹	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
	1	Response as filed 2017-10-17, in Australian Patent Application No. 2016204716 (Docket No. 20145-073AUD) (34pgs).	

Examiner Signature	/MICHAEL J MOORE JR/	Date Considered	04/19/2018
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¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No.: 4662
Appl. No. : 14/414,436
Filed : January 12, 2015
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Examiner : Michael J. Moore Jr
Art Unit : 2467
Docket No. : 20145-073US

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: 2018-06-25 By: /Nita Miller/
Nita Miller

RESPONSE TO FINAL OFFICE ACTION

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

Examiner Moore:

This paper is responsive to the Final Office Action mailed April 24, 2018, and having a shortened statutory period ending July 24, 2018. Accordingly, this paper is timely filed. Reconsideration is respectfully requested in view of the Amendments and Remarks below.

Amendments to the Claims appear in the complete Listing of Claims which may be found beginning at page **2** of this paper.

Remarks/Arguments may be found at page **13** of this paper.

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Docket No. : 20145-073US
Office Action Date : April 24, 2018
Response Date :

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application, and reflects the Examiner's renumbering:

Listing of Claims:

1. (Previously presented) A method performed by a downloadable agent, the method comprising:

collecting WAN performance information, wherein the downloadable agent is executable

on a computing device coupled to a LAN of a broadband subscriber, wherein the

LAN is coupled by another device to a WAN;

transmitting the WAN performance information to a machine, wherein the machine is operable to:

store the WAN performance information in a database associated with the machine,

analyze the WAN performance information to generate an analysis result, the analysis result comprises at least throughput; and

report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider; and

sending an on-demand change request associated with at least one of throughput, or latency.

2. (Original) The method of claim 1, wherein the other device is a router.

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3. (Original) The method of claim 1, wherein the machine is operable to store the WAN performance information with an associated timestamp.

4. (Original) The method of claim 1 wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.

5. (Original) The method of claim 4 further comprises transmitting by the downloadable agent the LAN performance data to the machine.

6. (Original) The method of claim 1, wherein the downloadable agent is executable in a virtual machine on the computing device.

7. (Canceled)

8. (Previously presented) The method of claim 1 further comprises receiving the analysis result, wherein receiving the analysis result comprises at least one of:

- receiving availability of higher bandwidth for operating a DSL service;
- receiving service product information for improving DSL service performance; or
- receiving utilization information for optimizing a consumers DSL service cost.

9. (Previously presented) The method of claim 1, wherein the WAN performance information includes at least one of:

- topological information,
- geographical information,
- latency,
- jitter,
- packet loss,

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Response Date :

time,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
user's provisioned WAN service,
RF characteristics including at least one of: signal power, frequency bands and mode of
operation,
environment statistics, or
data on operation of communication devices.

10. (Cancelled)
11. (Original) The method of claim 1, wherein the machine is a server that resides in a cloud.
12. (Previously presented) The method of claim 1, wherein the computing device is one of:
tablet computing device;
a personal computer;
a gaming console;
an access point (AP);
a base station;
a wireless smartphone device;
a wireless LAN device;

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Response Date :

an access gateway;

a router;

a performance enhancement device;

a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;

a cable CPE modem;

an in-home powerline device;

a Home Phoneline Network Alliance (HPNA) based device;

an in-home coax distribution device;

a G.hn (Global Home Networking Standard) compatible device;

an in-home metering communication device;

an in-home appliance communicatively interfaced with the LAN;

a wireless femtocell base station;

a wireless Wi-Fi compatible base station;

a wireless mobile device repeater;

a wireless mobile device base station;

nodes within an ad-hoc/mesh network;

a set-top box (STB)/set-top unit (STU) customer electronics device;

an Internet Protocol (IP) enabled television;

an IP enabled media player;

an IP enabled gaming console;

an Ethernet gateway;

a computing device connected to the LAN;

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an Ethernet connected computer peripheral device;

an Ethernet connected router;

an Ethernet connected wireless bridge;

an Ethernet connected network bridge;

an Ethernet connected network switch;

wearable device; or

internet enabled cameras.

13. (Original) The method of claim 1, wherein the downloadable agent is executable on an Internet browser.

14. (Original) The method of claim 1, wherein the downloadable agent is accessible remotely via the Internet.

15. (Original) The method of claim 1 further comprises periodically sending collected WAN performance information to the machine.

16. (Original) The method of claim 1 further comprises waiting for a predetermined condition or threshold to be satisfied before sending collected WAN performance information to the machine.

17. (Original) The method of claim 16, where the predetermined condition or threshold is at least one of:

a function of a type of data collected, or

limit or threshold on a performance level associated with the collected data.

18. (Previously presented) The method of claim 1, wherein the machine is operable to collect WAN performance information by polling or by a scheduled based system.

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19. (Previously presented) The method of claim 1 further comprises collecting data from at least one of:

The National Weather Service;

a radio station; or

an operator.

20. (Canceled)

21. (Previously presented) A system comprising:

a database; and

a server coupled to the database, the server operable to:

receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and

store the WAN performance information in the database associated with the server,

analyze the WAN performance information to generate an analysis result, the analysis result comprises at least throughput; and

report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider;

wherein the server is operable to receive an on-demand change request associated with at least one of: throughput, or latency.

22. (Original) The system of claim 21, wherein the server resides in a cloud.

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23. (Original) The system of claim 21, wherein the server is operable to store the WAN performance information with an associated timestamp.

24. (Original) The system of claim 21, wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.

25. (Original) The system of claim 24, wherein the server is operable to receive from the downloadable agent the LAN performance data.

26. (Previously presented) The system of claim 25, wherein the server comprises:
a first logic for collecting the WAN performance information;
a second logic for performing statistical analysis using the first WAN performance information; and
a third logic for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider.

27. (Previously presented) The system of claim 26, wherein the logic that receive the instruction and command from the third module are accessible by internet.

28. (Original) The system of claim 26, wherein the server comprises:
a management interface for communicating with the downloadable agent via internet.

29. (Previously presented) The system of claim 26, wherein the server comprises:
a user interface logic for providing access and for displaying information associated with the first, second, third modules.

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30. (Previously presented) The system of claim 21, wherein the server is operable to compute throughput of a DSL connection by collecting current performance metrics associated with DSL service.

31. (Previously presented) The system of claim 30, wherein the server is to perform throughput computation with reference to a website.

32. (Original) The system of claim 31, wherein the throughput computation comprises probing a network.

33. (Original) The system of claim 21, wherein the downloadable agent is executable in a virtual machine on the computing device.

34. (Original) The system of claim 21, wherein the downloadable agent is dynamically downloaded to the computing device.

35. (Previously presented) The system of claim 21, wherein the server is operable to report the analysis result by performing at least one of:

- sending availability of higher bandwidth for operating a DSL service;
- sending service product information for improving DSL service performance; or
- sending utilization information for optimizing a consumers DSL service cost.

36. (Previously presented) The system of claim 21, wherein the WAN performance information includes at least one of:

- topological information,
- geographical information,
- time,
- latency,

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Office Action Date : April 24, 2018
Response Date :

jitter,
packet loss,
type of communication device,
device network identification,
manufacturer and model of equipment,
equipment characteristics,
firmware,
user's network usage pattern,
RF characteristics including at least one of: signal power, frequency bands and mode of
operation,
environment statistics, or
data on operation of communication devices.

37. (Cancelled)

38. (Previously presented) The system of claim 21, wherein the computing device is one of:
tablet computing device;
an access point (AP);
a base station;
a wireless smartphone device;
a wireless LAN device;
an access gateway;
a router,
a performance enhancement device;

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a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;

a cable CPE modem;

an in-home powerline device;

a Home Phoneline Network Alliance (HPNA) based device;

an in-home coax distribution device;

a G.hn (Global Home Networking Standard) compatible device;

an in-home metering communication device;

an in-home appliance communicatively interfaced with the LAN;

a wireless femtocell base station;

a wireless Wi-Fi compatible base station;

a wireless mobile device repeater;

a wireless mobile device base station;

nodes within an ad-hoc/mesh network;

a set-top box (STB)/set-top unit (STU) customer electronics device;

an Internet Protocol (IP) enabled television;

an IP enabled media player;

an IP enabled gaming console;

an Ethernet gateway;

a computing device connected to the LAN;

an Ethernet connected computer peripheral device;

an Ethernet connected router;

an Ethernet connected wireless bridge;

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an Ethernet connected network bridge;

an Ethernet connected network switch;

wearable device; or

internet enabled cameras.

39. (Original) The system of claim 21, wherein the server is operable to provide a marketplace of ideas for the communication devices for trading bandwidth for media services.

40. (Previously presented) The system of claim 21, wherein the server is operable to collect WAN performance information by polling or by a scheduled based system.

41-110. (Cancelled)

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Response Date :

REMARKS/ARGUMENTS

In the Final Office Action (hereinafter, "Office Action"), mailed April 24, 2018, the Examiner rejects all pending claims. By this response, no claims are amended, deleted, or added. Following entry of this response, claims 1-6, 8-9, 11-19, 21-36 and 38-40 will be pending in the application.

Claim Rejections

I. Rejection of Claims under pre-AIA 35 U.S.C. § 103(a)

The Examiner rejected claims 1-6, 8-19, and 21-40, under 35 U.S.C. 102(b) as being unpatentable over U.S. Publication No. 2002/0174421, to Zhao *et al.* (hereinafter "Zhao") in view of U.S. Publication No. 2012/0244863, to Burnette *et al.* (hereinafter "Burnette"). Applicant respectfully disagrees.

Applicant respectfully makes reference to MPEP §§ 2131 and 2131.02, which state in part:

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. (MPEP § 2131, citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). The identical invention must be shown in as complete detail as is contained in the ... claim. (MPEP § 2131.02, citing *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)).

Claim 1, as presented, states (*emphasis added*):

"A method performed by a downloadable agent, the method comprising:
collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and
transmitting the WAN performance information to a machine, wherein the machine is operable to:
store the WAN performance information in a database associated with the machine,
analyze the WAN performance information to generate an analysis result, the analysis result comprises at least throughput;
report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider; and

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Response Date :

sending an on-demand change request associated with at least one of throughput, or latency.”

Applicant respectfully asserts that Zhao in view of Burnette does not disclose every element in claim 1, especially the emphasized element of **“sending an on-demand change request associated with at least one of throughput, or latency”**.

On page 14 of the Office Action (Section: Response to Arguments), the Examiner wrote *“However, as provided in the previous Office Action and clarified above, Zhao further teaches the servicing of received requests (change requests) from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064]. Zhao further describes where the measured performance parameters include latency data as spoken of on page 6, paragraph [0110]. Giving a broadest reasonable interpretation, the above received service requests from clients are considered on-demand change requests that are associated with latency.”*

First, Applicant respectfully points out **that servicing received request disclosed by Zhao is patentably distinct from on-demand change request**. Zhao explicitly discloses in [0064] that *“Each of servers 402-404 may, at a given time, be servicing requests from one or more clients, 411-414. According to the present disclosure, performance parameters which are measured at client sites 411-414 can be transmitted up through the hierarchy to the respective servers 402-404.”* In Zhao’s disclosure, the requests from the one or more clients, **411-414** are requests for transmitting measured performance parameters, instead of *on-demand change requests*.

Second, Applicant respectfully asserts that Zhao does not disclose or suggest **change request associated with at least one of throughput, or latency**. Zhao explicitly discloses in [011] that *“In one embodiment, the site monitor maybe operable to collect and/or process the following parameters: unique session visits; page response time data (average, minimum and maximum); server latency data (average, minimum and maximum).”* Zhao simply discloses collect or process server latency data, instead of **change request associated with latency**.

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Response Date :

Similarly, Burnette does not disclose the limitation of “**sending an on-demand change request associated with at least one of throughput, or latency.**”

Therefore, based at least on the above remarks, Applicant respectfully asserts that claim 1 is patentable over Zhao in view of Burnette.

The above mentioned remarks in regarding to independent claim 1 are also applicable to independent claim 21. Therefore, independent claim 21 is also patentable over Zhao in view of Burnette.

Dependent claims 2-6, 8-9, 11-19, 22-36 and 38-40 depend from independent claims 1 and 21 respectively, and thus follow the allowability of independent claims 1 and 21.

CONCLUSION

In view of the above arguments, Applicant believes that pending claims 1-6, 8-9, 11-19, 21-36 and 38-40 are allowable and respectfully requests that a Notice of Allowance be issued for this application in its current state. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned may be reached by telephone at 520-288-8876.

If any fees are due in connection with this filing the Commissioner is authorized to charge such fees to Deposit Account 50-2776.

Respectfully submitted,

Date: June 25, 2018

By: /Xin Dai/
Xin Dai, Ph.D.
Reg. No. 72,098



Electronic Acknowledgement Receipt

EFS ID:	32998832
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	25-JUN-2018
Filing Date:	12-JAN-2015
Time Stamp:	19:55:30
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		073US_RFOA.pdf	81171 7b800b0f35dd8d72def9f0bc4f3a1ba98b18e052	yes	15

Multipart Description/PDF files in .zip description		
Document Description	Start	End
Response After Final Action	1	1
Claims	2	12
Applicant Arguments/Remarks Made in an Amendment	13	15

Warnings:

Information:

Total Files Size (in bytes):

81171

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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 14/414,436	Filing Date 01/12/2015	<input type="checkbox"/> To be Mailed	
ENTITY: <input checked="" type="checkbox"/> LARGE <input type="checkbox"/> SMALL <input type="checkbox"/> MICRO					
APPLICATION AS FILED - PART I					
	(Column 1)	(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A		
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A		
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A		
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	minus 20 = *		x \$80 =		
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 = *		x \$420 =		
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).				
<input type="checkbox"/> 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		
APPLICATION AS AMENDED - PART II					
	(Column 1)	(Column 2)	(Column 3)		
AMENDMENT	06/25/2018 CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
Total <small>(37 CFR 1.16(i))</small>	* 36	Minus ** 72	= 0	x \$100 =	0
Independent <small>(37 CFR 1.16(h))</small>	* 2	Minus *** 4	= 0	x \$460 =	0
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
				TOTAL ADD'L FEE	0
	(Column 1)	(Column 2)	(Column 3)		
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
Total <small>(37 CFR 1.16(i))</small>	*	Minus **	=	x \$0 =	
Independent <small>(37 CFR 1.16(h))</small>	*	Minus ***	=	x \$0 =	
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					
				TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.				HSLIE	
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".				TRACIE V HARGROVE	
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".					
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.					

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

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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes application details for Leonardo Dagum and examiner information for Moore Jr, Michael J.

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):

docket1@northweber.com

Advisory Action Before the Filing of an Appeal Brief	Application No. 14/414,436	Applicant(s) Dagum et al.	
	Examiner MICHAEL J MOORE JR	Art Unit 2467	AIA Status No

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

THE REPLY FILED 25 June 2018 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
- a) The period for reply expires ____ months from the mailing date of the final rejection.
- b) The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
- c) A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires ____ months from the mailing date of the prior Advisory Action or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.

Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANTS FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37CFR 41.37(a).

AMENDMENTS

3. The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
- a) They raise new issues that would require further consideration and/or search (see NOTE below);
- b) They raise the issue of new matter (see NOTE below);
- c) They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
- d) They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: _____ (See 37CFR 1.116 and 41.33(a)).

4. The amendments are not in compliance with 37CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. Applicants reply has overcome the following rejection(s): _____
6. Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. For purposes of appeal, the proposed amendment(s): (a) will not be entered, or (b) will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____
9. The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. The request for reconsideration has been considered but does NOT place the application in condition for allowance because:
See Continuation Sheet.

13. Note the attached Information *Disclosure Statement(s)*. (PTO/SB/08) Paper No(s). _____

14. Other: _____

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
Claim(s) allowed: _____
Claim(s) objected to: _____
Claim(s) rejected: 1-6, 8-9, 11-19, 21-36 and 38-40.
Claim(s) withdrawn from consideration: _____

/MICHAEL J MOORE JR/
Primary Examiner, Art Unit 2467

Continuation of REQUEST FOR RECONSIDERATION/OTHER 12. The request for reconsideration has been considered but does NOT place the application in condition for allowance because: Regarding claim 1, Applicant argues that Zhao in view of Burnette does not teach "sending an on-demand change request associated with at least one of throughput, or latency. Applicant further argues that servicing received requests as described in Zhao is patentably distinct from on-demand change requests. Examiner respectfully disagrees.

As provided in the Final Office Action, Zhao teaches the servicing of received requests (change requests) from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064]. Zhao further describes where the measured performance parameters include latency data as spoken of on page 6, paragraph [0110]. As noted by Applicant, Zhao further states that performance parameters which are measured at client sites 411-414 can be transmitted up through the hierarchy to the respective servers 402-404. Zhao further teaches that all of the performance parameter information can then be sent from the servers to site monitor 401, which can be used to organize the data according to selected categories as spoken of on page 4, paragraph [0064]. As further noted by Applicant, Zhao teaches where the site monitor may be operable to collect and/or process the following parameters: ... server latency data (average, minimum and maximum). From the above, Zhao teaches where the site monitor collects server latency data from the received requests from one or more clients 411-414, where the server latency data includes average, minimum and maximum server latency values, which indicates how latency changes in time among the monitored servers. Giving a broadest reasonable interpretation of the above claim language, the above received service requests from clients are considered on-demand change requests that are associated with latency. Furthermore, Applicant's specification only provides examples of what an "on-demand change request" may include (see paragraph [0055] of Applicant's specification) rather than a clear definition of this term. For the above reasons, it is maintained that Zhao in view of Burnette teaches the above limitation in question.

OK TO ENTER: /M.J.M/

07/16/2018

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No.: 4662
Appl. No. : 14/414,436
Filed : January 12, 2015
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Examiner : Michael J. Moore Jr
Art Unit : 2467
Docket No. : 20145-073US

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: 2018-06-25 By: /Nita Miller/
Nita Miller

RESPONSE TO FINAL OFFICE ACTION

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

Examiner Moore:

This paper is responsive to the Final Office Action mailed April 24, 2018, and having a shortened statutory period ending July 24, 2018. Accordingly, this paper is timely filed. Reconsideration is respectfully requested in view of the Amendments and Remarks below.

Amendments to the Claims appear in the complete Listing of Claims which may be found beginning at page **2** of this paper.

Remarks/Arguments may be found at page **13** of this paper.

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.

NOTICE OF APPEAL FROM THE EXAMINER TO THE PATENT TRIAL AND APPEAL BOARD		Docket Number (Optional) 20145-073US
I hereby certify that this correspondence is being facsimile transmitted to the USPTO EFS-Web transmitted to the USPTO, or 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" [37 CFR 1.8(a)] on <u>2018-07-24</u> Signature <u>/Nita Miller/</u> Typed or printed name <u>Nita Miller</u>	In re Application of Leonardo Dagum	
	Application Number 14/414,436	Filed 2015-01-12
	For <small>METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK</small>	
	Art Unit 2467	Examiner Michael J. Moore, Jr.
Applicant hereby appeals to the Patent Trial and Appeal Board from the last decision of the examiner.		
The fee for this Notice of Appeal is (37 CFR 41.20(b)(1)) \$ <u>800.00</u>		
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee shown above is reduced by half, and the resulting fee is: \$ _____		
<input type="checkbox"/> A check in the amount of the fee is enclosed.		
<input checked="" type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.		
<input checked="" type="checkbox"/> The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. <u>502776</u> .		
<input type="checkbox"/> A petition for an extension of time under 37 CFR 1.136(a) (PTO/SB/22) is 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.		
I am the		
<input type="checkbox"/> applicant/inventor.	<u>/Michael North/</u> Signature	
<input type="checkbox"/> 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)	<u>Michael North</u> Typed or printed name	
<input checked="" type="checkbox"/> attorney or agent of record. Registration number <u>46963</u>	<u>650-856-7564</u> Telephone number	
<input type="checkbox"/> attorney or agent acting under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34. _____	<u>2018-07-24</u> Date	
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*.		
<input checked="" type="checkbox"/> *Total of <u>1</u> forms are submitted.		

This collection of information is required by 37 CFR 41.31. 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, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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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 Patent Application Fee Transmittal				
Application Number:	14414436			
Filing Date:	12-Jan-2015			
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
First Named Inventor/Applicant Name:	Leonardo Dagum			
Filer:	Michael V. North/Nita Miller			
Attorney Docket Number:	20145-073US			
Filed as Large Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
NOTICE OF APPEAL	1401	1	800	800
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				800

Electronic Acknowledgement Receipt

EFS ID:	33269237
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	24-JUL-2018
Filing Date:	12-JAN-2015
Time Stamp:	15:57:18
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$800
RAM confirmation Number	072518INTEFSW15581900
Deposit Account	502776
Authorized User	Nita Miller

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)
 37 CFR 1.21 (Miscellaneous fees and charges)
 37 CFR 1.492 (National application filing, search, and examination fees)

37 CFR 1.492(a) (Basic national fee only)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Notice of Appeal Filed	073US_Notice_of_Appeal.pdf	210953 5986569441a111e680055b0f97ae642294f030d50	no	2

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30812 66263a10340eef451ba2f6f4926070ec16ac1a63	no	2
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Warnings:

Information:

Total Files Size (in bytes): 241765

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.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore Jr.
	Attorney Docket Number	20145-073US

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	20020174421	A1	2002-11-21	Zhao 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 ²ⁱ	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	2012091725	WO		2012-07-05	Adaptive Spectrum and Signal Alignment, Inc.		
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		14414436
	Filing Date		2015-01-12
	First Named Inventor	Leonardo Dagum	
	Art Unit		2467
	Examiner Name	Michael J. Moore Jr.	
	Attorney Docket Number		20145-073US

1	Notice of Final Rejection, and English translation thereof, dated 2018-06-21, in Korean Patent Application No. 1020187002557 (Docket No. 20145-073KRD) (5pgs).	✕
2	Notice of Allowance, dated 2018-06-20, in Canadian Patent Application No. 2,879,047 (Docket No. 20145-073CA) (1pg).	<input type="checkbox"/>
3	Notice of Final Rejection, and English translation thereof, dated 2018-05-11, in Korean Patent Application No. 1020187002557 (Docket No. 20145-073KRD) (5pgs).	☒
4	Response filed 2018-06-12, in Korean Patent Application No. 1020187002557 (Docket No. 20145-073KRD) (17pgs).	<input type="checkbox"/>

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	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore Jr.
	Attorney Docket Number	20145-073US

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	/Michael North/	Date (YYYY-MM-DD)	2018-08-02
Name/Print	Michael North	Registration Number	46963

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

Electronic Patent Application Fee Transmittal				
Application Number:	14414436			
Filing Date:	12-Jan-2015			
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
First Named Inventor/Applicant Name:	Leonardo Dagum			
Filer:	Michael V. North/Nita Miller			
Attorney Docket Number:	20145-073US			
Filed as Large Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
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	240	240
Total in USD (\$)				240

Electronic Acknowledgement Receipt	
EFS ID:	33356698
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	02-AUG-2018
Filing Date:	12-JAN-2015
Time Stamp:	14:16:05
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$240
RAM confirmation Number	080318INTEFSW14170800
Deposit Account	502776
Authorized User	Nita Miller

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)
 37 CFR 1.21 (Miscellaneous fees and charges)
 37 CFR 1.492 (National application filing, search, and examination fees)

37 CFR 1.492(a) (Basic national fee only)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	073US_SIDS_Trans.pdf	29888	no	3
			754cb3a7516cd7ab999c5cebfa9aa794a6817758		
Warnings:					
Information:					
2	Foreign Reference	073US_SIDS_FR1.pdf	4365673	no	48
			911062fe419622c129062f079748e2a22eab3598		
Warnings:					
Information:					
3	Non Patent Literature	073US_SIDS_NPL1.pdf	2064585	no	5
			434508908d484d1d871d615a695c1bc40b1059a1		
Warnings:					
Information:					
4	Non Patent Literature	073US_SIDS_NPL2.pdf	3937632	no	1
			885ace3778a7d1610eb60860ef3ca172fac4fec9		
Warnings:					
Information:					
5	Non Patent Literature	073US_SIDS_NPL3.pdf	2162140	no	5
			0b196bb3c16de52e8b9756a43976166d2192e537		
Warnings:					
Information:					
6	Non Patent Literature	073US_SIDS_NPL4.pdf	1623822	no	17
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Warnings:					
Information:					

7	Information Disclosure Statement (IDS) Form (SB08)	073US_SIDS_SB08.pdf	612324	no	4
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Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	30719	no	2
			bed1671050f97a90a893485d9050374685066ed1		
Warnings:					
Information:					
Total Files Size (in bytes):				14826783	
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>					

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No. : 4662
Appl. No. : 14/414,436
Filing Date : 2012-09-25
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Art Unit : 2467
Examiner : Michael J. Moore Jr.
Docket No. : 20145-073US

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: 2018-08-02 By: /Nita Miller/
Nita Miller

INFORMATION DISCLOSURE STATEMENT

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

SIR or MADAM:

Filed herewith, in accordance with the provisions of 37 CFR §§ 1.56 and 1.97–1.98, listing various references for consideration by the Examiner, is an Information Disclosure Statement (“IDS”).

The filing of this IDS shall not be construed as a representation that a search has been made, or regarding the completeness of the list of references, or that no other material information exists. Furthermore, the filing of this IDS shall not be construed as a representation that inclusion of a reference in this list is an admission that it is prior art or is pertinent to this application, or as an admission that the information listed is, or may be considered to be, material to the patentability of the above referenced application. The filing of this IDS shall not be construed in any manner as an admission against interest.

This IDS is being filed:

PATENT

- within three months of the filing date of a national application, other than a continued prosecution application under § 1.53(d);
- within three months of the date of entry of the national stage as set forth in § 1.491 in an international application;
- before the mailing of a first Office Action on the merits;
- before the mailing of a first Office Action after the filing of a request for continued examination under § 1.114;
- after three months of the filing date or entry into the national stage or after the mailing of a first Office action on the merits, but before the mailing date of any final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

OR

- Applicant certifies pursuant to 37 CFR § 1.97(e):

- That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement;

OR

- That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- on or before the payment of the issue fee but after the mailing of a final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

AND

- Applicant certifies pursuant to 37 CFR § 1.97(e):

- That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application

PATENT

not more than three months prior to the filing of this information disclosure statement;

OR

That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

Applicant submits that the enclosed Information Disclosure Statement is timely; therefore, no fee is required.

Except as provided for under 37 CFR § 1.98(a)(2), Applicant has enclosed a copy of each listed reference.

The above referenced application relies upon Application No. _____, filed _____ for an earlier effective filing date under 35 U.S.C. 120. Although, pursuant to 37 CFR § 1.98(d), the references submitted herein are not required to be submitted for the Examiner to consider them, Applicant submits the references herein so that the information will be printed on the patent issuing from this application.

Pursuant to 37 CFR § 1.704(d), Applicant certifies that each of the references cited herein were first cited in a communication from a foreign patent office in a counterpart application and that this communication was not received by any individual designated in 37 CFR § 1.56(c) more than thirty days prior to the filing of this Information Disclosure Statement.

Consideration of the listed references and favorable action are requested. If any additional fees are due in connection with the filing of this Information Disclosure Statement, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-6925.

Respectfully submitted,

Date: 2018-08-02

By: /Michael North/
Michael North
Reg. No. 46963

Customer No.
146571
UNITED STATES PATENT
AND TRADEMARK OFFICE

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

(19) World Intellectual Property Organization
International Bureau



(10) International Publication Number
WO 2012/091725 A1

(43) International Publication Date
5 July 2012 (05.07.2012)

(51) International Patent Classification:
H04M 11/06 (2006.01) *H04L 12/24* (2006.01)
H04L 12/28 (2006.01) *H04M 3/30* (2006.01)
(21) International Application Number:
PCT/US2010/062604

806 Coleman Avenue, Apt. 24, Menlo Park, CA 94025 (US).

(22) International Filing Date:
30 December 2010 (30.12.2010)

(74) Agents: CALDWELL, Gregory, D. et al.; Blackely, Sokoloff, Taylor & Zafman LLP, 1279 Oakmead Parkway, Sunnyvale, CA 94085-4040 (US).

(25) Filing Language: English

(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.

(26) Publication Language: English

(71) Applicant (for all designated States except US): ADAPTIVE SPECTRUM AND SIGNAL ALIGNMENT, INC. [US/US]; 333 Twin Dolphin Drive, Redwood City, CA 94065 (US).

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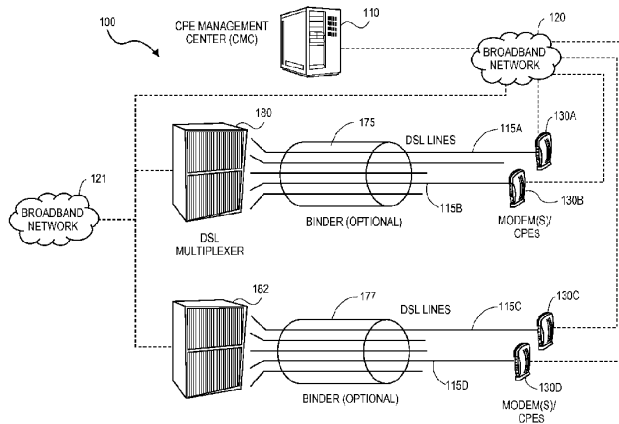


FIG. 1

- 110 CENTRE DE GESTION D'EQUIPEMENT CPE (CMC)
- 115B, 115D LIGNES DSL
- 120, 121 RESEAU A LARGE BANDE
- 130B, 130D UN OU PLUSIEURS MODEMS/EQUIPEMENTS CPE
- 175, 177 LIANT (FACULTATIF)
- 180, 182 MULTIPLEXEUR DSL

(57) Abstract: Described are systems and methods for a Digital Subscriber Line (DSL) customer premises equipment (CPE) Management Center (CMC). In one embodiment, the CMC includes a communications interface to receive information from the CPE device regarding operation of the CPE device. The received information is analyzed and a command signal generation module generates a corresponding command signal for transmission to the at least one CPE device to modify the CPE device operation based on the analysis results in a manner which either enhances CPE device performance, for example increasing data rate, or improves line stability, for example reducing CPE error rate.

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**MANAGEMENT CENTER FOR COMMUNICATION SYSTEM
CUSTOMER PREMISES EQUIPMENT**

TECHNICAL FIELD

The subject matter described herein relates generally to the field of communications systems, and in particular, a method and apparatus to manage customer premise equipment (CPE).

BACKGROUND

Many end user consumers including residential consumers and business consumers connect to the Internet by way of Digital Subscriber Line (DSL) technologies. With DSL technologies, a service provider provides an end user, or “customer” with access to a Broadband network via a twisted pair telephone line, referred to herein simply as a “line.” The use of such lines to deliver Broadband network content to an end user is beneficial because they have already been implemented throughout much of the world, and thus, Broadband network access requires minimal infrastructure build out between an end user’s location and the Broadband network interface.

Because the number of lines may be very great, lines service providers typically attempt to provision lines so that a certain minimal level of line performance and stability is achieved in a manner which will require little, if any, further consideration by the provider. Even where a provider might implement a more active line management program, a lack of insight into a each end user’s experiences and demands coupled with the expense of needing to maintain a great number of lines may still result in a “set it to forget it” mentality on the part of a line provider or wholesaler which may ultimately dissatisfy an end user either with respect to perceived quality of service (QOS), etc.

Also, in some locations, a DSL services wholesaler provides DSL communication equipment to form an infrastructure for such services and DSL services resellers sell DSL services (e.g., “Internet access”) delivered over that infrastructure to individual end users. Because the DSL services wholesaler controls the equipment forming the

DSL infrastructure and the DSL services reseller maintains a services relationship with the consumers, conflicts exist between a DSL services wholesaler most interested in protecting the integrity of the infrastructure and a DSL services reseller desiring access and control of the equipment for the sake of managing service quality to their end users.

Whether the services are provided to the end customers by the wholesaler or a reseller service provider, the services to the end customers are typically monitored and configured by the DSL service providers management systems, which are in general operated by the wholesaler, and are located in the wholesaler's network (central office (CO), NMS, etc.). Any information from the end customer's equipment is therefore typically collected via the service provider equipment at the CO side, such as DSLAMs (DSL Access Multiplexers), network traffic routers, and gateways.

Furthermore, instructions, control and monitoring messages for controlling, collecting information, and configuring the end user/customer devices on the customer end, are also provided via equipment at the CO side. Such instructions and messages are communicated over information and communication channels provided between the customer side devices, and the service provider equipment. The customer side devices are also known as Customer Premises Equipment (CPE), and devices. An example of these communications channels are TR-69, Internet protocol (IP), Embedded Operational Channel (EOC), SNMP.

There are many instances, where certain information is not provided from the customer side to the service provider side. For example, there is limited bandwidth provided for the control communication channels between the customer devices and the service provider equipment, therefore limited information is exchanged between the customer devices and the service provider equipment. Furthermore, the customer devices are exposed to impairments on the CPE side, such as noise, interference (radio interference, impulse noise) etc., which may not be readily deduced from the service provider side. As another example, where an ILEC (Incumbent Local Exchange Carrier) operating a central office (CO) might implement line management at the CO side of the Line, a CLEC (Competitive Local Exchange Carrier) may assume the role of a third party with

respect to line management via the CPE side, particularly where the CLEC leases line capacity and may lack any access to the central office (CO) side.

There could also be limitations on the CO side for provisioning or configuring the DSL system. For example, there are limitations with respect to how information and settings are managed by certain types of DSLAMs. For example, the range of parameter settings within certain types of DSLAMs may not comply with established industry specifications, or the DSLAM Management Information Base (MIB) or certain parameters within the MIB might not be accessible. In other instances, the DSLAM MIB might not allow the range of certain parameters to be changed. These limitations would prevent provisioning, improving or optimizing the performance of DSL connections.

The present state of the art may benefit from embodiments of the present invention by providing an interface to the lines through which line performance may be enhanced and/or line problems diagnosed.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments are illustrated by way of example, and not by way of limitation, and can be more fully understood with reference to the following detailed description when considered in connection with the figures in which:

Figure 1 illustrates an exemplary system in which embodiments of a customer premises equipment (CPE) Management Center may operate;

Figure 2 illustrates exemplary functional modules of a CPE Management Center which embodiments may utilize;

Figure 3A is a flow diagram illustrating operation of a CPE Management Center in accordance with exemplary embodiments;

Figure 3B is a flow diagram illustrating modification of CPE operation, in accordance with an exemplary embodiment;

Figure 4 illustrates an exemplary CPE network in which embodiments of a CPE Management Center may operate;

Figure 5 illustrate exemplary components of a CPE which embodiments may utilize; and

Figure 6 illustrates a diagrammatic representation of a machine in the form of a computer system, in accordance with one embodiment.

DETAILED DESCRIPTION

Described herein is a DSL customer premises equipment (CPE) Management Center (CMC) and methods for implementing and operating a CMC. Generally, a CMC manages lines via the CPE side of a Line in an “end user-centric” manner. The CMC is to provide a means for Line management either directly to an end user of a CPE or to third party serving a plurality of end users as part of a consumer market. For example, where an ILEC (Incumbent Local Exchange Carrier) operating a central office (CO), might implement line management at the CO side of the Line, a CLEC (Competitive Local Exchange Carrier) may assume the role of this third party with respect to line management via the CPE side, particularly where the CLEC leases line capacity and may lack any access to the central office (CO) side. In such an embodiment, the CMC provides the CLEC an interface to the lines through which line performance may be enhanced and/or line problems diagnosed even where the management interface of a Digital Subscriber Line Access Multiplier (DSLAM) for various lines is not directly accessible. In other instances, an end user might contract line management services with the third party separately from the DSL provider.

In embodiments, the CMC management functions include: 1) collecting operational data characterizing CPE device operation on a particular line, and 2) providing analysis/diagnostics of the line based on at least the collected operational data, and/or 3) automatically modifying CPE device operation, again based at least on the collected operational data, to enhance line performance. Examples of diagnostics include identifying line problems, such as wiring defects. Examples of enhancing line performance include increasing the data rate of the line or stabilizing the line (e.g., reducing error rates).

As used herein, the terms “end user,” “subscriber,” and/or “customer” are used interchangeably and all refer to a person, business and/or organization to which communication services and/or equipment are provided by any of a variety of service provider(s). Further, the term “customer premises” refers to the location to which communication services are being provided by a service provider. As an example when the Public Switched Telephone Network (PSTN) used to provide DSL services, customer premises are located at, near and/or are associated with the network termination (NT) side of the telephone lines. Exemplary customer premises include a residence or an office building.

The term “service provider” refers to any of a variety of entities that provide, sell, provision, troubleshoot and/or maintain communication services and/or communication equipment. Exemplary service providers include a telephone operating company, a cable operating company, a wireless operating company, an internet service provider delivering services over its own communications infrastructure or the communications infrastructure of a another party, or any third party that diagnoses or improve broadband communication (DSL, DSL services, cable, etc.) performance.

In the following description, numerous specific details are set forth such as examples of specific systems, languages, components, etc., in order to provide a thorough understanding of the various embodiments. It will be apparent, however, to one skilled in the art that these specific details need not be employed to practice the disclosed embodiments. In other instances, well known materials or methods have not been described in detail in order to avoid unnecessarily obscuring the disclosed embodiments.

In addition to various hardware components depicted in the figures and described herein, embodiments further include various operations which are described below. The operations described in accordance with such embodiments may be performed by hardware components or may be embodied in machine-executable instructions, which may be used to cause a general-purpose or special-purpose processor programmed with the instructions to perform the operations. Alternatively, the operations may be performed by a combination of hardware and software, including software instructions

that perform the operations described herein via memory and one or more processors of a computing platform.

Embodiments also relate to a system or apparatus for performing the operations herein. The disclosed system or apparatus may be specially constructed for the required purposes, or it may comprise a general purpose computer selectively activated or reconfigured by a computer program stored in the computer. Such a computer program may be stored in a non-transitory computer readable storage medium, such as, but not limited to, any type of disk including floppy disks, optical disks, CD-ROMs, and magnetic-optical disks, read-only memories (ROMs), random access memories (RAMs), EPROMs, EEPROMs, magnetic or optical cards, or any type of media suitable for storing non-transitory electronic instructions, each coupled to a computer system bus. In one embodiment, a non-transitory computer readable storage medium having instructions stored thereon, causes one or more processors within a system to perform the methods and operations which are described herein. In another embodiment, the instructions to perform such methods and operations are stored upon a non-transitory computer readable medium for later execution.

Figure 1 illustrates architecture of an exemplary CMC system 100 in which embodiments may operate in compliance with the G.997.1 DSL management standard (also known as G.ploam), and one or more of the following DSL transmission standards: Asymmetric Digital Subscriber Line (ADSL) systems (one form of Digital Subscriber Line (DSL) systems), which may or may not include splitters, operate in compliance with the various applicable standards such as ADSL1 (G.992.1), ADSL-Lite (G.992.2), ADSL2 (G.992.3), ADSL2-Lite G.992.4, ADSL2+ (G.992.5) and the G.993.x emerging Very-high-speed Digital Subscriber Line or Very high-bitrate Digital Subscriber Line (VDSL) standards, as well as the G.991.1 and G.991.2 Single-Pair High-speed Digital Subscriber Line (SHDSL) standards.

The CMC system 100 includes multiple CPE devices 130A, 130B, 130C, and 130D, each of which corresponds to an end user location such as a customer's residence or business. In one embodiment, each of the CPE devices 130A-D are DSL modems located within a customer's home or business to which the customer's home or

business networked terminal devices are coupled. The CPE device could also be a broadband gateway, or a broadband modem, providing broadband connectivity to the customer premises.

As illustrated in Figure 1, the CMC system 100 further includes an access aggregation device 180, 182 coupled to the CPE devices 130A-D via one or more twisted pair lines 115A-D (e.g., POTS telephone lines and the like). Multiple twisted pair lines 115 associated with different customer's remote DSL terminals may travel through or be co-located within binders 175, 177. Figure 1 depicts the twisted pair lines 115A, 115B connecting CPE devices 130A and 130B as traversing the common binder 175 and twisted pair lines 115C, 115D connecting CPE devices 130C and 130D. One or more lines 115C, 115D could be connected to the same CPE. As an example, embodiments of the current invention include DSL bonding, and/or DSL vectoring, wherein multiple lines are connect to the same CPE device.

Each access aggregation device 180 and 182 has multiple physical ports to which the twisted pair lines 115A-D are connected. As depicted, CPE devices 130A, 130B connect with physical ports of access aggregation device 180 while CPE devices 130C, 130D connect with physical ports of access aggregation device 182. In one embodiment, each of the plurality of access aggregation devices 180, 182 are DSLAMs co-located at a physical CO location which may include other equipment operated by an ILEC, for example. Alternatively, the access aggregation device 180, 182 may be located remotely from each other and remotely from a CO location. Each access aggregation device 180, 182 is connected via a broadband link to a Broadband network, which is then in turn accessible to the various CPE devices 130A-D. The DSLAMs may connect to the broadband network 120 and/or a provider's private broadband network 121 in the operator's infrastructure, while the CMC connects to the CPE over the Internet via the broadband network 120.

The CMC system 100 further includes the CMC 110. In the exemplary embodiment depicted in Figure 1, the CMC 110 is communicatively coupled to the CPE devices 130A-D over a wide area network (WAN). For WAN embodiments, the CMC 110 is coupled to the CPE device through the broadband network 120. In an alternate

embodiment, the CMC 110 is connected to the CPE devices 130A-D directly or over a local area network (LAN) at the customer premises. As previously noted, CMC 110 may be operated by an independent entity for monitoring and controlling one or more CPE devices 130A-D as a controller, assisting end users of the CPE devices 130A-D. The CMC 110 may also be referred to as a Controller, Network Management Server (NMS), Element Management Service (EMS), or the like with the understanding that the control is exerted over the CPE device. For certain embodiments, for example, control by the CMC 110 is independent of management on the CO-side of the line.

Figure 2 depicts functional modules of the CMC 110, according to an embodiment of the invention. The CMC 110 includes a data collecting means such as the Data Collection module 210, an analyzing means, such as the Analysis module 220, and an instruction generating means, such the Instruction and Command Generation module 230. These functional modules of the CMC 130 may or may not all be in the same location and/or provided by the same equipment, and may instead be distributed in different locations and separately accessed. Each module of the CMC 110 may be implemented by one or more servers each having one or more programmable processors executing code and accessing the Data Storage Means 240 comprising memory as well as other non-transitory storage media (e.g., hard drives and the like). Figure 3A depicts a flow diagram of a CMC method 300 which is performed by the CMC 110, in accordance with an exemplary embodiment. Some of the blocks and/or operations listed in Figure 3A are optional in accordance with certain embodiments. The numbering of the blocks presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur.

CPE-based Line Information Collection

CMC method 300 begins at operation 310 with the data collection module 210 collecting information from the CPE device 130 (e.g., CPE DEVICE 130A). The data collection module 210 is to collect such data on a periodic basis, on-demand, in real-time or on any non-periodic basis. Whether the CMC 110 is communicatively coupled to the CPE device 130 through the broadband network 120 (e.g., for example the Internet) or is operating and connected locally on a CPE terminal or connected over the provider's network 121, the data collection module 210 is operable to receive

information regarding operation of the CPE device 130 from the CPE device 130 via one or more of: analog POTS, cellular data communications, wireless data communications, Broadband Forum TR-069, internet data communications (e.g., TCP/IP protocol or other means outside the normal internal data communication systems within a given DSL system), electronic mail communications such as SNMP, and a DSL communication channel such as the Operation, Administration, and Maintenance (OAM) and Embedded Operational Channel (EOC) specified by the G.997.1 or G.992.x standards for physical layer management for ADSL transmission systems.

As further illustrated in Figure 3A, the data collection module 210 is operable to also collect information from optional sources demarked by dashed lines. In some embodiments, the additional points of information collection are at least exclusive of the CO-end of a line and may further be particular to collection points present on the CPE-side of the line only. However, in some embodiments, the CMC 110 does collect information from the access aggregation device coupled to the CPE device 130 (e.g., a DSLAM 180 for CPE device 130A). In such an embodiment, sufficient access to the CO is made available to the CMC 110 so that operational data for a line may be collected by the data collection module 210 in addition to the operational data collected from the CPE DEVICE 130 and other CPE-side collection points. In some such embodiments, the access to the CO is limited in that CMC 110 is afforded no control over the DSLAM operation.

In an embodiment, the CMC 110 is coupled to a diagnostic and remedy guidance device 359 (“diagnostic device”) present on the CPE end of the line. Referring to Figure 4, which expands on the CMC system 100 by further illustrating CPE terminals coupled to the CPE device 130 (e.g. in a home network), the diagnostic and remedy guidance device 359 may be implemented as a set top box or integrated into another device (e.g., the CPE device 130 itself). In certain embodiments, the diagnostic and remedy guidance device 359 is operable to analyze a line performance (e.g., during showtime operation) for a predetermined operational performance signature indicative of a line condition and to provide guidance on mitigating such a condition. In other embodiments, the diagnostic and remedy guidance device 359 is operable to perform

single ended line tests (SELT), for example while an end user is not utilizing the line for access to the broadband network 120. The SELT performed by the diagnostic and remedy guidance device 359 may be any conventionally performed line test (e.g., line reflectance measurements, etc.), but rather than requiring a truck roll and technician intervention, the diagnostic and remedy guidance device 359 is operable to perform the measurements autonomously. As shown in Figure 3A, the data collection module 210 may access the diagnostic information determined by the diagnostic and remedy guidance device 359.

In an embodiment, the CMC 110 sources end user preferences from which the data collection module 210 acquires information provided by the end user of the CPE device 130. The user preferences may relate to, for example, desired data rates, quality of services for video, audio and data transmission, and time of day usage, and are typically tailored to the type of broadband network content being accessed via the CPE device 130 and/or the type of customer network coupled to the CPE DEVICE 130. The end user preference information may come from a database of user preferences 362 which aggregates user preference information entered by an end-user for each CPE device 130 being managed by the CMC 110, for example at the time a CMC account is established by an end user.

In an embodiment, the CMC 110 sources end user feedback 364 from which the data collection module 210 acquires information regarding an end user's contemporaneous experiences with the CPE device 130. For example, the data collection module 210 may access information provided by an end user of the CPE device 130 indicating that received content is pixilated, inadequately buffered, or the like. Depending on the embodiment, the end user feedback may be provided to the CMC 110 via an application device interface, such as the CMC user interface 472 further illustrated in Figure 4.

Further referring to Figure 4, in an embodiment, the CMC user interface 472 is coupled with the CMC 110 (i.e., hosted by the CMC 110 through the broadband network 120). In another embodiment, the CMC user interface 472 is hosted by the CPE device 130. For example, the CPE device 130 may include a web server which an end user may

access to provide feedback real-time. For such an embodiment, the CMC 110 may be executing on the CPE device 130 itself or on CPE terminal device as a LAN embodiment of the CMC system 100. Alternatively, the CMC user interface 272 is supported by a noise cancellation or signal conditioning device, for example implemented as a set top box 449, separate from the CPE device 130. The noise cancellation device or signal conditioning device 449 may comprise a filter bank utilizing filter coefficients generated via any filtering techniques known in the art, such as, but not limited to, DSL vectoring, DFE, GDFE, and the like. In other embodiments, the diagnostic and remedy guidance device 359 previously described or an ACS device 374 supports an application providing the end user interface 472. Similarly, a controller or input device of the multimedia/computing device 471 may also provide the end user interface 472 through which an end user indicates an instantaneous problem.

In an embodiment, the CMC 110 is coupled to an operational database 366 from which the data collection module 210 acquires stored operational data that is generated as a result of a CPE device's performance in the DSL communication system. Such stored operational data may have been collected over a period of time at some sample rate that minimizes performance reductions (c.g., 15 second intervals minutes apart over different times of day, etc.). The stored operational data accessed by the CMC 110 may be for the target line being managed and/or at least one other non-target line to improve inferences regarding the target line. In one such embodiment, the CMC 110 accesses the operational database 366 to collect operational data for a non-target line contained within a binder common to the target line being managed. For example, where the CMC 110 is to manage the line 115A, operational data stored for lines 115A and 115B, etc. may be accessed from the operational database 366.

In an embodiment, the CMC 110 is coupled to a Broadband network information database 368 from which the data collection module 210 accesses information regarding the type and performance of the Broadband network 120. For example, a CMC operator may provide physical inventory of the Broadband network 120 including characterization of a Broadband link in the Broadband network (e.g., the DSL line 115), a history of the broadband communication link's characterization, a location of the link within the Broadband network, and use of the communication link.

As further depicted in Figure 3A, the CMC 110 may be coupled to a Broadband network content delivery system 371, such as a set top box (e.g., multimedia/computing device 471 depicted in Figure 4) from which the data collection module 210 may determine information about the performance demands placed on the line via the CPE DEVICE 130. In such embodiments, any of motion picture subscription service parameters, streaming video service parameters, internet television service parameters, music subscription service parameters, network gaming or entertainment service parameters, or Voice over Internet Protocol (VoIP) telephony service parameters, may be collected.

In further embodiments, the CMC 110 sources a customer premises network higher-layer protocol information database 373 from which the data collection module 210 receives information such as, but not limited to, packet loss and TCP/IP network information. The network higher-layer protocol information database 373 may contain such information for each of the lines to be managed by the CMC 110. The CMC 110 may additionally source the ACS device 374 to access information relating to the customer premises network and/or usage of the line via the CPE device 130.

CPE-based Line Analysis

Returning to Figure 2, the CMC 110 includes an analyzing means, such as the analysis module 220 which is communicatively connected to the data collection module 210. As illustrated in Figure 3A, at operation 320, the analysis module 220 is to analyze the information received by the data collection module 210. Analysis of that information may be performed real time as information is received by the collection module 220, or may be performed periodically, or on demand, by accessing data collected by the data collection module 210 and stored in the data storage means 240. Analysis module 220 is to determine whether the instruction and command signal generation module 230 is to send instructions to one or more of the CPE devices 130 to enhance line performance and/or stability. The analysis module 220 is further to determine if the report generation module 250 is to issue a line diagnostics report conveying the analysis results to an end user and/or operator of the CMC 110.

In one embodiment, the analysis module 220 is to perform analysis at operation 320 based on collected information including one or more of: downstream attenuation, magnitude of channel response (Hlog) information, downstream bit, gain, and signal to noise ratio (SNR) table, quiet line noise table, impulse noise history, history of downstream code violations (CV) or upstream CV, history of downstream errored seconds (ES) or upstream ES, history of downstream forward error correction (FEC) or upstream FEC, history of retrains; history of bit swap or other real time adaptive features; history of fast retrains and/or SOS's, or line impedance. SOS relates to sudden and severe noise conditions, where a rapid rate adaptation (RRA) solution, known as SOS in the ITU-T standard, is a promising mitigation strategy to sustain the link and prevent the DSL modem to retrain. Since the CMC 110 is collecting data from potentially a plurality of sources, but at a minimum is collecting information from the CPE DEVICE 130, the line performance enhancement is CPE-centric.

Generally, line analysis may include line diagnostic functions performed at operation 320 including, without limitation: bad splice detection, bridged tap detection, impulse noise detection, split pair detection, identification or classification of noise and/or interference sources, Amateur Radio (HAM) detection, AM radio detection, HDSL detection, T1/E1 detection, high-power noise detection, unbalanced wiring detection, maximum data rate analysis, and forward error correction (FEC) analysis. Results of these diagnostics functions are optionally stored in the CMC storage means 240 for future or immediate reference.

Analysis of Line Quality & Stability

The analysis module 220 may employ a number of techniques with the information collected from the CPE-side of the line. For example, in one embodiment operation 320 entails analyzing line instability and/or quality based on the channel performance monitoring parameters and/or line performance monitoring parameters obtained from at least the CPE DEVICE 130. In a particular embodiment, line instability and/or quality is analyzed in method 300 based on parameter values obtained from the CPE-side of the line. For example, distributions of parameter values collected over time are evaluated. Both line instability and quality can be determined from evaluation of such distributions. For example, if the distribution for CV does not satisfy threshold

conditions, then the line is declared unstable. As another example, if the distribution of FEC does not satisfy threshold conditions, then the line is declared of poor quality. Thresholding expressions may also be constructed using combinations of rules with multiple parameters from the CPE-side. These expressions could depend on the vendor and/or system ID of the CPE device 130.

Information characterizing a line problem or failure may be recorded to the data storage means 240 (Figure 2). For example, the time/day of line problems can be recorded to provide statistical information about the times and days when such events are most likely to happen. This can be achieved for example by recording the intervals when CV or some other channel/line performance monitoring parameter exceeds a certain threshold. A failure may also be recorded, for example, if the parameter falls below the threshold.

Any conditions derived from parameters such as the above may also incorporate performance parameters such as data rate, maximum attainable bit rate (MABR) and margin. For example if MABR is used as the performance parameter for a specific line, collected MABR data for that line is compared to a neighborhood average for the given loop length. If the MABR data rates are lower than the average of those for neighboring lines by a predetermined margin, then the line is considered likely of being unstable. The average neighborhood MABR is obtained by: collecting MABR data in the neighborhood network of a line, taking the average or other statistical function of the MABR for lines which have similar loop lengths. This data can also be updated over time. The network neighborhood average shows the expected MABR for all the lines in a specific neighborhood, and if a line MABR drops below that average, it could be an indication of a line problem. Examples of the other statistical functions, besides the mean, could include "median" or "X percentage worst case value" being the MABR for which X percentage of the lines have lower MABR.

Analysis of Noise Type

In a further embodiment, the analysis module 220 is to identify a type of noise in the line based on the information received from the CPE device 130. For example, where stability or quality is determined to be poor, then a further decision is made as to the

type of noise/disturbance that is causing the poor line stability. The type of noise/disturbance may be compared to the noise at the CPE device 130 before a line failure and after a line failure including a so-called "SOS event" or an SRA event, where the modem in the DSL receiver remains operational, but reduces its data rate. SOS relates to sudden and severe noise conditions, where a rapid rate adaptation (RRA) solution, known as SOS in the ITU-T standard, is a promising mitigation strategy to sustain the link and prevent the DSL modem to retrain. SRA (Seamless Rate Adaptation) relates to slow to moderately varying noise cases, where rates are adaptively reduced. A significant difference between the measured noises indicates that the line failure occurred because of a substantial increase of the noise level. Comparable noise levels before and after the line failure indicate that causes other than an increase in the noise lead to the line failure. Notably, a major advantage of the CPE-centric management systems and methods described herein relates to noise analysis/mitigation because the CO-side (e.g., DSLAM) does not necessarily experience the same noise as the end user. For example, duration, timing, periodicity of noise, and characterization of noise is often particular to the end of the line from which it is measured.

A CPE-side noise measurement before the line failure is preferably made at least a few seconds before the line failure occurs. The noise measurement after the line failure should be made after the line has reinitialized (or after the SOS or SRA procedure to reduce data rate has concluded) and is in stable condition (e.g. signal to noise ratio (SNR) margin is stable, CV count is Low, etc.). Other embodiments may utilize any other of the many techniques known for evaluating the noise via the CPE-side of the line. In one embodiment, for example, the CPE device 130 reports the mean-square-error (MSE) of its decoder. Such error may correspond to a slicer's output, a trellis decoder's output, or a RS decoder output.

If it is found that the noise before and after the line failure is not significantly different, then it is determined that the line failure may be the result of a power loss, or the result of a severe impulse noise event (for example, a voltage surge on the line). In order to differentiate between power loss and impulse noise event, some additional checks can be performed. For example, a check if line failure is correlated with a loss-of-power

(LPR) failure reported by CPE device, a check if the CPE device is powered by a computer such as via a USB connection to the multimedia/computing device 471, a check if neighboring lines experience failures at the same or similar times indicating a severe impulse noise event, a check if CPE device 130 is in saturation, there's an increase of received signal power, activation of circuit protection logic, overflow bits or similar activated indications. If such exist, then it is likely a severe impulse noise event has occurred. Otherwise, stationary noise is declared. For either power loss or impulse noise events, the information characterizing the line failure can be recorded, for example, the time/day of the failure can be recorded to provide statistical information about the times, days when such events are most likely to happen.

In an embodiment, an impulse noise event duration is estimated by using channel or line performance monitoring parameters and recording the length of time over which these parameters exceed a certain threshold. The impulse noise width and period may also be estimated, if the intervals for measuring performance monitoring parameters are made short enough to be in the order of microseconds. Even if such short intervals are not possible, the repetitive impulse noise can still be approximately characterized based on the collected parameter values. For example, repetitive impulse noise may be characterized as level 1, if CV exceeds a first threshold for a first percentage of intervals, or may be characterized as level 2, if CV exceeds a second threshold for a second percentage of intervals.

The collected data in the various embodiments of the current invention, and used in the analysis embodiments include one or more of the following data, sources of information, and collected operational parameters: data rate data; Signal-to-Noise Ratio ("SNR") margin data; maximum attainable data rate data; aggregate transmitted power data; code violation count data; forward error corrections data; errored seconds data; errored minutes data; retrain counts data; channel attenuation data; noise power spectral density data; crosstalk coupling data; far-end crosstalk coupling data; near-end crosstalk coupling data; echo transfer function data; and data pertaining to crosstalk between the DSL modem pair and a second DSL modem pair operating on a neighboring DSL line.

The collected data in the various embodiments of the current invention, and used in the analysis embodiments, may further include one or more of the following: any stored list of events including DSL physical layer anomalies, defects and faults together with the event time stamps that has led to SOS activation; SOS activation times, durations and average data rate loss; any stored list of events including DSL physical layer anomalies, defects and faults together with the event time stamps that has led to a fast retrain, a failed retrain or a full retrain; INM (Impulse noise monitoring) histograms and impulse noise statistics; echo transfer function or un-cancelled echo PSD; retransmission statistics including the number of retransmitted blocks, number of successfully retransmitted blocks; total number of blocks; average, minimum and maximum throughput.

Diagnosis of Line Conditions

In embodiments, line conditions, such as problems like wiring defects, causing line instability or poor quality are diagnosed at operation 320 by analysis of information collected by the CMC 110 over time. Since the CMC 110 is collecting data from potentially a plurality of sources, but at a minimum is collecting information from the CPE DEVICE 130, the line wiring diagnostics are CPE-centric.

Generally, at operation 320, the analysis module 220 may employ one or more techniques to detect line problems with the information collected from the CPE-side of the line. Because the embodiments described herein use the information collected from the line, for example, during showtime, line wiring conditions/defects may be identified without disruption to the end user's DSL service.

In one embodiment, at operation 320 line performance metrics are generated, based on the received information, and then evaluated against a predetermined condition indicative of a line problem, such as a wiring defect. There are many known types of wiring defects in DSL systems. For example in some countries the in-house DSL wiring often includes a redundant third wire that was used for ringing a telephone bell several decades ago. The third-wire is not used any more, but the existence of such third wire in DSL systems creates an unbalanced impedance. Often, a parameter such as the bit distribution of a DSL line with a line problem, such as a wiring defect, may

have abrupt changes and therefore it is possible to differentiate a line with a wiring defect from a typical line by quantifying the variations across frequency bins (tones), and comparing against predetermined thresholds. Generally, when a metric passes the threshold, whether exceeding or falling below the threshold, the line parameter may be considered to have rapid variations.

A reference database accessible to the analysis module 220 (e.g., provided by storage means 240) may include a plurality of a line problems (e.g., wiring defects), each line problem associated with one or more reference metrics. At operation 320, reference information is compared the one or more performance metrics derived from the CPE information to identify the line problem, such as a wiring defect. These performance metrics may be the average sum of changes in the parameter values across all or preselected number of tones. The performance metrics may also be the number of tones over which the parameter has changed. Alternatively, the performance metric could also be the sum of absolute values of changes, or their power, across all or preselected number of tones.

In another embodiment, the performance metric is average noise change in the DSL signal. Quiet-Line-Noise (QLN) or Mean Square Error (MSE) per tone may also be utilized, or the noise may be estimated indirectly from SNR, HLOG and PSD. For example, $MSE(n) = PSD(n) + Hlog(n) - SNR(n)$, where n is the frequency tone index. QLN is the measured noise when the modem is neither active nor training. However, the noise may change significantly with time. This noise at later times during operation is referred to herein as MSE noise (Mean-Square-Error noise) or MSE function.

The above metrics can be applied to other DSL line parameters (such as bit distribution, Hlog (Hlin), SNR and measured noise). Hlog (Hlin) and SNR per tone samples are already reported parameters similar to the bit distribution, which then could be used in the analysis. The calculated detection metrics are compared against a pre-chosen threshold.

If any of the metrics are above (or in some embodiments below) their corresponding threshold, the line is considered to have a wiring defect. In another embodiment, a

combination, for example a Boolean or logical combination of the values of the above metrics are compared against a single threshold.

Instruction and Command Signal Generation

As further illustrated in Figure 3A, following the analysis operation 320, a command or instruction signal is sent from the CMC 110 to the CPE device 130 at operation 340, to modify the CPE device operation, and/or a report of the analysis is issued at operation 350. As denoted by the return arrow between operation 340 and operation 310, command signal generation may dynamically modify the CPE device operation in response to changes in the received information.

In an embodiment, the command or instruction signals are communicated over information and communication channels provided between the CPE devices, and the CMC 110. An example of these communications channels are TR-69, Internet protocol (IP), Embedded Operational Channel (EOC), and SNMP.

The signal generation operation 340 is performed by the instruction and command signal generation module 230 (Figure 2). The instruction and command signal generation module 230 is configured to accept a parameter value generated by the analysis module 220 and, at operation 340, generate a signal for use by the CPE device 130 to modify its operation so as to enhance line performance, improve stability, or reduce errors in the modem. The instruction and command signal generation module 230 may or may not be part of the analysis module 220 and/or be implemented in the same hardware, such as a computer system. Instruction and command signal generation module 230 constitutes a means for regulating one or more parameter values in the CPE device 130.

In a particular embodiment, the nature of the analysis results dictates whether a report is issued (e.g., by report generation module 250), the CPE device operation modified via instructions issued to the CPE (e.g., by instruction and command signal generation module 230), or both. For example, diagnosis of certain line problems may result in no generation of an instruction command or signal at operation 340. If the results of the

analysis indicated that there is no need to make any changes to the CPE configuration or settings then no command or signal is generated.

Where an instruction and command signal is issued to the CPE device 130 at operation 340, the signal may include, without limitation: a minimum INP override instruction; a target INP change instruction; a Maximum delay override instruction; a target delay change instruction; a channel initialization policy override instruction; an instruction to turn off specific downstream tones; an instruction to change transmit power over specific downstream tones; an instruction to force a CPE initiated re-training at a scheduled time; an instruction to Lower the maxR (representing the maximum rate); an instruction to change maximum data rate; or an instruction to change target margin. For example, one or more of the following physical layer parameters, could be set by the instruction and command signal: a Maximum Nominal Power Spectral Density (“MAXNOMPSD”); a Maximum Nominal Aggregate Transmitted Power (“MAXNOMATP”); a Gain (“gi”); a Bit loading (“bi”); a Power-Cut-Back (“PCB”); a Maximum Received Power (“MAXRXPWR”); a Power Spectral Density Mask (“PSDMASK”); a Preferred Band (“PREFBAND”); a Target Signal-to-Noise Ratio Margin (“TARSNRM”); a Minimum Signal-to-Noise Ratio Margin (“MINSNRM”); a Maximum Signal-to-Noise Ratio Margin (“MAXSNRM”); a frequency-dependent Bit-Cap (“BCAP”); a frequency-dependent Target Signal-to-Noise Ratio Margin (“TSNRM”); a Transmit Spectrum Shaping (“TSSI”); a specification of bands affected by radio frequency interference; a Carrier Mask (“CARMASK”); a per band preference band indication; a per tone bit cap; a per tone TARSNRM; a minimum data rate; and a maximum data rate.

In an embodiment, the command signal issued to the CPE device 130 at operation 340 modifies the CPE device operation within a channel or line parameter value guard band established by the CO. For example, where a CO establishes a line profile, minimum or maximum values for a given channel or line parameter may also be established. In that case, the command signal issued to the CPE device 130 at operation 340 may modify the CO-established line profile, as constrained within the minimum and maximum values. As such, the CPE-centric management functions performed by the

CMC 110 may be balanced with a CO operator's need to maintain some control over the infrastructure.

Figure 3B is a flow diagram illustrating CO-constrained modification of CPE operation, in accordance with an exemplary embodiment. Some of the blocks and/or operations listed in Figure 3B are optional in accordance with certain embodiments. The numbering of the blocks presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur. As shown in Figure 3B, a CPE operation modification method 355 begins at operation 360 with the CMC 110 determining one or more line parameter values associated with a CO-imposed line constraint. Such parameters value constraints, may for example be included in data collected from the CO at operation 310 of Figure 3A (e.g., pertaining to operational settings of the DSLAM 180).

In many instances, the range of values (minimum and/or maximum) for a given operational command or line parameter specified by the operator at the CO side may represent values which cause a non-optimum performance of the line or even in some cases cause instability. This is because operators typically assign the same line profile to all lines within their network. Operators prefer this simple approach, especially when dealing with hundreds of thousands of lines, further because segments of their network could also have been leased to resellers. However, each line could be experiencing different conditions and impairments. For example, in an environment with strong impulse noises, a very low margin setting for a line could cause the lines to become unstable. A proper setting in such cases would be to increase the minimum margin to a larger value. In yet other instances, the DSLAM MIB might not allow the range of certain parameters to be changed. These limitations would prevent provisioning, improving or optimizing the performance of DSL connections, when such limitations exist.

In such cases, at operation 370, the analysis module 220, determines to what extent one or more limits or range of line parameter values may be changed within the CO-imposed constraints. For example, the diagnostic and analysis techniques described elsewhere herein for the line analysis operation 320 may resolve a first set of line

parameter values and at operation 370 that first set of line parameter values is limited by the CO-imposed constraints. Alternatively, a constrained optimization routine may be performed at operation 370 to incorporate predetermined CO-imposed constraints into the analysis operation 320 to arrive at one or more modified parameter values, limits, or range of values, in view of CO-imposed line constraints. If the results of the analysis indicated that there is no need to make any changes to the CPE configuration or settings then no command or signal is generated, and the method 360 returns to operations 310 or 350 to collect more data as part of ongoing line management and/or issues a report of the analysis cycle.

When the analysis results indicate that existing settings need to be overwritten, if there are no CO-imposed constraints instruction signals are generated for overriding the settings with the new values at operation 370. For example, the instruction generation means (e.g., module 230) overwrites, or otherwise changes the limits or the range of line parameter values by setting the parameter values or their limits on the CPE side, and on the CPE device. Where the instruction generation is further based on CO-constraints, the analysis may also trigger generation of instruction signal at operation 375 for reconciliation of the settings. For example a CO-imposed upper limit may be retained, while a lower limit is increased. An example would be for margin control, where an upper margin limit is kept the same, however the minimum margin is increased, to provide more protection against unexpected noise sources such as impulse noise. Such a setting could for example enable stabilizing the line, or improving the performance of the line when such a change is not possible on the CO side. In another example, one change at operation 375 includes limiting the range of parameters, within the existing range already pre-assigned on the line. In this example embodiment, the original range is set at the CO side, and the new range is being set at the CPE side, and the new range is not the same as the original range. The lower limit is higher than the existing minimum limit, and the upper limit is lower than the existing maximum limit. With limiting the range, the new range could assist with either improving the performance of the line or reducing or eliminating the instability of the line.

Standard parameter settings may also only have a lower limit or only a higher limit. For example, in standard implementations Impulse Noise Protection (INP) parameter is

assigned a minimum INP (MIN INP), value but no maximum INP value. This lower value is normally set at the DSLAM by the line operator. In practice, modems would train to overcome impulse noise, and at times when hit by large impulse noise, the INP value is set to a very large value, which could impair the performance of the DSL connection. Since the DSLAM and the standards do not support an upper limit for INP, this impairment could not be overcome. Embodiments of present invention enable overwriting and setting the upper limit at the CPE side (e.g., at operation 370), by setting an upper limit for the INP. The override setting could be stored by the management center. The new range limits could be stored in the data storage means 240, or at the CPE if such a storage capability is available. The new limit would cap the maximum levels, therefore very large INP values would be avoided.

In addition to the examples provided above, one or more of the following DSL physical layer parameters controlling the operation of the DSL line, could similarly be set by the instruction generating means: SOS triggering controls including controls on SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error. Fast retrain triggering controls including controls on duration of LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error. Full retrain triggering controls including controls on duration LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error. Retransmission controls including MIN and MAX INP for different types of impulse noises (e.g., Repetitive Electrical Impulse Noise (REIN) or Single Isolated Impulse Noise (SHINE)), MIN and MAX delay, FEC overhead ratio within a retransmission block, MAX throughput loss.

Command and control signals may be sent at operation 340 (or 370 and 375) to interfaces controlling the CPE device configuration and settings. Issued command or instruction signals are communicated over information and communication channels provided between the CPE device 130 and the CMC 110. An example of these communications channels are TR-69, Internet protocol (IP), Embedded Operational Channel (EOC), and SNMP. The CPE device 130 may be provided an interface similar to interfaces currently utilized on the CO side (e.g., those for controlling the settings and configurations via the DSLAM, such as the Q interface). The embodiments herein,

such as the physical layer control parameters and the instructions of the examples above, define settings of a CPE interface which may be implemented in either a standardized or vendor-specific manner to directly change and control the configuration and settings of the CPE device 130.

In another embodiment, the CPE devices 130 do not belong to, are not owned by, or otherwise associated with, the same wholesaler or operator networks. For example, CPE devices 130 A-B, could belong to a first wholesaler or operator, and the CPE devices 130 C-D, could belong to a second wholesaler or operator. Similarly, the CPE devices 130 might not belong to the same reseller networks. Furthermore, the binders 175 and 177 could be the same binder and the DSL lines 115-A-D could all be passing through the same binder. Therefore, the CPE devices 130 A-B, and the CPE devices 130 C-D could be sharing the same binder. Lines which share the same binder could experience crosstalk from the other lines in the binder. The crosstalk could include Near-End crosstalk (NEXT) or Far-End crosstalk (FEXT). Furthermore, the lines sharing the same path could be exposed to similar sources of external interference, such as Radio Frequency (RF) interference. When the lines are operated by the same operator or Wholesaler, DSM (Dynamic Spectrum Management) techniques, such as those discussed in the DSM standards (such as the Dynamic Spectrum Management Technical Report (2007), ATIS-PP-0600007) could be used to optimize the performance of the DSL lines in the presence of crosstalk and interference, such as the aforementioned NEXT, FEXT, and RF interference. However, if the lines are operated by different operators, the DSM techniques could not be fully applied, since they are installed at the operator side, and require information from all lines (such as crosstalk information), whereas each operator would only have access to information and data pertaining to DSL lines within their own network, and won't have access to information from lines operated by another operator.

Embodiments of the present invention collect information and operational data and parameters from the CPE side. Although the CPEs may belong to different networks operated by different operators, in embodiments of the present invention, it is possible to collect information from the CPE side, store and process it in one common location, at the CPE Management Center CMC. The CMC would provide the means for

collecting and analyzing information from the CPEs belonging to different operators, because the CMC is not tied to any of the networks of the multitude of operators. Furthermore, using the collection means in the data collection embodiments of the present invention, the CMC can collect information from the CPE devices independent of the particular network the DSL lines operate on and modify the various CPE devices to achieve performance goals.

Analysis Report Generation

At operation 350, analysis report is automatically compiled and issued by the report generation module 250 (Figure 2) to either an end user of the CPE device 130 or to an operator of the CMC 110. The report may be issued via any of the means described in reference to modes of data collection. In one embodiment, the report is issued via a application interface supported by the CMC 110 (e.g., via CMC user interface 172). The application interface may be a graphical user interface (GUI) and/or a Northbound Application Programming Interface (NAPI) via which the performance enhancement or analysis results are accessible.

Report generation may occur in response to an event, such as, but not limited to identification of a line condition change or a passage of a predetermined amount of time since issuance of a previous report. In certain circumstances an analysis report may be issued in addition to a modification of the CPE device operation. In such a case, the analysis report may include a description of the modifications to the CPE device operation.

In the case for diagnosis of a line problem, the reporting function may for example report the presence of a wiring defect, or absence of a wiring defect if a test condition was not true. "Severity" of the problem may also be reported at operation 350. Similarly, any analysis result characterizing the line quality, line stability, line noise type as described herein may be output via an interface of the CMC 110.

Depending on the diagnosis, one or more corrective actions may be provided in the analysis report. For example, instructions to contact an ILEC to request removal of a

bridged tap may be issued, or instructions to seek a contractor for removal of a third wire on the customer premises may be issued.

In embodiments where no operational instruction is issued to the CPE device 130, the CMC need only include a data collection module communicatively coupled to a CPE device, to receive information from the CPE device regarding CPE device operation, an analysis module coupled to the data collection module to analyze the received information for a predetermined operational performance signature indicative of a line problem, and a report generation module coupled to the analysis module to automatically compile or generate a report of the analysis results.

As previously described, the analysis module may obtain and evaluate channel performance monitoring parameters, line performance monitoring parameters, or distributions of the parameters over time, to analyze whether any line instability exists.

A diagnostics application interface may be further coupled to the analysis module to provide a predetermined set of corrective actions associated with the line problem.

Also as previously described, the information received from the CPE device may be operational data generated by the CPE device while in showtime and even where no command to change the CPE device operation is issued to the CPE device, the report generation module may issue the report to a DSL system operator or an end user of the CPE device in response to an event. Exemplary events include identification of a line condition change or a passage of a predetermined amount of time since issuance of a previous report.

In a particular embodiment, the analysis module is to analyze the received information by generating one or more performance metrics, based on the received information, and evaluate the one or metrics against the predetermined condition indicative of the line problem. As previously described, the one or more performance metrics may be any of: an average bit change across a plurality of tones in a DSL signal transmitted on the line, total bit change across a plurality of tones in the DSL signal transmitted on the line, a number of tones which experience at least two bits absolute change compared to

a previous tone, average noise change in the DSL signal, wherein noise change is obtained from one of Hlog, Hlin, Signal-to-Noise Ratio (SNR), Quiet-Line-Noise (QLN), Mean Square Error (MSE) per tone, or a calculation based on one of SNR, Hlog, or Power Spectral Density (PSD).

Even where no command to change the CPE device operation is issued to the CPE device, the data collection module may nevertheless base analysis activities based on information collected from a plurality of sources remote from the CPE device, including one or more of: a diagnostic device, a DSL multiplexer, an end user preference database, end user feedback, an end user-specified Broadband network information table, a Broadband network content delivery system, a home network protocol interface, or an ACS device.

CPE Device

In certain embodiments described herein, the CPE DEVICE 130 includes provisions for communication with the CMC 110 (e.g., Data collection module 210 and Instruction and command signal generation module 230). An exemplary CPE DEVICE 530 depicted in Figure 5, includes a chipset 535 supporting remotely programmable firmware 540 via a remote programming interface 536 through which the CMC 110 may access the CPE device 130 via the Transceiver Unit (TU)/modem 520. The CMC 110 may set the CPE device 530 to report the various operational data parameters described herein when generated by the CPE DEVICE 530 during showtime even if such parameters are not reported under existing standards. Similarly, the remotely programmable firmware 540 may support modification of the CPE device operation in response to receiving an instruction signal from the CMC 110. As such, any of the instruction signal commands issued at operation 340 may be implemented by the CPE device 530.

Figure 6 illustrates a diagrammatic representation of a machine 600 in the exemplary form of a computer system, in accordance with one embodiment, within which a set of instructions, for causing the machine 600 to perform any one or more of the methodologies discussed herein, may be executed. In alternative embodiments, the machine may be connected (e.g., networked) to other machines in a Local Area

Network (LAN), an intranet, an extranet, or the Internet. The machine may operate in the capacity of a server or a client machine in a client-server network environment, or as a peer machine in a peer-to-peer (or distributed) network environment or as a server or series of servers within an on-demand service environment, including an on-demand environment providing database storage services. Certain embodiments of the machine may be in the form of a personal computer (PC), a tablet PC, a set top box (STB), a Personal Digital Assistant (PDA), a cellular telephone, a web appliance, a server, a network router, switch or bridge, computing system, or any machine capable of executing a set of instructions (sequential or otherwise) that specify actions to be taken by that machine. Further, while only a single machine is illustrated, the term “machine” shall also be taken to include any collection of machines (e.g., computers) that individually or jointly execute a set (or multiple sets) of instructions to perform any one or more of the methodologies discussed herein.

The exemplary computer system 600 includes a processor 602, a main memory 604 (e.g., read-only memory (ROM), flash memory, dynamic random access memory (DRAM) such as synchronous DRAM (SDRAM) or Rambus DRAM (RDRAM), etc., static memory such as flash memory, static random access memory (SRAM), volatile but high-data rate RAM, etc.), and a secondary memory 618 (e.g., a persistent storage device including hard disk drives and persistent data base implementations), which communicate with each other via a bus 630. Main memory 604 includes information and instructions and software program components necessary for performing and executing the functions with respect to the various embodiments of the CMC 110 described herein.

Processor 602 represents one or more general-purpose processing devices such as a microprocessor, central processing unit, or the like. More particularly, the processor 602 may be a complex instruction set computing (CISC) microprocessor, reduced instruction set computing (RISC) microprocessor, very long instruction word (VLIW) microprocessor, processor implementing other instruction sets, or processors implementing a combination of instruction sets. Processor 602 may also be one or more special-purpose processing devices such as an application specific integrated circuit (ASIC), a field programmable gate array (FPGA), a digital signal processor (DSP),

network processor, or the like. Processor 602 is configured to execute the processing logic 626 for performing the operations and functionality which is discussed herein.

The computer system 600 may further include a network interface card 608. The computer system 600 also may include a user interface 610 (such as a video display unit, a liquid crystal display (LCD), or a cathode ray tube (CRT)), an alphanumeric input device 612 (e.g., a keyboard), a cursor control device 614 (e.g., a mouse), and a signal generation device 616 (e.g., an integrated speaker). The computer system 600 may further include peripheral device 636 (e.g., wireless or wired communication devices, memory devices, storage devices, audio processing devices, video processing devices, etc.).

The secondary memory 618 may include a non-transitory machine-readable storage medium (or more specifically a non-transitory machine-accessible storage medium) 631 on which is stored one or more sets of instructions (e.g., software 622) embodying any one or more of the methodologies or functions described herein. Software 622 may also reside, or alternatively reside within main memory 604, and may further reside completely or at least partially within the processor 602 during execution thereof by the computer system 600, the main memory 604 and the processor 602 also constituting machine-readable storage media. The software 622 may further be transmitted or received over a network 620 via the network interface card 608.

While the subject matter disclosed herein has been described by way of example and in terms of the specific embodiments, it is to be understood that the claimed embodiments are not limited to the explicitly enumerated embodiments disclosed. To the contrary, the disclosure is intended to cover various modifications and similar arrangements as would be apparent to those skilled in the art. Therefore, the scope of the appended claims should be accorded the broadest interpretation so as to encompass all such modifications and similar arrangements. It is to be understood that the above description is intended to be illustrative, and not restrictive. Many other embodiments will be apparent to those of skill in the art upon reading and understanding the above description. The scope of the disclosed subject matter is therefore to be determined in

reference to the appended claims, along with the full scope of equivalents to which such claims are entitled.

CLAIMS

1. A DSL customer premises equipment (CPE) Management Center (CMC) coupled to a Broadband network, the CMC comprising:

a data collection module, communicatively coupled to at least one DSL CPE device, to receive information from the CPE device regarding operation of the CPE device;

an analysis module coupled to the data collection module to analyze the received information; and

a command signal generation module coupled to the analysis module to receive analysis results and to generate a corresponding command signal for transmission to the at least one CPE device to modify the CPE device operation based on the analysis results.

2. The CMC of claim 1, wherein the data collection module is to gather information from a plurality comprising one or more of: a DSL multiplexer, a diagnostic and remedy guidance device, an end user preference database, an end user customer feedback interface, an operational database, an end user Broadband network information database, a Broadband network content delivery system, a customer premises network higher-layer protocol information database, or an ACS device.

3. The CMC of claim 1, further comprising an application device interface, through which end user feedback is provided, coupled with at least one of the CMC, the CPE device, a noise cancellation device, a signal conditioning device, a diagnostic and remedy guidance device, and a controller or input device by which the user can indicate an instantaneous problem, or an ACS device.

4. The CMC of claim 1, wherein the data collection module is further to collect information defining line parameter constraints within which the CPE device is required to operate, wherein the analysis module is to analyze the received information to determine how to modify the CPE device within the line parameter constraints, and wherein the command signal generation module is to issue a command to the CPE

device by changing line parameter values, limits, or a range of line parameter values within the line parameter constraints.

5. The CMC of claim 1, wherein the data collection module is communicatively coupled to a plurality of CPE devices, a first of the plurality associated with a first wholesaler or operator network and a second of the plurality associated with a second wholesaler or operator network, and wherein the command signal generation module is to modify operation of a CPE device of both the first and second wholesaler or operator networks.

6. The CMC of claim 1, wherein the CMC reports modifications to the CPE device operation or analysis results concerning the line to a CMC operator or to an end user of the CPE device.

7. The CMC of claim 1, wherein the command signal is further based on information provided by the CMC operator and analyzed by the analysis module, wherein the information comprises:

- a physical inventory of the Broadband network including characterization of a Broadband link in the Broadband network,
- a history of the broadband link's characterization, and
- a location and use of the broadband link.

8. The CMC of claim 1, wherein the command signal is further based on information provided by the end user and analyzed by the analysis module, wherein said information comprises at least one of:

- the end user's use and preference of Broadband network services and quality, including at least one of desired data rates, quality of services for video, audio and data transmission, and
- time of day usage preferences.

9. The CMC of claim 1, wherein the command signal is further based on information provided by a content delivery service, wherein said information comprises at least one of: motion picture subscription service parameters, streaming video service parameters,

internet television service parameters, music subscription service parameters, network gaming or entertainment service parameters, or Voice over Internet Protocol (VoIP) telephony service parameters.

10. The CMC of claim 1, wherein the plurality of sources communicate with the CMC by way of one or more of the following:

analog POTS, cellular data communications, wireless data communications, Broadband Forum TR-069, IP protocol data communications, electronic mail communications, and a DSL communication channel selected from the group consisting of: Operation, Administration, and Maintenance (OAM) and Embedded Operational Channel (EOC).

11. The CMC of claim 1, wherein the command signal generation module generates the command signal to dynamically modify the CPE device operation in response to changes in the received information.

12. The CMC of claim 1, wherein the received information comprises at least one of:

Downstream attenuation;
Hlog information;
Downstream bit, gain, and SNR table;
Quiet line noise table;
Impulse noise history;
History of CV, downstream or upstream;
History of ES, downstream or upstream;
History of FEC, downstream or upstream;
History of retrains;
History of bit swap or other real time adaptive features;
History of fast retrains and/or SOS's;
Impedance;
DSL physical layer anomalies, defects and faults together with the event time stamps that has led to SOS activation, a fast retrain, a full retrain or a failed retrain;
SOS activation times, durations and average data rate loss;
INM (Impulse noise monitoring) histograms and impulse noise statistics;

echo transfer function or un-cancelled echo PSD; or
retransmission statistics.

13. The CMC of claim 12, wherein the analysis module is further to identify a type of noise in the line based on the received information.

14. The CMC of claim 1, wherein the command signal comprises at least one of:

a minimum INP override instruction;

a target INP change instruction;

a Maximum delay override instruction;

a target delay change instruction;

a channel initialization policy override instruction;

an instruction to turn off specific downstream tones;

an instruction to change transmit power over specific downstream tones;

an instruction to force a CPE initiated re-training at a scheduled time;

an instruction to Lower the maxR;

an instruction to change maximum data rate;

an instruction to change target margin;

SOS triggering controls including controls on SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error;

fast retrain triggering controls including controls on duration of LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error;

full retrain triggering controls including controls on duration LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error; or

retransmission controls including MIN and MAX INP for different types of impulse noises (REIN or SHINE), MIN and MAX delay, FEC overhead ratio within a retransmission block, MAX throughput loss.

15. The CMC of claim 14, wherein command signal generation module is to modify the CPE device operation by changing limits or a range of line parameter values pre-assigned to the line at a CO side.

16. A method of managing digital subscriber line (DSL) customer premises equipment (CPE), the method comprising:

- collecting information from a CPE device regarding operation of the CPE device through a Broadband network coupled to the digital subscriber line;
- analyzing the received information; and
- generating a command signal for transmission to the CPE device to modify the CPE device operation based on the analysis results.

17. The method of claim 16, wherein collecting the information further comprises gathering operation information from a plurality of sources, wherein the plurality of sources comprises one or more of: a DSL multiplexer, a diagnostic and remedy guidance device, an end user preference database, an end user customer feedback interface, an operational database, an end user Broadband network information database, a Broadband network content delivery system, a customer premises network higher-layer protocol information database, or an ACS device.

18. The method of claim 16, further comprising:

- collect information defining line parameter constraints within which the CPE device is required to operate; and
- wherein analyzing the received information further comprises determining how to modify the CPE device within the line parameter constraints, and
- wherein generating the command signal generation module further comprises issuing a command to the CPE device which changes line parameter values, limits, or a range of line parameter values within the line parameter constraints.

19. The method of claim 16, wherein collecting information from a CPE device further comprises collecting information from a plurality of CPE devices, a first of the plurality associated with a first wholesaler or operator network and a second of the plurality associated with a second wholesaler or operator network, and wherein generating a command signal for transmission modifies operation of a CPE device from both the first and the second wholesaler or operator networks.

20. The method of claim 16, wherein the command signal is to change limits or a range of line parameter values pre-assigned on the line at a CO side.

21. The method of claim 16, wherein the received information comprises at least one of:

Downstream attenuation;

Hlog information;

Downstream bit, gain, and SNR table;

Quiet line noise table;

Impulse noise history;

History of CV, downstream or upstream;

History of ES, downstream or upstream;

History of FEC, downstream or upstream;

History of retrains;

History of bit swap or other real time adaptive features;

History of fast retrains and/or SOS's; or

Impedance;

DSL physical layer anomalies, defects and faults together with the event time stamps that has led to SOS activation, a fast retrain, a full retrain or a failed retrain;

SOS activation times, durations and average data rate loss;

INM (Impulse noise monitoring) histograms and impulse noise statistics;

echo transfer function or un-cancelled echo PSD; or

retransmission statistics; and

wherein the command signal comprises at least one of:

a minimum INP override instruction;

a target INP change instruction;

a Maximum delay override instruction;

a target delay change instruction;

a channel initialization policy override instruction;

an instruction to turn off specific downstream tones;

an instruction to change transmit power over specific downstream tones;

an instruction to force a CPE initiated re-training at a scheduled time;

an instruction to Lower the maxR;

an instruction to change maximum data rate;

an instruction to change target margin;

SOS triggering controls including controls on SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error;

fast retrain triggering controls including controls on duration of LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error;

full retrain triggering controls including controls on duration LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error; or

retransmission controls including MIN and MAX INP for different types of impulse noises (REIN or SHINE), MIN and MAX delay, FEC overhead ratio within a retransmission block, MAX throughput loss.

22. A computer readable storage media, comprising instruction stored thereon, which when executed by a processing system cause the system to perform the method of claim 16.

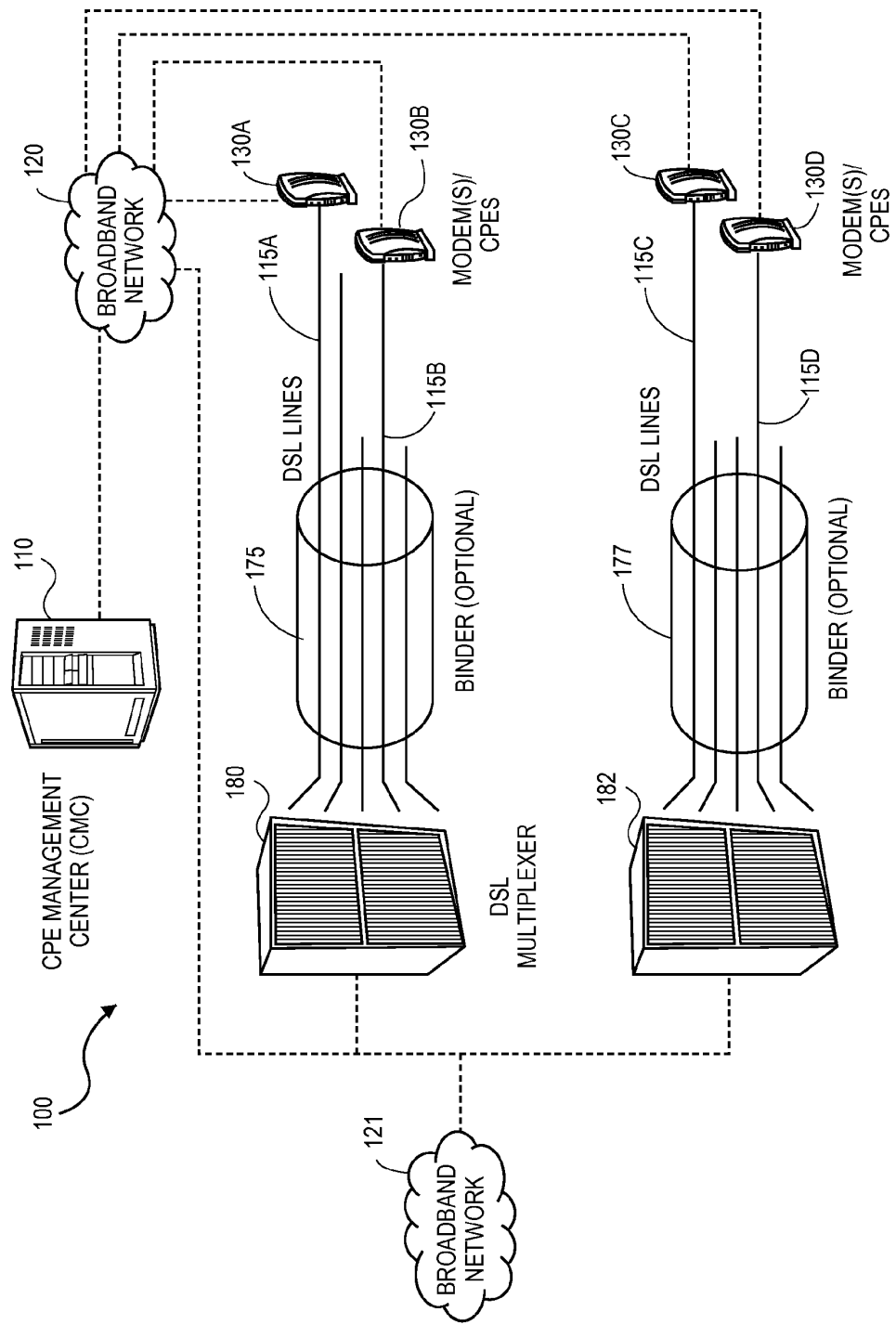


FIG. 1

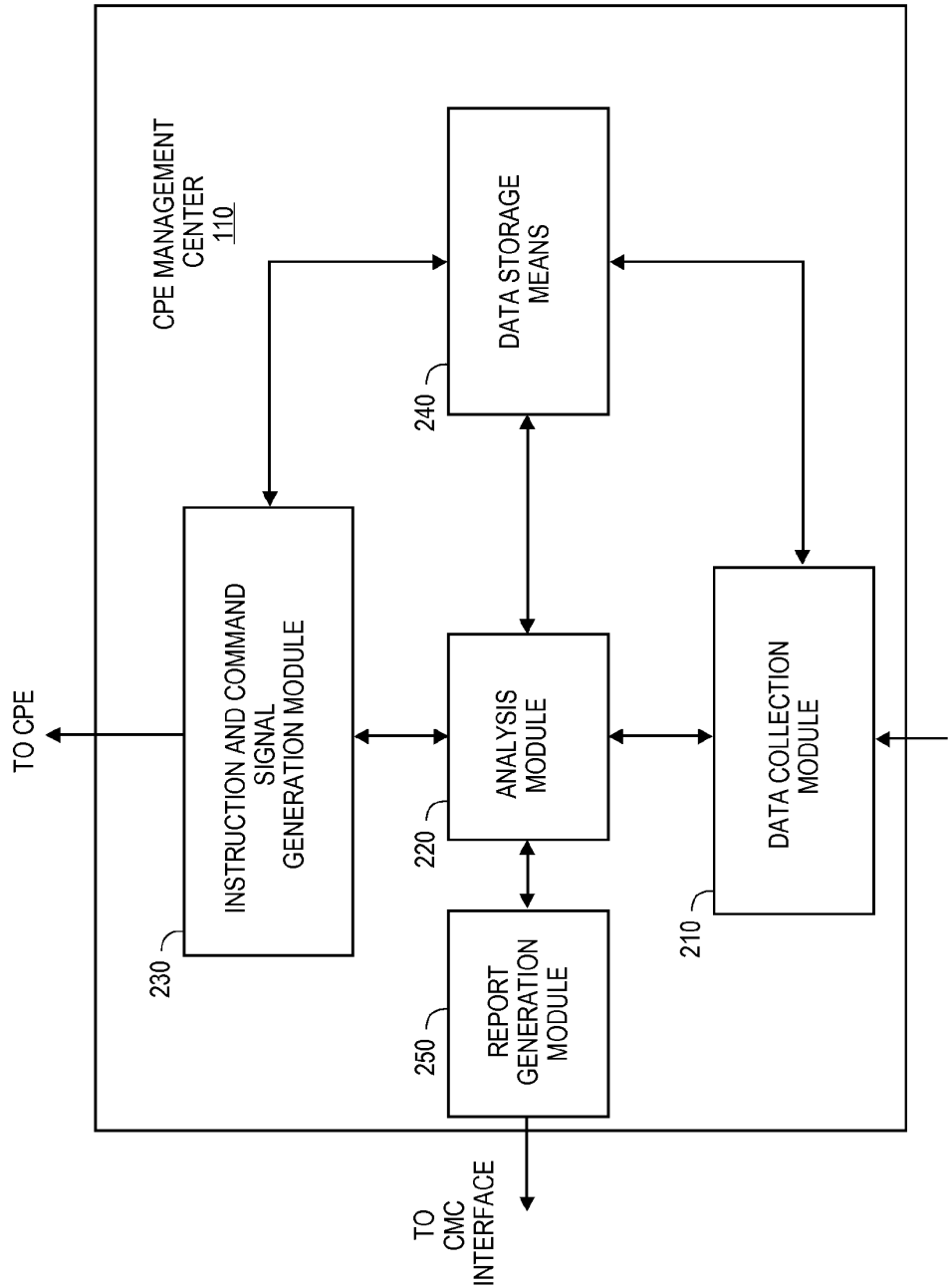


FIG. 2

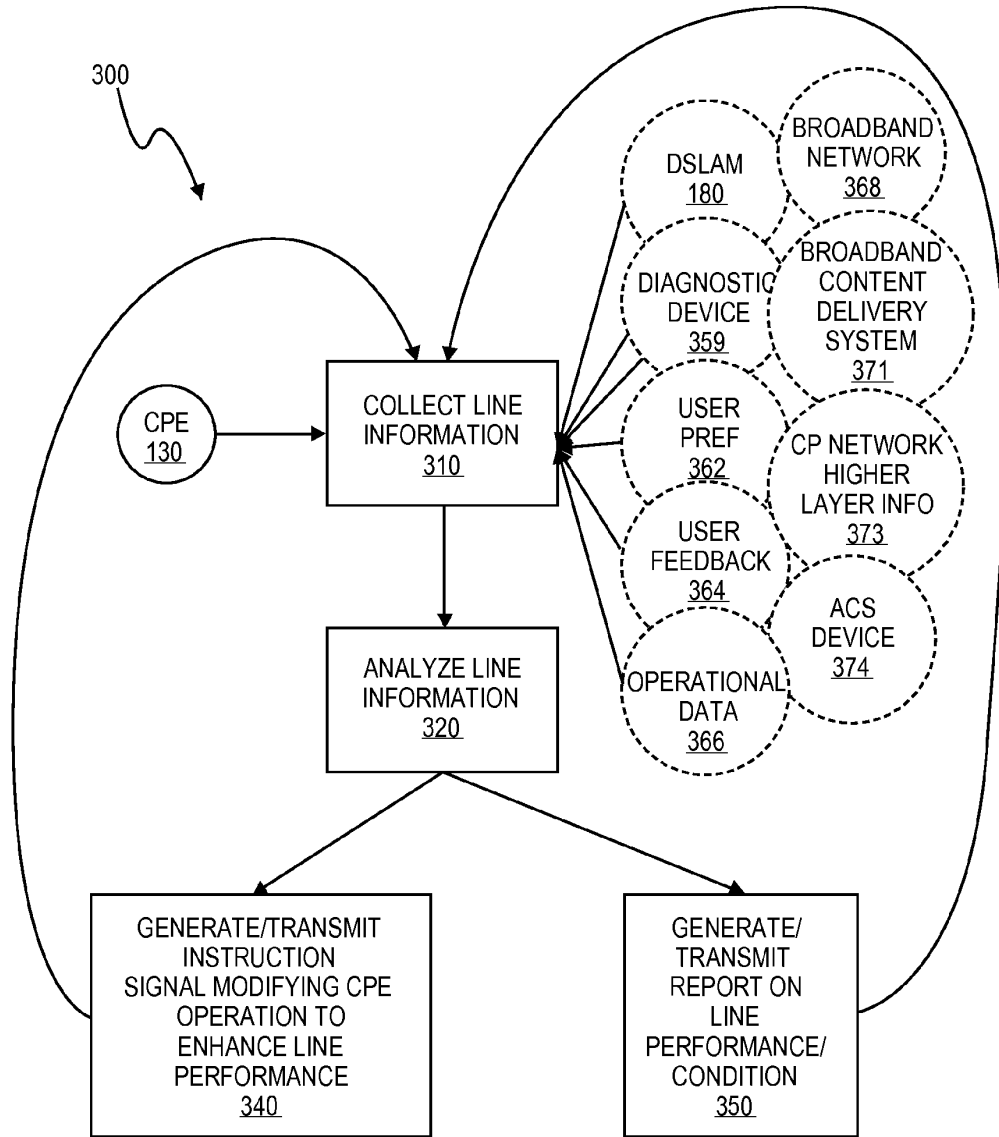


FIG. 3A

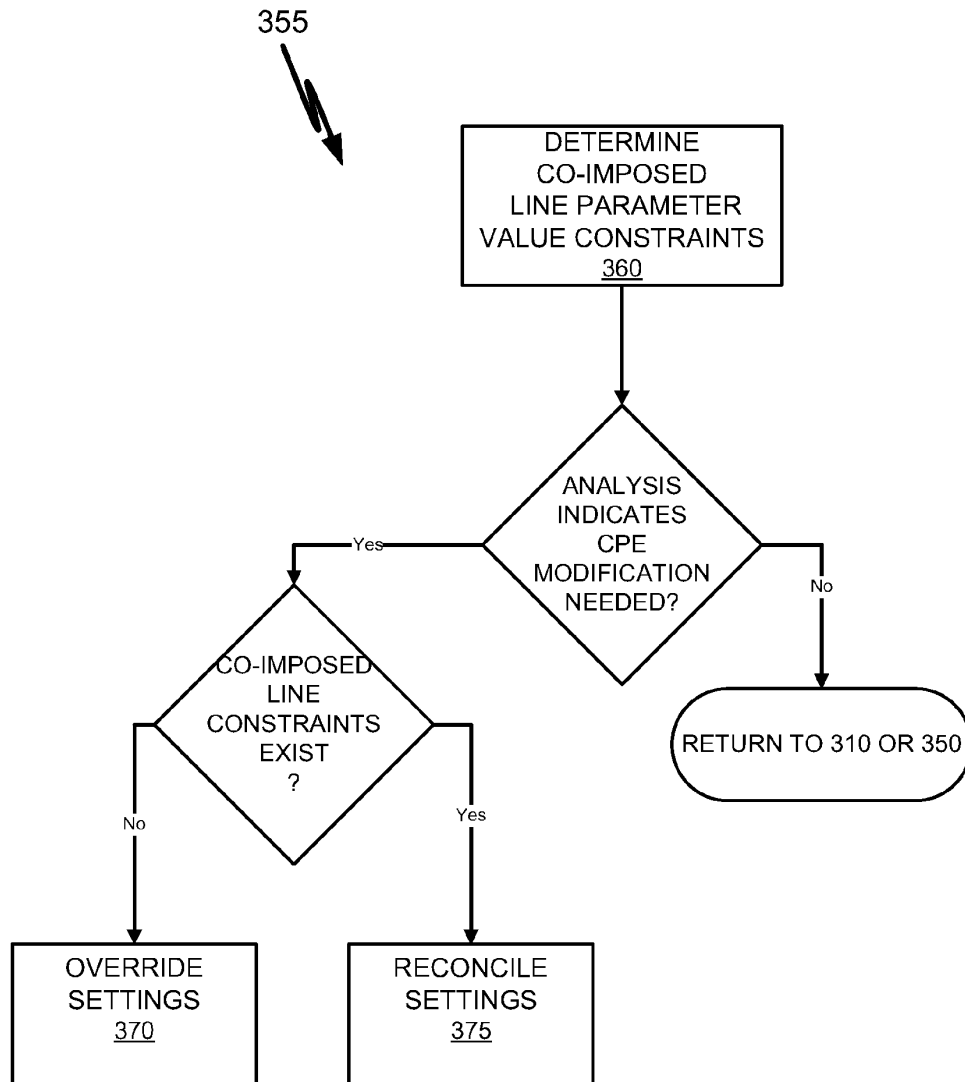


FIG. 3B

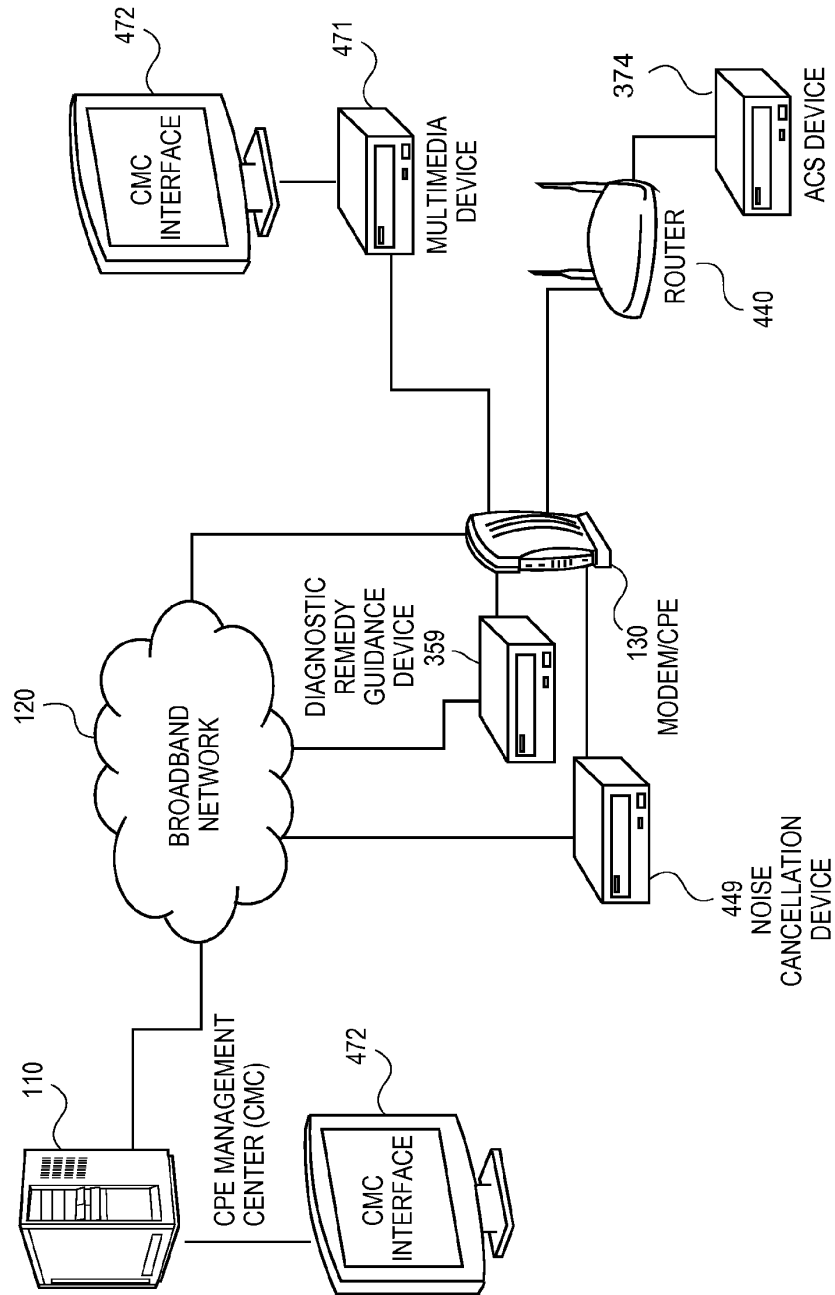


FIG. 4

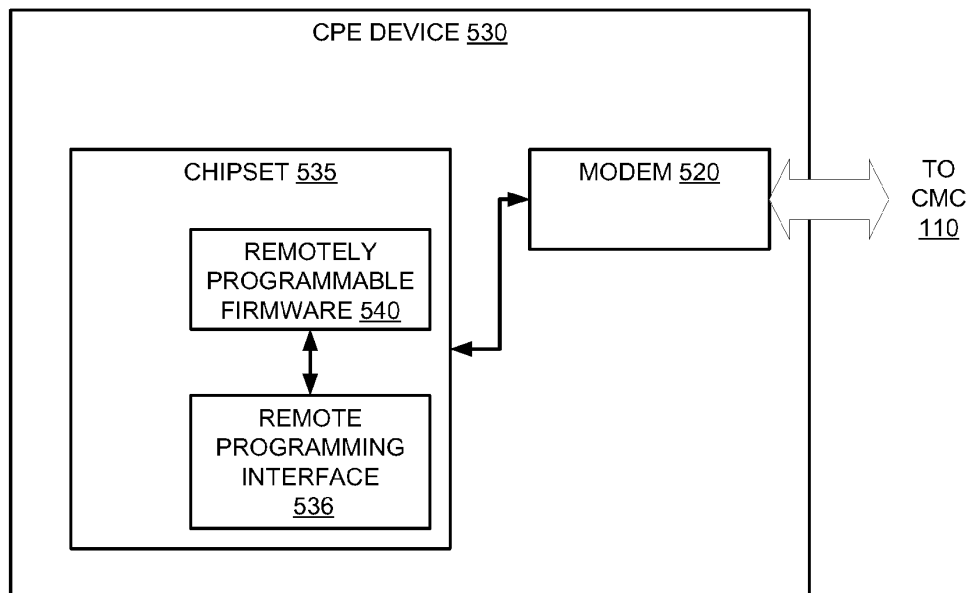


FIG. 5

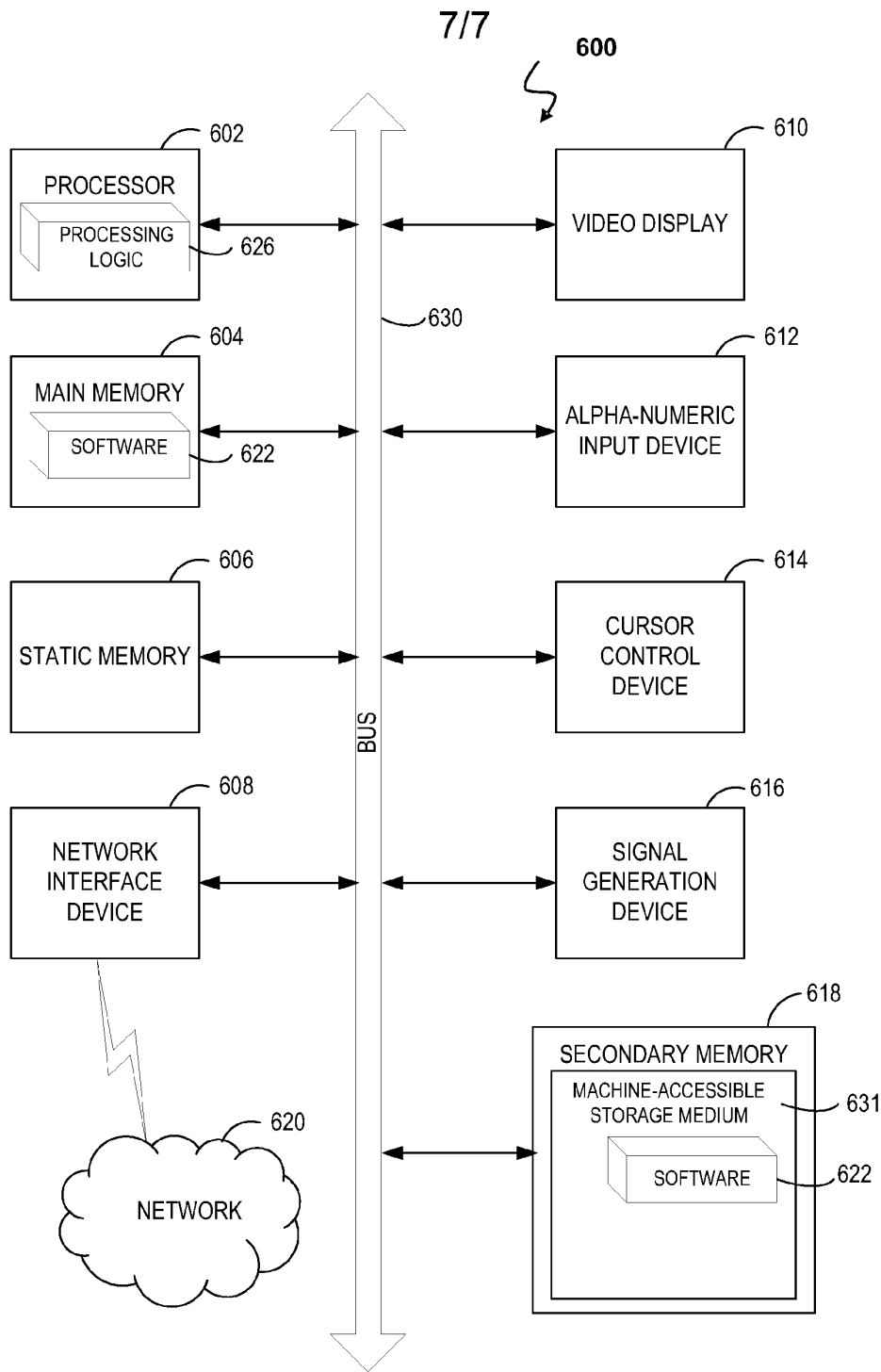


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/062604

A. CLASSIFICATION OF SUBJECT MATTER INV. H04M11/06 H04L12/28 H04L12/24 H04M3/30 ADD.		
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		
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, COMPENDEX, INSPEC, IBM-TDB, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2006/120513 A1 (ADAPTIVE SPECTRUM & SIGNAL [US]; CIOFFI JOHN M [US]; RHEE WONJONG [US]) 16 November 2006 (2006-11-16) page 20 - page 21; figure 4a -----	1-22
X	US 2006/280235 A1 (RHEE WONJONG [US] ET AL) 14 December 2006 (2006-12-14) paragraph [0048] - paragraph [0057]; figure 2 -----	1-22
X	US 2009/028170 A1 (JIANG BAOFENG [US] ET AL) 29 January 2009 (2009-01-29) paragraph [0011] - paragraph [0024] -----	1-22
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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 <p align="center">25 November 2011</p>		Date of mailing of the international search report <p align="center">01/12/2011</p>
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer <p align="center">Hardelin, Thierry</p>

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2010/062604

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006120513 A1	16-11-2006	AU 2006245450 A1	16-11-2006
		BR PI0608974 A2	17-02-2010
		CA 2608329 A1	16-11-2006
		EP 1886480 A1	13-02-2008
		JP 2008545288 A	11-12-2008
		US 2007036340 A1	15-02-2007
		WO 2006120513 A1	16-11-2006

US 2006280235 A1	14-12-2006	AU 2006256483 A1	14-12-2006
		CA 2611387 A1	14-12-2006
		CN 101233742 A	30-07-2008
		EP 1911256 A1	16-04-2008
		JP 2008546340 A	18-12-2008
		US 2006280235 A1	14-12-2006
		WO 2006131794 A1	14-12-2006

US 2009028170 A1	29-01-2009	NONE	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No.: 4662
Appl. No. : 14/414,436
Filed : January 12, 2015
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Examiner : Michael J. Moore Jr.
Art Unit : 2467
Docket No. : 20145-073US

CERTIFICATE OF MAILING or EFS UPLOAD

I hereby certify that this correspondence is being electronically transmitted via the EFS filing system or, pursuant to 37 CFR §1.8, deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Appeal Brief Patent, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Dated: 2018-09-24 By: /Nita Miller//
Nita Miller

APPEAL BRIEF

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

Dear Examiner Moore:

This Appeal Brief follows a Notice of Appeal filed July 24, 2018, and appeals the rejection of the pending claims by the United States Patent and Trademark Office (USPTO) in the Final Office Action mailed April 24, 2018 (hereinafter, the "Final Office Action"). Accordingly this Appeal Brief is timely filed.

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Docket No. : 20145-073US
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1. Real Party in Interest

The real party in interest of the above-identified patent application is Adaptive Spectrum and Signal Alignment, Inc.

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2. Related Appeals and Interferences

There are no related U.S. patent applications that have been or are currently under appeal, being litigated or involved in an interference proceeding, which Appellant, Appellant's legal representative, or Assignee are aware that would directly affect or be directly affected or have a bearing on the Board's decision in the pending appeal.

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3. Status of Claims

Claims 1-110 were originally filed.

Claims 1-6, 8-9, 11-19, 21-36, and 38-40 are currently pending and have been finally rejected.

Claims 7, 10, 20, 37, 41-52, 54-61, 88, 89, 97-10, and 103-108 were canceled.

The final rejections of claims 1-6, 8-9, 11-19, 21-36, and 38-40 are at issue in this appeal.

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4. Summary of Claimed Subject Matter

Claims 1 and 21 are independent claims, are currently pending, and have been finally rejected. The concise summaries provided below refer to the specification by paragraph number of the published version of the application, US Pat. Appl. Pub. No. 2015/0207720 A1, and to the drawings.

Claim 1

Independent claim 1 is a method claim that recites steps for collecting and analyzing WAN information performed by a downloadable agent placed inside a LAN¹. The combination of these steps allows collection of information on all devices centrally for a comprehensive analysis. *See, e.g.*, Specification, ¶ 15; Fig. 1.

The first step collects WAN performance information using a downloadable agent executable on a computing device coupled to a LAN, which couples to a WAN. *See, e.g.*, Specification, ¶ 37, ln. 1-3 (“In one embodiment, the DA **102** associated with the communication device collects data locally within the communication device and then periodically sends the collected data to the server **105**”).

The second step transmits the WAN performance information to a machine, which stores the WAN performance information in a database, analyze the WAN performance information to generate an analysis result comprising at least throughput, and report the analysis result. *See, e.g.*, Specification, ¶ 42, ln. 1-4 (“the server **105** is operable to store the WAN performance information in the database **106** associated with the server **105**. In one embodiment, the server **105** is operable to store the WAN performance information with an associated timestamp.”); ¶ 46, ln. 3-9 (“the server **105** is operable to perform statistical analysis, including throughput, based on information received from the DA **102** and other information in the

¹ In the Summary of Claimed Subject Matter, for the purpose of explanation, specific details are set forth in order to provide an understanding of the invention to facilitate review. Specific references to the claims and claim elements and to portions of the specification shall not be used to limit the scope of the claims. All permutations, enhancements, equivalents, combinations, and improvements thereto that are apparent to those skilled in the art upon a reading of the specification are included within the true spirit and scope of the present invention.

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database.”); ¶ 54, ln. 1-3 (“the server **105** is operable to report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.”).

The third step sends an on-demand change request associated with at least one of throughput, or latency. *See, e.g.*, Specification, ¶ 55, ln. 1-4 (“the server **105** is operable to receive an on-demand change request. In one embodiment, the on-demand change is associated with at least one of: throughput, latency, packet loss, or jitter.”).

Dependent claims 2-6, 8-9, and 11-19 relate to more specific limitations of one or more of the elements within claim 1.

Claim 20

Independent claim 20 is a system claim that recites elements² for receiving, storing, analyzing WAN information collected by a downloadable agent placed inside a LAN. The combination of these steps allows collection of information on all devices centrally for a comprehensive analysis. *See, e.g.*, Specification, ¶ 15; Fig. 1.

The first element is a database.

The second element is a server operable to receive WAN performance information collected using a downloadable agent executable on a computing device in LAN coupled to a WAN, to store the WAN performance information in the database, to analyze the WAN performance information to generate an analysis result comprising at least throughput, and report the analysis result. *See, e.g.*, Specification, ¶ 37, ln. 1-3 (“In one embodiment, the DA **102** associated with the communication device collects data locally within the communication device and then periodically sends the collected data to the server **105**”); Specification, ¶ 42, ln. 1-4 (“the server **105** is operable to store the WAN performance information in the database **106** associated with the server **105**. In one embodiment, the server **105** is operable to store the WAN performance information with an associated

² In the Summary of Claimed Subject Matter, for the purpose of explanation, specific details are set forth in order to provide an understanding of the invention to facilitate review. Specific references to the claims and claim elements and to portions of the specification shall not be used to limit the scope of the claims. All permutations, enhancements, equivalents, combinations, and improvements thereto that are apparent to those skilled in the art upon a reading of the specification are included within the true spirit and scope of the present invention.

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timestamp.”); ¶ 46, ln. 3-9 (“ the server **105** is operable to perform statistical analysis, including throughput, based on information received from the DA **102** and other information in the database.”); ¶ 54, ln. 1-3 (“the server **105** is operable to report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.”).

The second element further requires that server to receive an on-demand change request associated with at least one of throughput, or latency. *See, e.g.*, Specification, ¶ 55, ln. 1-4 (“the server **105** is operable to receive an on-demand change request. In one embodiment, the on-demand change is associated with at least one of: throughput, latency, packet loss, or jitter.”).

Dependent claims 22-36, and 38-40 relate to more specific limitations of one or more of the elements within claim 21.

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5. Grounds of Rejection to be Reviewed on Appeal

Is the rejection of claims 1-6, 8-9, 11-19, 21-36, and 38-40 under pre-AIA 35 U.S.C. §103(a) proper?

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6. Arguments

Rejection of claims under pre-AIA 35 U.S.C. § 103(a)

As a preliminary matter, Appellant respectfully makes reference to MPEP §§ 2142, which state in part “The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in *KSR* noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Court quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006), stated that “[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”

In the Final Office Action, claims 1-6, 8-9, 11-19, 21-36, and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Publication No. 2002/0174421 to Zhao *et al.* (hereinafter “Zhao”) in view of U.S. Patent Publication No. 2012/0244863 to Burnette *et al.* (hereinafter “Burnette”). The rejections are maintained in the Advisory Office Action (hereinafter, “Advisory Action”), mailed July 19, 2018.

Regarding Claim 1, the Final Office Action contends on page 14 (Section: Response to Arguments) that “*However, as provided in the previous Office Action and clarified above, Zhao further teaches the servicing of received requests (change requests) from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064]. Zhao further describes where the measured performance parameters include latency data as spoken of on page 6, paragraph [0110]. Giving a broadest reasonable interpretation, the above received service requests from clients are considered on-demand change requests that are associated with latency.*”

In the Advisory Action, the Examiner wrote “*Zhao teaches the servicing of received requests (change requests) from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064]. Zhao further describes where the measured performance parameters include latency data as spoken of on page 6, paragraph [0110]. As noted by Applicant, Zhao further states that performance*

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parameters which are measured at client sites 411-414 can be transmitted up through the hierarchy to the respective servers 402-404. Zhao further teaches that all of the performance parameter information can then be sent from the servers to site monitor 401, which can be used to organize the data according to selected categories as spoken of on page 4, paragraph [0064]. As further noted by Applicant, Zhao teaches where the site monitor may be operable to collect and/or process the following parameters: ... server latency data (average, minimum and maximum). From the above, Zhao teaches where the site monitor collects server latency data from the received requests from one or more clients 411-414, where the server latency data includes average, minimum and maximum server latency values, which indicates how latency changes in time among the monitored servers. Giving a broadest reasonable interpretation of the above claim language, the above received service requests from clients are considered on-demand change requests that are associated with latency.”

I. By providing citations with articulated reasoning not able to support the legal conclusion of obviousness

In the Final Office Action, the Examiner interprets disclosure of Zhao (**servicing received request**) as equivalent to the limitation of **“sending an on-demand change request associated with at least one of throughput, or latency** Applicant respectfully asserts that the Examiner simply cites various paragraphs of Zhao with explanations not able to support applicability to the feature.” Applicant respectfully makes reference to MPEP §§ 2144, which state in part that “Simply stating the principle (e.g., “art recognized equivalent,” “structural similarity”) without providing an explanation of its applicability to the facts of the case at hand is generally not sufficient to establish a prima facie case of obviousness.”

Applicant respectfully points out **that servicing received request disclosed by Zhao is patentably distinct from on-demand change request.** Zhao explicitly discloses in [0064] that *“Each of servers 402-404 may, at a given time, be servicing requests from one or more clients, 411-414. According to the present disclosure, performance parameters which are measured at client sites 411-414 can be transmitted up through the hierarchy to the respective servers 402-404. All of this information can then be sent from the servers to site monitor 401,*

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which can be used to organize the data according to selected categories.” In Zhao’s disclosure, the requests from the one or more clients, **411-414** are requests for transmitting measured performance parameters, instead of *on-demand change requests*.

Applicant respectfully asserts that Zhao does not disclose or suggest **change request associated with at least one of throughput, or latency**. Zhao explicitly discloses in [011] that “In one embodiment, the site monitor maybe operable to **collect and/or process the following parameters**: unique session visits; page response time data (average, minimum and maximum); **server latency data** (average, minimum and maximum)...” Zhao simply discloses collect or process server latency data, instead of **change request associated with latency**.

Furthermore Applicant respectfully makes reference to MPEP §§ 2142, which state in part “*impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.*” As such, the rejections from the proper perspective of the time of Applicant’s claims, without the teachings of Applicant’s disclosure, shall be considered.

The Examiner interprets “processing server latency data” in [011] of Zhao as **on-demand change requests** by stating that “*Giving a broadest reasonable interpretation of the above claim language, the above received service requests from clients are considered on-demand change requests that are associated with latency*”. Applicant respectfully points out that the limitation of “on-demand change request” inherently requires a change for throughput, or latency, or both, based on analyzed WAN performance information. While Zhao’s disclosure only related to collect and process information including server latency data, without disclosing or suggesting changing the server latency. At most, Zhao discloses in various paragraphs changing webpage layout or a HTML object tree for a webpage, which are distinct from changing throughput, or latency. Therefore, the Examiner’s interpretation of “processing server latency data” in [011] of Zhao as **on-demand change requests** is beyond broadest reasonable interpretation.

Similarly, Burnette does not disclose the limitation of “**sending an on-demand change request associated with at least one of throughput, or latency**”.

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Therefore, based on at least the above remarks, Applicant respectfully asserts that the claim 1 is not obvious over Zhao in view of Burnette.

The above mentioned remarks in regarding to amended claim 1 are also applicable to amended independent claim 20. Therefore, independent claim 20 is also patentably distinct from Zhao in view of Burnette.

In view of the above arguments, the Applicant respectfully asks the Board to reverse the Examiner's rejection of 1-6, 8-9, 11-19, 21-36, and 38-40, and to all these claims as presently amended.

Respectfully submitted,

Date: September 21, 2018

By: /Xin Dai/
Xin Dai, Ph.D.
Reg. No. 72,098



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APPENDIX – LISTINGS OF CLAIMS

1. (Previously presented) A method performed by a downloadable agent, the method comprising:

collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN;

transmitting the WAN performance information to a machine, wherein the machine is operable to:

store the WAN performance information in a database associated with the machine,

analyze the WAN performance information to generate an analysis result, the analysis result comprises at least throughput; and

report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider; and

sending an on-demand change request associated with at least one of throughput, or latency.

2. (Original) The method of claim 1, wherein the other device is a router.

3. (Original) The method of claim 1, wherein the machine is operable to store the WAN performance information with an associated timestamp.

4. (Original) The method of claim 1 wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.

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5. (Original) The method of claim 4 further comprises transmitting by the downloadable agent the LAN performance data to the machine.

6. (Original) The method of claim 1, wherein the downloadable agent is executable in a virtual machine on the computing device.

7. (Canceled)

8. (Previously presented) The method of claim 1 further comprises receiving the analysis result, wherein receiving the analysis result comprises at least one of:

receiving availability of higher bandwidth for operating a DSL service;

receiving service product information for improving DSL service performance; or

receiving utilization information for optimizing a consumers DSL service cost.

9. (Previously presented) The method of claim 1, wherein the WAN performance information includes at least one of:

topological information,

geographical information,

latency,

jitter,

packet loss,

time,

type of communication device,

device network identification,

manufacturer and model of equipment,

equipment characteristics,

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firmware,
user's network usage pattern,
user's provisioned WAN service,
RF characteristics including at least one of: signal power, frequency bands and mode of operation,

environment statistics, or
data on operation of communication devices.

10. (Cancelled)
11. (Original) The method of claim 1, wherein the machine is a server that resides in a cloud.
12. (Previously presented) The method of claim 1, wherein the computing device is one of:
 - tablet computing device;
 - a personal computer;
 - a gaming console;
 - an access point (AP);
 - a base station;
 - a wireless smartphone device;
 - a wireless LAN device;
 - an access gateway;
 - a router;
 - a performance enhancement device;
 - a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;
 - a cable CPE modem;

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an in-home powerline device;
a Home Phoneline Network Alliance (HPNA) based device;
an in-home coax distribution device;
a G.hn (Global Home Networking Standard) compatible device;
an in-home metering communication device;
an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;

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wearable device; or

internet enabled cameras.

13. (Original) The method of claim 1, wherein the downloadable agent is executable on an Internet browser.

14. (Original) The method of claim 1, wherein the downloadable agent is accessible remotely via the Internet.

15. (Original) The method of claim 1 further comprises periodically sending collected WAN performance information to the machine.

16. (Original) The method of claim 1 further comprises waiting for a predetermined condition or threshold to be satisfied before sending collected WAN performance information to the machine.

17. (Original) The method of claim 16, where the predetermined condition or threshold is at least one of:

a function of a type of data collected, or

limit or threshold on a performance level associated with the collected data.

18. (Previously presented) The method of claim 1, wherein the machine is operable to collect WAN performance information by polling or by a scheduled based system.

19. (Previously presented) The method of claim 1 further comprises collecting data from at least one of:

The National Weather Service;

a radio station; or

an operator.

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Appeal Brief date : September 24, 2018

20. (Canceled)

21. (Previously presented) A system comprising:

a database; and

a server coupled to the database, the server operable to:

receive WAN performance information from a downloadable agent, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN; and

store the WAN performance information in the database associated with the server,

analyze the WAN performance information to generate an analysis result, the analysis result comprises at least throughput; and

report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider;

wherein the server is operable to receive an on-demand change request associated with at least one of: throughput, or latency.

22. (Original) The system of claim 21, wherein the server resides in a cloud.

23. (Original) The system of claim 21, wherein the server is operable to store the WAN performance information with an associated timestamp.

24. (Original) The system of claim 21, wherein the downloadable agent is operable to collect LAN performance data from at least one of the computing device and other device coupled to the LAN.

25. (Original) The system of claim 24, wherein the server is operable to receive from the downloadable agent the LAN performance data.

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26. (Previously presented) The system of claim 25, wherein the server comprises:
- a first logic for collecting the WAN performance information;
 - a second logic for performing statistical analysis using the first WAN performance information; and
 - a third logic for generating instruction and commands according to the statistical analysis for at least one of the broadband subscriber, networking equipment at the broadband subscriber's premises, the service provider of the broadband subscriber and the access equipment of the service provider.
27. (Previously presented) The system of claim 26, wherein the logic that receive the instruction and command from the third module are accessible by internet.
28. (Original) The system of claim 26, wherein the server comprises:
- a management interface for communicating with the downloadable agent via internet.
29. (Previously presented) The system of claim 26, wherein the server comprises:
- a user interface logic for providing access and for displaying information associated with the first, second, third modules.
30. (Previously presented) The system of claim 21, wherein the server is operable to compute throughput of a DSL connection by collecting current performance metrics associated with DSL service.
31. (Previously presented) The system of claim 30, wherein the server is to perform throughput computation with reference to a website.
32. (Original) The system of claim 31, wherein the throughput computation comprises probing a network.

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Appeal Brief date : September 24, 2018

33. (Original) The system of claim 21, wherein the downloadable agent is executable in a virtual machine on the computing device.

34. (Original) The system of claim 21, wherein the downloadable agent is dynamically downloaded to the computing device.

35. (Previously presented) The system of claim 21, wherein the server is operable to report the analysis result by performing at least one of:

- sending availability of higher bandwidth for operating a DSL service;
- sending service product information for improving DSL service performance; or
- sending utilization information for optimizing a consumers DSL service cost.

36. (Previously presented) The system of claim 21, wherein the WAN performance information includes at least one of:

- topological information,
- geographical information,
- time,
- latency,
- jitter,
- packet loss,
- type of communication device,
- device network identification,
- manufacturer and model of equipment,
- equipment characteristics,
- firmware,

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user's network usage pattern,

RF characteristics including at least one of: signal power, frequency bands and mode of operation,

environment statistics, or

data on operation of communication devices.

37. (Cancelled)

38. (Previously presented) The system of claim 21, wherein the computing device is one of:

tablet computing device;

an access point (AP);

a base station;

a wireless smartphone device;

a wireless LAN device;

an access gateway;

a router,

a performance enhancement device;

a Digital Subscriber Line (DSL) Customer Premises Equipment (CPE) modem;

a cable CPE modem;

an in-home powerline device;

a Home Phoneline Network Alliance (HPNA) based device;

an in-home coax distribution device;

a G.hn (Global Home Networking Standard) compatible device;

an in-home metering communication device;

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an in-home appliance communicatively interfaced with the LAN;
a wireless femtocell base station;
a wireless Wi-Fi compatible base station;
a wireless mobile device repeater;
a wireless mobile device base station;
nodes within an ad-hoc/mesh network;
a set-top box (STB)/set-top unit (STU) customer electronics device;
an Internet Protocol (IP) enabled television;
an IP enabled media player;
an IP enabled gaming console;
an Ethernet gateway;
a computing device connected to the LAN;
an Ethernet connected computer peripheral device;
an Ethernet connected router;
an Ethernet connected wireless bridge;
an Ethernet connected network bridge;
an Ethernet connected network switch;
wearable device; or
internet enabled cameras.

39. (Original) The system of claim 21, wherein the server is operable to provide a marketplace of ideas for the communication devices for trading bandwidth for media services.

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40. (Previously presented) The system of claim 21, wherein the server is operable to collect WAN performance information by polling or by a scheduled based system.

41-110. (Cancelled)

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Appeal Brief date : September 24, 2018

EVIDENCE APPENDIX

None

Appl. No. : 14/414,436
Docket No. : 20145-073US
Notice of Appeal date : July 24, 2018
Appeal Brief date : September 24, 2018

RELATED PROCEEDINGS APPENDIX

None

Electronic Acknowledgement Receipt

EFS ID:	33810040
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	24-SEP-2018
Filing Date:	12-JAN-2015
Time Stamp:	16:45:58
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Appeal Brief Filed	073US_Appeal_Brief.pdf	121870 <small>437216786928f5617a33dbcc650a1ce123001a244</small>	no	26

Warnings:

Information:	
Total Files Size (in bytes):	121870
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>	



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146571 e 2018-10-11
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Palo Alto, CA 94304

Paper No. 20181009

Table with 4 rows and 2 columns. Row 1: Application No. 14/414,436, Date Mailed: 2018-10-11, ELECTRONIC. Row 2: First Named Inventor: Leonardo Dagum, Examiner: MOORE JR, MICHAEL J. Row 3: Attorney Docket No.: 20145-073US, Art Unit: 2467. Row 4: Confirmation No.: 4662, Filing Date: 01/12/2015.

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

Commissioner for Patents

Notification of Non-Compliant Appeal Brief <i>(37 CFR 41.37)</i>	Application No. 14/414,436	Applicant(s) Dagum et al.	
	Examiner MOORE JR, MICHAEL J	Art Unit 2467	AIA Status No

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

The Appeal Brief filed on 24 September 2018 is defective for failure to comply with one or more provisions of 37 CFR 41.37(c).

To avoid dismissal of the appeal, applicant must file an amended brief or other appropriate correction (see MPEP 1205.03) within **ONE MONTH or THIRTY DAYS** from the mailing date of this Notification, whichever is longer. **EXTENSIONS OF THIS TIME PERIOD MAY BE GRANTED UNDER 37 CFR 1.136.**

1. The brief does not contain the items required under 37 CFR 41.37(c), or the items are not under the proper heading or in the proper order.
2. (a) The brief does not contain a concise explanation of the subject matter defined in each of the rejected independent claims, referring to the specification in the Record by page and line number or by paragraph number and to the drawings, if any, by reference characters; and/or (b) the brief fails to identify, for each rejected independent claim and for each dependent claim argued separately that contains a means plus function or step plus function recitation under 35 U.S.C. 112, sixth paragraph, the structure, material, or acts described in the specification as corresponding to each claimed function with reference to the specification in the Record by page and line number or paragraph number, and to the drawings, if any, by reference characters (37 CFR 41.37(c)(1)(iii)).
3. The brief does not contain a correct copy of the appealed claims as an appendix thereto (37 CFR 41.37(c)(1)(v)).
4. Other (including any explanation in support of the above items):

The Summary of Claimed Subject Matter is non-compliant as it identifies claim 20 as an independent claim instead of Claim 21 and maps it to the specification and drawings if needed by paragraph numbers. A new Summary of Claimed Subject Matter is needed showing claim 14 as an independent claim. An entire new Brief is not necessary only the corrected section..

EVERETT R WILLIAMS
(571)272-3619

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No.: 4662
 Appl. No. : 14/414,436
 Filed : January 12, 2015
 Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
 FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
 Examiner : MOORE JR, MICHAEL J
 Art Unit : 2467
 Docket No. : 20145-073US

CERTIFICATE OF TRANSMISSION (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted to the United States Patent and Trademark Office via EFS-Web addressed to: Mail Stop Appeal Brief Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Dated: 2018-10-26 By: /Nita Miller/
Nita Miller

RESPONSE TO NOTIFICATION OF NON-COMPLIANT APPEAL BRIEF AND SUBMISSION OF CORRECTED SECTION PURSUANT TO 37 CFR 41.37

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

Dear Sir/Madam:

This paper is responsive to the Notification of Non-Compliant Appeal Brief mailed 2018-10-11, and having a statutory period for reply ending 2018-11-11. Accordingly, this paper is timely filed. The Notification states,

The Summary of Claimed Subject Matter is non-compliant as it identifies claim 20 as an independent claim instead of Claim 21 and maps it to the specification and drawings if needed by paragraph numbers. A new Summary of Claimed Subject Matter is needed showing claim 14 as an independent claim. An entire new Brief is not necessary only the corrected section.

Applicant initiated a telephone call today with the person of contact confirming the requirement for a corrected section identifying claim 21 (and not claim 14) as an independent claim. The corrected section appears at page 2 of this paper.

No fees are due herewith; however, the Commissioner is authorized to charge any fees which may be required to Deposit Account No. 50-2776.

Respectfully submitted,

Date: 2018-10-26

By: /Xin Dai/
Xin Dai, Ph.D
Reg. No. 72,098



Appl. No. : 14/414,436
Docket No. : 20145-073US
Notification date : 2018-10-11
Response date : 2018-10-26

4. Summary of Claimed Subject Matter

Claims 1 and 21 are independent claims, are currently pending, and have been finally rejected. The concise summaries provided below refer to the specification by paragraph number of the published version of the application, US Pat. Appl. Pub. No. 2015/0207720 A1, and to the drawings.

Claim 1

Independent claim 1 is a method claim that recites steps for collecting and analyzing WAN information performed by a downloadable agent placed inside a LAN¹. The combination of these steps allows collection of information on all devices centrally for a comprehensive analysis. *See, e.g.*, Specification, ¶ 15; Fig. 1.

The first step collects WAN performance information using a downloadable agent executable on a computing device coupled to a LAN, which couples to a WAN. *See, e.g.*, Specification, ¶ 37, ln. 1-3 (“In one embodiment, the DA **102** associated with the communication device collects data locally within the communication device and then periodically sends the collected data to the server **105**”).

The second step transmits the WAN performance information to a machine, which stores the WAN performance information in a database, analyze the WAN performance information to generate an analysis result comprising at least throughput, and report the analysis result. *See, e.g.*, Specification, ¶ 42, ln. 1-4 (“the server **105** is operable to store the WAN performance information in the database **106** associated with the server **105**. In one embodiment, the server **105** is operable to store the WAN performance information with an associated timestamp.”); ¶ 46, ln. 3-9 (“the server **105** is operable to perform statistical analysis, including throughput, based on information received from the DA **102** and other information in the database.”); ¶ 54, ln. 1-3 (“the server **105** is operable to report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.”).

¹ In the Summary of Claimed Subject Matter, for the purpose of explanation, specific details are set forth in order to provide an understanding of the invention to facilitate review. Specific references to the claims and claim elements and to portions of the specification shall not be used to limit the scope of the claims. All permutations, enhancements, equivalents, combinations, and improvements thereto that are apparent to those skilled in the art upon a reading of the specification are included within the true spirit and scope of the present invention.

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Response date : 2018-10-26

The third step sends an on-demand change request associated with at least one of throughput, or latency. *See, e.g.*, Specification, ¶ 55, ln. 1-4 (“the server **105** is operable to receive an on-demand change request. In one embodiment, the on-demand change is associated with at least one of: throughput, latency, packet loss, or jitter.”).

Dependent claims 2-6, 8-9, and 11-19 relate to more specific limitations of one or more of the elements within claim 1.

Claim 21

Independent claim 21 is a system claim that recites elements² for receiving, storing, analyzing WAN information collected by a downloadable agent placed inside a LAN. The combination of these elements allows collection of information on all devices centrally for a comprehensive analysis. *See, e.g.*, Specification, ¶ 15; Fig. 1.

The first element is a database.

The second element is a server operable to receive WAN performance information collected using a downloadable agent executable on a computing device in LAN coupled to a WAN, to store the WAN performance information in the database, to analyze the WAN performance information to generate an analysis result comprising at least throughput, and report the analysis result. *See, e.g.*, Specification, ¶ 37, ln. 1-3 (“In one embodiment, the DA **102** associated with the communication device collects data locally within the communication device and then periodically sends the collected data to the server **105**”); Specification, ¶ 42, ln. 1-4 (“the server **105** is operable to store the WAN performance information in the database **106** associated with the server **105**. In one embodiment, the server **105** is operable to store the WAN performance information with an associated timestamp.”); ¶ 46, ln. 3-9 (“the server **105** is operable to perform statistical analysis, including throughput, based on information received from the DA **102** and other information in the database.”); ¶ 54, ln. 1-3 (“the server **105** is

² In the Summary of Claimed Subject Matter, for the purpose of explanation, specific details are set forth in order to provide an understanding of the invention to facilitate review. Specific references to the claims and claim elements and to portions of the specification shall not be used to limit the scope of the claims. All permutations, enhancements, equivalents, combinations, and improvements thereto that are apparent to those skilled in the art upon a reading of the specification are included within the true spirit and scope of the present invention.

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Docket No. : 20145-073US
Notification date : 2018-10-11
Response date : 2018-10-26

operable to report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider.”).

The second element further requires that server to receive an on-demand change request associated with at least one of throughput, or latency. *See, e.g.*, Specification, ¶ 55, ln. 1-4 (“the server **105** is operable to receive an on-demand change request. In one embodiment, the on-demand change is associated with at least one of: throughput, latency, packet loss, or jitter.”).

Dependent claims 22-36, and 38-40 relate to more specific limitations of one or more of the elements within claim 21.

Electronic Acknowledgement Receipt

EFS ID:	34127665
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	26-OCT-2018
Filing Date:	12-JAN-2015
Time Stamp:	13:31:17
Application Type:	U.S. National Stage under 35 USC 371

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Appeal Brief Filed	073US_Response_to_Notification.pdf	42263 <small>088094ac54124594b17d52babde89681da cf55d</small>	no	4

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Total Files Size (in bytes):	42263
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Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		Complete if Known	
		Application Number	14/414,436
		Filing Date	2015-01-12
		First Named Inventor	Leonardo Dagum
		Art Unit	2467
		Examiner Name	Michael J. Moore Jr.
Sheet 1	of 1	Attorney Docket Number	20145-073US

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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
	1	Office Action dated 2018-08-17, in Chinese Patent Application No. 201280075818.9 (52pgs).	✓

Examiner Signature		Date Considered	
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.
 1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.
 This collection of information is required by 37 CFR 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 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, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Electronic Patent Application Fee Transmittal				
Application Number:	14414436			
Filing Date:	12-Jan-2015			
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
First Named Inventor/Applicant Name:	Leonardo Dagum			
Filer:	Michael V. North/Nita Miller			
Attorney Docket Number:	20145-073US			
Filed as Large Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
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	240	240
Total in USD (\$)				240

Electronic Acknowledgement Receipt	
EFS ID:	34150317
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	29-OCT-2018
Filing Date:	12-JAN-2015
Time Stamp:	18:03:31
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$240
RAM confirmation Number	103018INTEFSW18044300
Deposit Account	502776
Authorized User	Nita Miller

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37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)
 37 CFR 1.21 (Miscellaneous fees and charges)
 37 CFR 1.492 (National application filing, search, and examination fees)
 37 CFR 1.492(a) (Basic national fee only)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	073US_SIDS_Trans.pdf	29878 bd707d542397fb46eb6073a21046e62cf143f6f9	no	3

Warnings:

Information:

2	Information Disclosure Statement (IDS) Form (SB08)	073US_SIDS_sb08b.pdf	137033 1db77d2befc08cd08407ef890cf665779a17566a	no	1
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3	Non Patent Literature	073US_SIDS_NPL1.pdf	665279 0d7b4a7ab204e6d2528d1e2d65aca69252e3d25b	no	52
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4	Fee Worksheet (SB06)	fee-info.pdf	30726 c78ff26409d252b5bbe5a09af29e850d506e6d25	no	2
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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No. : 4662
Appl. No. : 14/414,436
Filing Date : 2012-09-25
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Art Unit : 2467
Examiner : Michael J. Moore Jr.
Docket No. : 20145-073US

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: 2018-08-02 By: /Nita Miller/
Nita Miller

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
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Alexandria, VA 22313-1450

SIR or MADAM:

Filed herewith, in accordance with the provisions of 37 CFR §§ 1.56 and 1.97–1.98, listing various references for consideration by the Examiner, is an Information Disclosure Statement (“IDS”).

The filing of this IDS shall not be construed as a representation that a search has been made, or regarding the completeness of the list of references, or that no other material information exists. Furthermore, the filing of this IDS shall not be construed as a representation that inclusion of a reference in this list is an admission that it is prior art or is pertinent to this application, or as an admission that the information listed is, or may be considered to be, material to the patentability of the above referenced application. The filing of this IDS shall not be construed in any manner as an admission against interest.

This IDS is being filed:

PATENT

- within three months of the filing date of a national application, other than a continued prosecution application under § 1.53(d);
- within three months of the date of entry of the national stage as set forth in § 1.491 in an international application;
- before the mailing of a first Office Action on the merits;
- before the mailing of a first Office Action after the filing of a request for continued examination under § 1.114;
- after three months of the filing date or entry into the national stage or after the mailing of a first Office action on the merits, but before the mailing date of any final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

OR

- Applicant certifies pursuant to 37 CFR § 1.97(e):

- That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement;

OR

- That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- on or before the payment of the issue fee but after the mailing of a final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

AND

- Applicant certifies pursuant to 37 CFR § 1.97(e):

- That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application

PATENT

not more than three months prior to the filing of this information disclosure statement;

OR

That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- Applicant submits that the enclosed Information Disclosure Statement is timely; therefore, no fee is required.
- Except as provided for under 37 CFR § 1.98(a)(2), Applicant has enclosed a copy of each listed reference.
- The above referenced application relies upon Application No. _____, filed _____ for an earlier effective filing date under 35 U.S.C. 120. Although, pursuant to 37 CFR § 1.98(d), the references submitted herein are not required to be submitted for the Examiner to consider them, Applicant submits the references herein so that the information will be printed on the patent issuing from this application.
- Pursuant to 37 CFR § 1.704(d), Applicant certifies that each of the references cited herein were first cited in a communication from a foreign patent office in a counterpart application and that this communication was not received by any individual designated in 37 CFR § 1.56(c) more than thirty days prior to the filing of this Information Disclosure Statement.

Consideration of the listed references and favorable action are requested. If any additional fees are due in connection with the filing of this Information Disclosure Statement, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-6925.

Respectfully submitted,

Date: 2018-10-29

By: /Michael North/
Michael North
Reg. No. 46963





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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/414,436	01/12/2015	Leonardo Dagum	20145-073US	4662
146571	7590	02/01/2019	EXAMINER	
North Weber & Baugh LLP - ASSIA 3260 Hillview Avenue, 1st Floor Palo Alto, CA 94304			MOORE JR, MICHAEL J	
			ART UNIT	PAPER NUMBER
			2467	
			NOTIFICATION DATE	DELIVERY MODE
			02/01/2019	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):

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Application Number: 14/414,436
Filing Date: 12 Jan 2015
Appellant(s): Dagum et al.

Xin Dai, Ph.D. (Reg. No. 72,098)
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed September 24, 2018 and corrected appeal brief filed October 26, 2018.

(1) Grounds of Rejection to be Reviewed on Appeal

Every ground of rejection set forth in the Office action dated 4/24/2018 from which the appeal is taken is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(2) Response to Argument

Regarding claim **1**, Appellant asserts that in the Final Office Action, the Examiner simply cited various paragraphs of *Zhao* with explanations not able to support applicability to the feature. Examiner respectfully disagrees and refers Appellant to the explanation provided in the Final Office Action pertaining to claim **1** as follows:

Zhao also teaches the servicing of received requests (change requests) from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064]. Zhao further describes where the

measured performance parameters include latency data as spoken of on page 6, paragraph [0110].

Examiner maintains that the above description of *Zhao* describes what features of *Zhao* correspond to the claim limitation “sending an on-demand change request associated with at least one of throughput, or latency”.

Appellant argues that the “servicing of received requests” in *Zhao* is patentably distinct from the claimed “on-demand change request”. Appellant further argues that *Zhao* does not disclose or suggest an “*on-demand change request associated with at least one of throughput, or latency*”. Examiner respectfully disagrees.

As noted by Appellant, *Zhao* further states that performance parameters which are measured at client sites 411-414 can be transmitted up through the hierarchy to the respective servers 402-404. *Zhao* further teaches that all of the performance parameter information can then be sent from the servers to site monitor 401, which can be used to organize the data according to selected categories as spoken of on page 4, paragraph [0064].

As further noted by Appellant, *Zhao* teaches where the site monitor may be operable to collect and/or process the following parameters: ... server latency data (average, minimum, and maximum) as spoken of on page 6, paragraph [0110]. Based on the above citations of *Zhao*, *Zhao* teaches where the site monitor collects server latency data from the received requests from one or more clients 411-414, where the server latency data includes average, minimum and maximum server latency values, which indicates how latency changes in time among the monitored servers.

Giving a broadest reasonable interpretation of the above claim language, the above received **service requests** from clients are considered “**on-demand change requests**” that are associated with latency. Similar reasoning applies to independent claim **21**.

Furthermore, Appellant’s specification only provides an example of what an “on-demand change request” may include in an example embodiment (see paragraph [0055] of Appellant’s specification) rather than a clear definition of this term. Examiner is therefore giving a broadest reasonable interpretation of the above claim language.

Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Appellant further asserts that “impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art”, and appears to argue that Examiner is utilizing hindsight reasoning. Examiner respectfully points out that an argument based on hindsight reasoning pertains to the conclusion of obviousness regarding a combination of references. The above claim limitation in question, “sending an on-demand change request associated with at least one of throughput, or latency” was indicated in the Final Office Action as being taught solely by the *Zhao* reference rather than a combination of references.

Appellant further asserts that the limitation “an on-demand change request” inherently requires a change for throughput, or latency, or both, based on analyzed WAN performance information. Appellant also asserts that Examiner’s interpretation of *Zhao* is beyond a broadest reasonable interpretation. Examiner respectfully disagrees. The above limitation in question only states that the “on-demand change request” is

“associated with” throughput, or latency, or both, and does not indicate what the claimed “change” pertains to or how the request is associated with throughput, or latency, or both. The above limitation also does not claim that the “on-demand change request” is sent based on analyzed WAN performance information. As described above, Appellant’s specification provides an example of what an “on-demand change request” may include, but it is Examiner’s position that the above claim language is not limited to that example. Based on this, Examiner maintains that the above interpretation of *Zhao* is not beyond a broadest reasonable interpretation.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/MICHAEL J MOORE JR/
Primary Examiner, Art Unit 2467

Conferees:

/HONG S CHO/
Primary Examiner, Art Unit 2467

/HASSAN A PHILLIPS/
Supervisory Patent Examiner, Art Unit 2467

Requirement to pay appeal forwarding fee. In order to avoid dismissal of the instant appeal in any application or ex parte reexamination proceeding, 37 CFR 41.45 requires payment of an appeal forwarding fee within the time permitted by 37 CFR 41.45(a), unless appellant had timely paid the fee for filing a brief required by 37 CFR 41.20(b) in effect on March 18, 2013.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore Jr.
	Attorney Docket Number	20145-073US

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore Jr.
	Attorney Docket Number	20145-073US

1	Notice of Final Rejection, and English translation thereof, dated 2018-06-21, in Korean Patent Application No. 1020187002557 (Docket No. 20145-073KRD) (5pgs).	<input checked="" type="checkbox"/>
2	Notice of Allowance, dated 2018-06-20, in Canadian Patent Application No. 2,879,047 (Docket No. 20145-073CA) (1pg).	<input type="checkbox"/>
3	Notice of Final Rejection, and English translation thereof, dated 2018-05-11, in Korean Patent Application No. 1020187002557 (Docket No. 20145-073KRD) (5pgs).	<input checked="" type="checkbox"/>
4	Response filed 2018-06-12, in Korean Patent Application No. 1020187002557 (Docket No. 20145-073KRD) (17pgs).	<input type="checkbox"/>

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EXAMINER SIGNATURE

Examiner Signature	/MICHAEL J MOORE JR/	Date Considered	01/22/2019
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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	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore Jr.
	Attorney Docket Number	20145-073US

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	/Michael North/	Date (YYYY-MM-DD)	2018-08-02
Name/Print	Michael North	Registration Number	46963

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
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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.

~~ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.J.M/~~

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Substitute for form 1449/PTO <h2 style="text-align: center; margin: 0;">INFORMATION DISCLOSURE STATEMENT BY APPLICANT</h2> <p style="text-align: center; margin: 0;"><i>(Use as many sheets as necessary)</i></p>				Complete if Known	
		Application Number	14/414,436		
		Filing Date	2015-01-12		
		First Named Inventor	Leonardo Dagum		
		Art Unit	2467		
		Examiner Name	Michael J. Moore Jr.		
Sheet	1	of	1	Attorney Docket Number	20145-073US

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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
	1	Office Action dated 2018-08-17, in Chinese Patent Application No. 201280075818.9 (52pgs).	✓

Examiner Signature	/MICHAEL J MOORE JR/	Date Considered	01/22/2019
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¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.
 This collection of information is required by 37 CFR 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 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, 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 (1-800-786-9199) and select option 2.
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Leonardo Dagum *et al.* Confirmation No.: 4662
Appl. No. : 14/414,436
Filed : January 12, 2015
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Examiner : MOORE JR, MICHAEL J
Art Unit : 2467
Docket No. : 20145-073US

CERTIFICATE OF MAILING or EFS UPLOAD

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Dated: 2019-04-01 By: /Nita Miller/
Nita Miller

REPLY BRIEF

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

Dear Examiner Moore:

This paper is in response to the Examiner's Answer mailed February 1, 2019, and having a period for reply expiring April 1, 2019. Accordingly, this paper is timely filed.

Submitted herewith is payment of the Appeal Forwarding Fee Code 1413 in the amount of \$2,240. If any additional fees are due in connection herewith, the Commissioner is authorized to charge such fees to Deposit Account 50-2776.

Appl. No. : 14/414,436
Docket No. : 20145-073US
Office Action date : February 1, 2019
Response date : April 1, 2019

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Appl. No. : 14/414,436
Docket No. : 20145-073US
Office Action date : February 1, 2019
Response date : April 1, 2019

1. Status of Claims

Claims 1-110 were originally filed.

Claims 1-6, 8-9, 11-19, 21-36, and 38-40 are currently pending and have been finally rejected.

Claims 7, 10, 20, 37, 41-52, 54-61, 88, 89, 97-10, and 103-108 were canceled.

The final rejections of claims 1-6, 8-9, 11-19, 21-36, and 38-40 are at issue in this appeal.

Appl. No. : 14/414,436
Docket No. : 20145-073US
Office Action date : February 1, 2019
Response date : April 1, 2019

2. Grounds of Rejection to be reviewed on Appeal

Is the rejection of claims 1-6, 8-9, 11-19, 21-36, and 38-40 under pre-AIA 35 U.S.C. §103(a) proper?

Appl. No. : 14/414,436
Docket No. : 20145-073US
Office Action date : February 1, 2019
Response date : April 1, 2019

3. Arguments

I. **By providing citations with articulated reasoning not able to support the legal conclusion of obviousness**

In the Examiner's Answer, in response to Appellant's brief on appeal filed September 24, 2018 and corrected appeal brief filed October 26, 2018, the Examiner states that:

“Regarding claim 1, Appellant asserts that in the Final Office Action, the Examiner simply cited various paragraphs of *Zhao* with explanations not able to support applicability to the feature. Examiner respectfully disagrees and refers Appellant to the explanation provided in the Final Office Action pertaining to claim 1 as follows:

Zhao also teaches the servicing of received requests (change requests) from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency) as spoken of on page 4, paragraph [0064]. Zhao further describes where the measured performance parameters include latency data as spoken of on page 6, paragraph [0110].

Examiner maintains that the above description of *Zhao* describes what features of *Zhao* correspond to the claim limitation "sending an on-demand change request associated with at least one of throughput, or latency". (on pages 3-4)

*Zhao explicitly discloses in [0064] “According to the present disclosure, performance parameters which are measured at client sites **411-414** can be transmitted up through the hierarchy to the respective servers **402-404**. All of this information can then be sent from the servers to site monitor **401**, which can be used to organize the data according to selected categories.”*

Zhao explicitly discloses in [0110] “In one embodiment, the site monitor maybe operable to collect and/or process the following parameters: unique session visits; page response time data (average, minimum and maximum); server latency data (average, minimum and maximum).....”

Appl. No. : 14/414,436
Docket No. : 20145-073US
Office Action date : February 1, 2019
Response date : April 1, 2019

The Examiner states in the Examiner's Answer that "Based on the above citations of *Zhao, Zhao* teaches where the site monitor collects server latency data from the received requests from one or more clients 411-414, where the server latency data includes average, minimum and maximum server latency values, which indicates how latency changes in time among the monitored servers. Giving a broadest reasonable interpretation of the above claim language, the above received service requests from clients are considered "on-demand change requests" that are associated with latency."

Appellant respectfully disagrees.

First, regarding the server latency data, Appellant respectfully points out that the *Zhao* explicitly discloses that the server latency measurement is done at the sever side instead of at the clients 411-414. ([0265]: An enhanced PSP module **310** at the web server **308** may take measurements of web server latency and processing time and send the information to the site monitor **320**.) *Zhao* only discloses that the site monitor may collect server latency data from the server, but does not disclose or suggest that the server latency measurement is from received requests from one or more clients.

Second, regarding the requests from one or more clients, *Zhao* discloses that the client requests are web request ([0237], [0291], *etc.*), or JARTA¹ request ([0079]). There is no disclosure or suggestion that the request from client is a change request associated with latency.

(¹: JARTA: Java Application Response Time Analyzer: component installed on an end user's browser to collect various response time measurements and certain client system information and transmit this information to a server, as shown in abstract of *Zhao*)

Third, *Zhao* only discloses collecting server latency data without even disclosing changing latency, no matter in the site monitor, web server, or in client's side.

On the contrary, the element of "sending an on-demand change request associated with at least one of throughput, or latency" is an active step, performed by the downloadable agent, to request change for at least one of throughput or latency. The element is fully enabled in the specification. For example, [0055] of the present application gives an example of such on-

Appl. No. : 14/414,436
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Office Action date : February 1, 2019
Response date : April 1, 2019

demand change request associated with at least one of throughput, or latency. ([0055]: For example, DA **102** of the PC **101 b** sends a request via connection **109** to the server **105** to acquire higher throughput than current throughput for its DSL line **110**. In such an embodiment, the server **105** performs analysis based on available data in the database **106** and determines if the on-demand request by the PC **102 c** can be met. If it can be met, a report is provided to the DA **102** by the server **105** with information (e.g., cost etc.) about how to improve throughput).

Appellant respectfully asserts that such an active request for change associated with at least one of throughput, or latency is absent from disclosure or suggestion of *Zhao*.

Similarly, Burnette does not disclose the limitation of “**sending an on-demand change request associated with at least one of throughput, or latency**”.

Therefore, based on at least the above remarks, Applicant respectfully asserts that the claim 1 is not obvious over *Zhao* in view of Burnette.

The above mentioned remarks in regarding to amended claim 1 are also applicable to amended independent claim 20. Therefore, independent claim 20 is also patentably distinct from *Zhao* in view of Burnette.

In view of the above arguments, the Applicant respectfully asks the Board to reverse the Examiner’s rejection of 1-6, 8-9, 11-19, 21-36, and 38-40, and to all these claims as presently amended.

Respectfully submitted,

Date: April 1, 2019

By: /Xin Dai/
Xin Dai, Ph.D.
Reg. No. 72,098



Electronic Patent Application Fee Transmittal				
Application Number:	14414436			
Filing Date:	12-Jan-2015			
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
First Named Inventor/Applicant Name:	Leonardo Dagum			
Filer:	Michael V. North/Nita Miller			
Attorney Docket Number:	20145-073US			
Filed as Large Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
APPEAL FORWARDING FEE	1413	1	2240	2240
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2240

Electronic Acknowledgement Receipt	
EFS ID:	35585010
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	01-APR-2019
Filing Date:	12-JAN-2015
Time Stamp:	11:29:31
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$2240
RAM confirmation Number	040119INTEFSW11302500
Deposit Account	502776
Authorized User	Nita Miller

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37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)
 37 CFR 1.21 (Miscellaneous fees and charges)
 37 CFR 1.492 (National application filing, search, and examination fees)

37 CFR 1.492(a) (Basic national fee only)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Reply Brief Filed	073US_Reply_Brief.pdf	65034	no	7
			8501524cd8b1ce28156273fd0ba17edd283c9dcb		

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30678	no	2
			768296cfe028a7317dfd82803a5905e77052df2a		

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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
14/414,436 01/12/2015 Leonardo Dagum 20145-073US 4662

146571 7590 04/04/2019
North Weber & Baugh LLP - ASSIA
3260 Hillview Avenue, 1st Floor
Palo Alto, CA 94304

Table with 1 column: EXAMINER

MOORE JR, MICHAEL J

Table with 2 columns: ART UNIT, PAPER NUMBER

2467

Table with 2 columns: NOTIFICATION DATE, DELIVERY MODE

04/04/2019

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.

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NORTH WEBER & BAUGH LLP - ASSIA
3260 HILLVIEW AVENUE, 1ST FLOOR
PALO ALTO, CA 94304

Appeal No: 2019-003445
Application: 14/414,436
Appellant: Leonardo Dagum et al.

Patent Trial and Appeal Board Docketing Notice

Application 14/414,436 was received from the Technology Center at the Board on April 02, 2019 and has been assigned Appeal No: 2019-003445.

In all future communications regarding this appeal, please include both the application number and the appeal number.

The mailing address for the Board is:

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Telephone inquiries can be made by calling 571-272-9797 and referencing the appeal number listed above.

By order of the Patent Trial and Appeal Board.

TTP

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore, Jr.
	Attorney Docket Number	20145-073US

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore, Jr.
	Attorney Docket Number	20145-073US

1	Notification of Re-Examination in the related Chinese Patent Application No. 201280075818.9, mailed on February 27, 2019 (37pgs).	<input checked="" type="checkbox"/>
2	Response to Notification of Re-Examination in the related Chinese Patent Application No. 201280075818.9, filed on April 5, 2019 (3pgs).	<input type="checkbox"/>
3	Examination Report in the related European Patent Application No. 12773454.9, mailed on March 11, 2019 (4 pgs).	<input type="checkbox"/>
4	Response to Examination Report in the related European Patent Application No. 12773454.9, dated March 11, 2019, filed on May 22, 2019 (3 pgs).	<input type="checkbox"/>
5	Examination Report in the related European Patent Application No. 12773454.9, mailed on September 18, 2019 (6 pgs).	<input type="checkbox"/>
6	Response to Examination Report in the related European Patent Application No. 12773454.9, dated September 18, 2019, filed on February 3, 2020 (4 pgs).	<input type="checkbox"/>
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EXAMINER SIGNATURE

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*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	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore, Jr.
	Attorney Docket Number	20145-073US

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).

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See attached certification statement.

- The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
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SIGNATURE

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	/Michael North/	Date (YYYY-MM-DD)	2020-08-10
Name/Print	Michael North	Registration Number	46963

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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- (51) **International Patent Classification:**
H04M 11/06 (2006.01) H04L 12/24 (2006.01)
H04L 12/28 (2006.01) H04M 3/30 (2006.01)
- (21) **International Application Number:**
PCT/US2010/062604
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- (25) **Filing Language:** English
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- (71) **Applicant (for all designated States except US):** ADAPTIVE SPECTRUM AND SIGNAL ALIGNMENT, INC. [US/US]; 333 Twin Dolphin Drive, Redwood City, CA 94065 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** CHOW, Peter [US/US]; 750 Woodstock Lane, Los Altos, CA 94022 (US). RHEE, Wonjong [KR/US]; 235 Berry Street, Apt. 606, San Francisco, CA 94158 (US). TEHRANI, Ardavan, Maleki [US/US]; 350 Sharon Park Drive, R-24, Menlo Park, CA 94025 (US). GOLDBURG, Marc [US/US]; 226 Hillside Way, Redwood City, CA 94062 (US). GINIS, Georgios [GR/US]; 735 Folkstone Avenue, San Mateo, CA 94402 (US). MOHSENI, Mehdi [IQ/US];

806 Coleman Avenue, Apt. 24, Menlo Park, CA 94025 (US).

- (74) **Agents:** CALDWELL, Gregory, D. et al.; Blackely, Sokoloff, Taylor & Zafman LLP, 1279 Oakmead Parkway, Sunnyvale, CA 94085-4040 (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, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, 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, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) **Title:** MANAGEMENT CENTER FOR COMMUNICATION SYSTEM CUSTOMER PREMISES EQUIPMENT

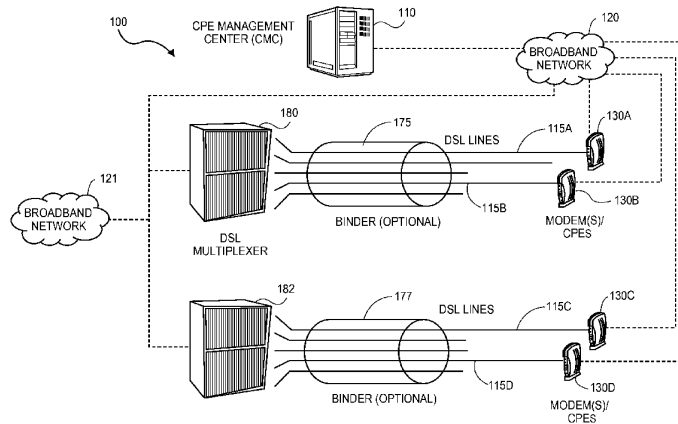


FIG. 1

- 110 CENTRE DE GESTION D'EQUIPEMENT CPE (CMC)
- 115B, 115D LIGNES DSL
- 120, 121 RESEAU A LARGE BANDE
- 130B, 130D UN OU PLUSIEURS MODEMS/EQUIPEMENTS CPE
- 175, 177 LIANT (FACULTATIF)
- 180, 182 MULTIPLEXEUR DSL

(57) **Abstract:** Described are systems and methods for a Digital Subscriber Line (DSL) customer premises equipment (CPE) Management Center (CMC). In one embodiment, the CMC includes a communications interface to receive information from the CPE device regarding operation of the CPE device. The received information is analyzed and a command signal generation module generates a corresponding command signal for transmission to the at least one CPE device to modify the CPE device operation based on the analysis results in a manner which either enhances CPE device performance, for example increasing data rate, or improves line stability, for example reducing CPE error rate.

WO 2012/091725 A1



Published:

— *with international search report (Art. 21(3))*

**MANAGEMENT CENTER FOR COMMUNICATION SYSTEM
CUSTOMER PREMISES EQUIPMENT**

TECHNICAL FIELD

The subject matter described herein relates generally to the field of communications systems, and in particular, a method and apparatus to manage customer premise equipment (CPE).

BACKGROUND

Many end user consumers including residential consumers and business consumers connect to the Internet by way of Digital Subscriber Line (DSL) technologies. With DSL technologies, a service provider provides an end user, or “customer” with access to a Broadband network via a twisted pair telephone line, referred to herein simply as a “line.” The use of such lines to deliver Broadband network content to an end user is beneficial because they have already been implemented throughout much of the world, and thus, Broadband network access requires minimal infrastructure build out between an end user’s location and the Broadband network interface.

Because the number of lines may be very great, lines service providers typically attempt to provision lines so that a certain minimal level of line performance and stability is achieved in a manner which will require little, if any, further consideration by the provider. Even where a provider might implement a more active line management program, a lack of insight into each end user’s experiences and demands coupled with the expense of needing to maintain a great number of lines may still result in a “set it to forget it” mentality on the part of a line provider or wholesaler which may ultimately dissatisfy an end user either with respect to perceived quality of service (QOS), etc.

Also, in some locations, a DSL services wholesaler provides DSL communication equipment to form an infrastructure for such services and DSL services resellers sell DSL services (e.g., “Internet access”) delivered over that infrastructure to individual end users. Because the DSL services wholesaler controls the equipment forming the

DSL infrastructure and the DSL services reseller maintains a services relationship with the consumers, conflicts exist between a DSL services wholesaler most interested in protecting the integrity of the infrastructure and a DSL services reseller desiring access and control of the equipment for the sake of managing service quality to their end users.

Whether the services are provided to the end customers by the wholesaler or a reseller service provider, the services to the end customers are typically monitored and configured by the DSL service providers management systems, which are in general operated by the wholesaler, and are located in the wholesaler's network (central office (CO), NMS, etc.). Any information from the end customer's equipment is therefore typically collected via the service provider equipment at the CO side, such as DSLAMs (DSL Access Multiplexers), network traffic routers, and gateways.

Furthermore, instructions, control and monitoring messages for controlling, collecting information, and configuring the end user/customer devices on the customer end, are also provided via equipment at the CO side. Such instructions and messages are communicated over information and communication channels provided between the customer side devices, and the service provider equipment. The customer side devices are also known as Customer Premises Equipment (CPE), and devices. An example of these communications channels are TR-69, Internet protocol (IP), Embedded Operational Channel (EOC), SNMP.

There are many instances, where certain information is not provided from the customer side to the service provider side. For example, there is limited bandwidth provided for the control communication channels between the customer devices and the service provider equipment, therefore limited information is exchanged between the customer devices and the service provider equipment. Furthermore, the customer devices are exposed to impairments on the CPE side, such as noise, interference (radio interference, impulse noise) etc., which may not be readily deduced from the service provider side. As another example, where an ILEC (Incumbent Local Exchange Carrier) operating a central office (CO) might implement line management at the CO side of the Line, a CLEC (Competitive Local Exchange Carrier) may assume the role of a third party with

respect to line management via the CPE side, particularly where the CLEC leases line capacity and may lack any access to the central office (CO) side.

There could also be limitations on the CO side for provisioning or configuring the DSL system. For example, there are limitations with respect to how information and settings are managed by certain types of DSLAMs. For example, the range of parameter settings within certain types of DSLAMs may not comply with established industry specifications, or the DSLAM Management Information Base (MIB) or certain parameters within the MIB might not be accessible. In other instances, the DSLAM MIB might not allow the range of certain parameters to be changed. These limitations would prevent provisioning, improving or optimizing the performance of DSL connections.

The present state of the art may benefit from embodiments of the present invention by providing an interface to the lines through which line performance may be enhanced and/or line problems diagnosed.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments are illustrated by way of example, and not by way of limitation, and can be more fully understood with reference to the following detailed description when considered in connection with the figures in which:

Figure 1 illustrates an exemplary system in which embodiments of a customer premises equipment (CPE) Management Center may operate;

Figure 2 illustrates exemplary functional modules of a CPE Management Center which embodiments may utilize;

Figure 3A is a flow diagram illustrating operation of a CPE Management Center in accordance with exemplary embodiments;

Figure 3B is a flow diagram illustrating modification of CPE operation, in accordance with an exemplary embodiment;

Figure 4 illustrates an exemplary CPE network in which embodiments of a CPE Management Center may operate;

Figure 5 illustrate exemplary components of a CPE which embodiments may utilize;
and

Figure 6 illustrates a diagrammatic representation of a machine in the form of a
computer system, in accordance with one embodiment.

DETAILED DESCRIPTION

Described herein is a DSL customer premises equipment (CPE) Management Center (CMC) and methods for implementing and operating a CMC. Generally, a CMC manages lines via the CPE side of a Line in an “end user-centric” manner. The CMC is to provide a means for Line management either directly to an end user of a CPE or to third party serving a plurality of end users as part of a consumer market. For example, where an ILEC (Incumbent Local Exchange Carrier) operating a central office (CO), might implement line management at the CO side of the Line, a CLEC (Competitive Local Exchange Carrier) may assume the role of this third party with respect to line management via the CPE side, particularly where the CLEC leases line capacity and may lack any access to the central office (CO) side. In such an embodiment, the CMC provides the CLEC an interface to the lines through which line performance may be enhanced and/or line problems diagnosed even where the management interface of a Digital Subscriber Line Access Multiplier (DSLAM) for various lines is not directly accessible. In other instances, an end user might contract line management services with the third party separately from the DSL provider.

In embodiments, the CMC management functions include: 1) collecting operational data characterizing CPE device operation on a particular line, and 2) providing analysis/diagnostics of the line based on at least the collected operational data, and/or 3) automatically modifying CPE device operation, again based at least on the collected operational data, to enhance line performance. Examples of diagnostics include identifying line problems, such as wiring defects. Examples of enhancing line performance include increasing the data rate of the line or stabilizing the line (e.g., reducing error rates).

As used herein, the terms “end user,” “subscriber,” and/or “customer” are used interchangeably and all refer to a person, business and/or organization to which communication services and/or equipment are provided by any of a variety of service provider(s). Further, the term “customer premises” refers to the location to which communication services are being provided by a service provider. As an example when the Public Switched Telephone Network (PSTN) used to provide DSL services, customer premises are located at, near and/or are associated with the network termination (NT) side of the telephone lines. Exemplary customer premises include a residence or an office building.

The term “service provider” refers to any of a variety of entities that provide, sell, provision, troubleshoot and/or maintain communication services and/or communication equipment. Exemplary service providers include a telephone operating company, a cable operating company, a wireless operating company, an internet service provider delivering services over its own communications infrastructure or the communications infrastructure of a another party, or any third party that diagnoses or improve broadband communication (DSL, DSL services, cable, etc.) performance.

In the following description, numerous specific details are set forth such as examples of specific systems, languages, components, etc., in order to provide a thorough understanding of the various embodiments. It will be apparent, however, to one skilled in the art that these specific details need not be employed to practice the disclosed embodiments. In other instances, well known materials or methods have not been described in detail in order to avoid unnecessarily obscuring the disclosed embodiments.

In addition to various hardware components depicted in the figures and described herein, embodiments further include various operations which are described below. The operations described in accordance with such embodiments may be performed by hardware components or may be embodied in machine-executable instructions, which may be used to cause a general-purpose or special-purpose processor programmed with the instructions to perform the operations. Alternatively, the operations may be performed by a combination of hardware and software, including software instructions

that perform the operations described herein via memory and one or more processors of a computing platform.

Embodiments also relate to a system or apparatus for performing the operations herein. The disclosed system or apparatus may be specially constructed for the required purposes, or it may comprise a general purpose computer selectively activated or reconfigured by a computer program stored in the computer. Such a computer program may be stored in a non-transitory computer readable storage medium, such as, but not limited to, any type of disk including floppy disks, optical disks, CD-ROMs, and magnetic-optical disks, read-only memories (ROMs), random access memories (RAMs), EPROMs, EEPROMs, magnetic or optical cards, or any type of media suitable for storing non-transitory electronic instructions, each coupled to a computer system bus. In one embodiment, a non-transitory computer readable storage medium having instructions stored thereon, causes one or more processors within a system to perform the methods and operations which are described herein. In another embodiment, the instructions to perform such methods and operations are stored upon a non-transitory computer readable medium for later execution.

Figure 1 illustrates architecture of an exemplary CMC system 100 in which embodiments may operate in compliance with the G.997.1 DSL management standard (also known as G.ploam), and one or more of the following DSL transmission standards: Asymmetric Digital Subscriber Line (ADSL) systems (one form of Digital Subscriber Line (DSL) systems), which may or may not include splitters, operate in compliance with the various applicable standards such as ADSL1 (G.992.1), ADSL-Lite (G.992.2), ADSL2 (G.992.3), ADSL2-Lite G.992.4, ADSL2+ (G.992.5) and the G.993.x emerging Very-high-speed Digital Subscriber Line or Very high-bitrate Digital Subscriber Line (VDSL) standards, as well as the G.991.1 and G.991.2 Single-Pair High-speed Digital Subscriber Line (SHDSL) standards.

The CMC system 100 includes multiple CPE devices 130A, 130B, 130C, and 130D, each of which corresponds to an end user location such as a customer's residence or business. In one embodiment, each of the CPE devices 130A-D are DSL modems located within a customer's home or business to which the customer's home or

business networked terminal devices are coupled. The CPE device could also be a broadband gateway, or a broadband modem, providing broadband connectivity to the customer premises.

As illustrated in Figure 1, the CMC system 100 further includes an access aggregation device 180, 182 coupled to the CPE devices 130A-D via one or more twisted pair lines 115A-D (e.g., POTS telephone lines and the like). Multiple twisted pair lines 115 associated with different customer's remote DSL terminals may travel through or be co-located within binders 175, 177. Figure 1 depicts the twisted pair lines 115A, 115B connecting CPE devices 130A and 130B as traversing the common binder 175 and twisted pair lines 115C, 115D connecting CPE devices 130C and 130D. One or more lines 115C, 115D could be connected to the same CPE. As an example, embodiments of the current invention include DSL bonding, and/or DSL vectoring, wherein multiple lines are connect to the same CPE device.

Each access aggregation device 180 and 182 has multiple physical ports to which the twisted pair lines 115A-D are connected. As depicted, CPE devices 130A, 130B connect with physical ports of access aggregation device 180 while CPE devices 130C, 130D connect with physical ports of access aggregation device 182. In one embodiment, each of the plurality of access aggregation devices 180, 182 are DSLAMs co-located at a physical CO location which may include other equipment operated by an ILEC, for example. Alternatively, the access aggregation device 180, 182 may be located remotely from each other and remotely from a CO location. Each access aggregation device 180, 182 is connected via a broadband link to a Broadband network, which is then in turn accessible to the various CPE devices 130A-D. The DSLAMs may connect to the broadband network 120 and/or a provider's private broadband network 121 in the operator's infrastructure, while the CMC connects to the CPE over the Internet via the broadband network 120.

The CMC system 100 further includes the CMC 110. In the exemplary embodiment depicted in Figure 1, the CMC 110 is communicatively coupled to the CPE devices 130A-D over a wide area network (WAN). For WAN embodiments, the CMC 110 is coupled to the CPE device through the broadband network 120. In an alternate

embodiment, the CMC 110 is connected to the CPE devices 130A-D directly or over a local area network (LAN) at the customer premises. As previously noted, CMC 110 may be operated by an independent entity for monitoring and controlling one or more CPE devices 130A-D as a controller, assisting end users of the CPE devices 130A-D. The CMC 110 may also be referred to as a Controller, Network Management Server (NMS), Element Management Service (EMS), or the like with the understanding that the control is exerted over the CPE device. For certain embodiments, for example, control by the CMC 110 is independent of management on the CO-side of the line.

Figure 2 depicts functional modules of the CMC 110, according to an embodiment of the invention. The CMC 110 includes a data collecting means such as the Data Collection module 210, an analyzing means, such as the Analysis module 220, and an instruction generating means, such the Instruction and Command Generation module 230. These functional modules of the CMC 130 may or may not all be in the same location and/or provided by the same equipment, and may instead be distributed in different locations and separately accessed. Each module of the CMC 110 may be implemented by one or more servers each having one or more programmable processors executing code and accessing the Data Storage Means 240 comprising memory as well as other non-transitory storage media (e.g., hard drives and the like). Figure 3A depicts a flow diagram of a CMC method 300 which is performed by the CMC 110, in accordance with an exemplary embodiment. Some of the blocks and/or operations listed in Figure 3A are optional in accordance with certain embodiments. The numbering of the blocks presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur.

CPE-based Line Information Collection

CMC method 300 begins at operation 310 with the data collection module 210 collecting information from the CPE device 130 (e.g., CPE DEVICE 130A). The data collection module 210 is to collect such data on a periodic basis, on-demand, in real-time or on any non-periodic basis. Whether the CMC 110 is communicatively coupled to the CPE device 130 through the broadband network 120 (e.g., for example the Internet) or is operating and connected locally on a CPE terminal or connected over the provider's network 121, the data collection module 210 is operable to receive

information regarding operation of the CPE device 130 from the CPE device 130 via one or more of: analog POTS, cellular data communications, wireless data communications, Broadband Forum TR-069, internet data communications (e.g., TCP/IP protocol or other means outside the normal internal data communication systems within a given DSL system), electronic mail communications such as SNMP, and a DSL communication channel such as the Operation, Administration, and Maintenance (OAM) and Embedded Operational Channel (EOC) specified by the G.997.1 or G.992.x standards for physical layer management for ADSL transmission systems.

As further illustrated in Figure 3A, the data collection module 210 is operable to also collect information from optional sources demarked by dashed lines. In some embodiments, the additional points of information collection are at least exclusive of the CO-end of a line and may further be particular to collection points present on the CPE-side of the line only. However, in some embodiments, the CMC 110 does collect information from the access aggregation device coupled to the CPE device 130 (e.g., a DSLAM 180 for CPE device 130A). In such an embodiment, sufficient access to the CO is made available to the CMC 110 so that operational data for a line may be collected by the data collection module 210 in addition to the operational data collected from the CPE DEVICE 130 and other CPE-side collection points. In some such embodiments, the access to the CO is limited in that CMC 110 is afforded no control over the DSLAM operation.

In an embodiment, the CMC 110 is coupled to a diagnostic and remedy guidance device 359 (“diagnostic device”) present on the CPE end of the line. Referring to Figure 4, which expands on the CMC system 100 by further illustrating CPE terminals coupled to the CPE device 130 (e.g. in a home network), the diagnostic and remedy guidance device 359 may be implemented as a set top box or integrated into another device (e.g., the CPE device 130 itself). In certain embodiments, the diagnostic and remedy guidance device 359 is operable to analyze a line performance (e.g., during showtime operation) for a predetermined operational performance signature indicative of a line condition and to provide guidance on mitigating such a condition. In other embodiments, the diagnostic and remedy guidance device 359 is operable to perform

single ended line tests (SELT), for example while an end user is not utilizing the line for access to the broadband network 120. The SELT performed by the diagnostic and remedy guidance device 359 may be any conventionally performed line test (e.g., line reflectance measurements, etc.), but rather than requiring a truck roll and technician intervention, the diagnostic and remedy guidance device 359 is operable to perform the measurements autonomously. As shown in Figure 3A, the data collection module 210 may access the diagnostic information determined by the diagnostic and remedy guidance device 359.

In an embodiment, the CMC 110 sources end user preferences from which the data collection module 210 acquires information provided by the end user of the CPE device 130. The user preferences may relate to, for example, desired data rates, quality of services for video, audio and data transmission, and time of day usage, and are typically tailored to the type of broadband network content being accessed via the CPE device 130 and/or the type of customer network coupled to the CPE DEVICE 130. The end user preference information may come from a database of user preferences 362 which aggregates user preference information entered by an end-user for each CPE device 130 being managed by the CMC 110, for example at the time a CMC account is established by an end user.

In an embodiment, the CMC 110 sources end user feedback 364 from which the data collection module 210 acquires information regarding an end user's contemporaneous experiences with the CPE device 130. For example, the data collection module 210 may access information provided by an end user of the CPE device 130 indicating that received content is pixilated, inadequately buffered, or the like. Depending on the embodiment, the end user feedback may be provided to the CMC 110 via an application device interface, such as the CMC user interface 472 further illustrated in Figure 4.

Further referring to Figure 4, in an embodiment, the CMC user interface 472 is coupled with the CMC 110 (i.e., hosted by the CMC 110 through the broadband network 120). In another embodiment, the CMC user interface 472 is hosted by the CPE device 130. For example, the CPE device 130 may include a web server which an end user may

access to provide feedback real-time. For such an embodiment, the CMC 110 may be executing on the CPE device 130 itself or on CPE terminal device as a LAN embodiment of the CMC system 100. Alternatively, the CMC user interface 272 is supported by a noise cancellation or signal conditioning device, for example implemented as a set top box 449, separate from the CPE device 130. The noise cancellation device or signal conditioning device 449 may comprise a filter bank utilizing filter coefficients generated via any filtering techniques known in the art, such as, but not limited to, DSL vectoring, DFE, GDFE, and the like. In other embodiments, the diagnostic and remedy guidance device 359 previously described or an ACS device 374 supports an application providing the end user interface 472. Similarly, a controller or input device of the multimedia/computing device 471 may also provide the end user interface 472 through which an end user indicates an instantaneous problem.

In an embodiment, the CMC 110 is coupled to an operational database 366 from which the data collection module 210 acquires stored operational data that is generated as a result of a CPE device's performance in the DSL communication system. Such stored operational data may have been collected over a period of time at some sample rate that minimizes performance reductions (e.g., 15 second intervals minutes apart over different times of day, etc.). The stored operational data accessed by the CMC 110 may be for the target line being managed and/or at least one other non-target line to improve inferences regarding the target line. In one such embodiment, the CMC 110 accesses the operational database 366 to collect operational data for a non-target line contained within a binder common to the target line being managed. For example, where the CMC 110 is to manage the line 115A, operational data stored for lines 115A and 115B, etc. may be accessed from the operational database 366.

In an embodiment, the CMC 110 is coupled to a Broadband network information database 368 from which the data collection module 210 accesses information regarding the type and performance of the Broadband network 120. For example, a CMC operator may provide physical inventory of the Broadband network 120 including characterization of a Broadband link in the Broadband network (e.g., the DSL line 115), a history of the broadband communication link's characterization, a location of the link within the Broadband network, and use of the communication link.

As further depicted in Figure 3A, the CMC 110 may be coupled to a Broadband network content delivery system 371, such as a set top box (e.g., multimedia/computing device 471 depicted in Figure 4) from which the data collection module 210 may determine information about the performance demands placed on the line via the CPE DEVICE 130. In such embodiments, any of motion picture subscription service parameters, streaming video service parameters, internet television service parameters, music subscription service parameters, network gaming or entertainment service parameters, or Voice over Internet Protocol (VoIP) telephony service parameters, may be collected.

In further embodiments, the CMC 110 sources a customer premises network higher-layer protocol information database 373 from which the data collection module 210 receives information such as, but not limited to, packet loss and TCP/IP network information. The network higher-layer protocol information database 373 may contain such information for each of the lines to be managed by the CMC 110. The CMC 110 may additionally source the ACS device 374 to access information relating to the customer premises network and/or usage of the line via the CPE device 130.

CPE-based Line Analysis

Returning to Figure 2, the CMC 110 includes an analyzing means, such as the analysis module 220 which is communicatively connected to the data collection module 210. As illustrated in Figure 3A, at operation 320, the analysis module 220 is to analyze the information received by the data collection module 210. Analysis of that information may be performed real time as information is received by the collection module 220, or may be performed periodically, or on demand, by accessing data collected by the data collection module 210 and stored in the data storage means 240. Analysis module 220 is to determine whether the instruction and command signal generation module 230 is to send instructions to one or more of the CPE devices 130 to enhance line performance and/or stability. The analysis module 220 is further to determine if the report generation module 250 is to issue a line diagnostics report conveying the analysis results to an end user and/or operator of the CMC 110.

In one embodiment, the analysis module 220 is to perform analysis at operation 320 based on collected information including one or more of: downstream attenuation, magnitude of channel response (Hlog) information, downstream bit, gain, and signal to noise ratio (SNR) table, quiet line noise table, impulse noise history, history of downstream code violations (CV) or upstream CV, history of downstream errored seconds (ES) or upstream ES, history of downstream forward error correction (FEC) or upstream FEC, history of retrains; history of bit swap or other real time adaptive features; history of fast retrains and/or SOS's, or line impedance. SOS relates to sudden and severe noise conditions, where a rapid rate adaptation (RRA) solution, known as SOS in the ITU-T standard, is a promising mitigation strategy to sustain the link and prevent the DSL modem to retrain. Since the CMC 110 is collecting data from potentially a plurality of sources, but at a minimum is collecting information from the CPE DEVICE 130, the line performance enhancement is CPE-centric.

Generally, line analysis may include line diagnostic functions performed at operation 320 including, without limitation: bad splice detection, bridged tap detection, impulse noise detection, split pair detection, identification or classification of noise and/or interference sources, Amateur Radio (HAM) detection, AM radio detection, HDSL detection, T/E1 detection, high-power noise detection, unbalanced wiring detection, maximum data rate analysis, and forward error correction (FEC) analysis. Results of these diagnostics functions are optionally stored in the CMC storage means 240 for future or immediate reference.

Analysis of Line Quality & Stability

The analysis module 220 may employ a number of techniques with the information collected from the CPE-side of the line. For example, in one embodiment operation 320 entails analyzing line instability and/or quality based on the channel performance monitoring parameters and/or line performance monitoring parameters obtained from at least the CPE DEVICE 130. In a particular embodiment, line instability and/or quality is analyzed in method 300 based on parameter values obtained from the CPE-side of the line. For example, distributions of parameter values collected over time are evaluated. Both line instability and quality can be determined from evaluation of such distributions. For example, if the distribution for CV does not satisfy threshold

conditions, then the line is declared unstable. As another example, if the distribution of FEC does not satisfy threshold conditions, then the line is declared of poor quality. Thresholding expressions may also be constructed using combinations of rules with multiple parameters from the CPE-side. These expressions could depend on the vendor and/or system ID of the CPE device 130.

Information characterizing a line problem or failure may be recorded to the data storage means 240 (Figure 2). For example, the time/day of line problems can be recorded to provide statistical information about the times and days when such events are most likely to happen. This can be achieved for example by recording the intervals when CV or some other channel/line performance monitoring parameter exceeds a certain threshold. A failure may also be recorded, for example, if the parameter falls below the threshold.

Any conditions derived from parameters such as the above may also incorporate performance parameters such as data rate, maximum attainable bit rate (MABR) and margin. For example if MABR is used as the performance parameter for a specific line, collected MABR data for that line is compared to a neighborhood average for the given loop length. If the MABR data rates are lower than the average of those for neighboring lines by a predetermined margin, then the line is considered likely of being unstable. The average neighborhood MABR is obtained by: collecting MABR data in the neighborhood network of a line, taking the average or other statistical function of the MABR for lines which have similar loop lengths. This data can also be updated over time. The network neighborhood average shows the expected MABR for all the lines in a specific neighborhood, and if a line MABR drops below that average, it could be an indication of a line problem. Examples of the other statistical functions, besides the mean, could include “median” or “X percentage worst case value” being the MABR for which X percentage of the lines have lower MABR.

Analysis of Noise Type

In a further embodiment, the analysis module 220 is to identify a type of noise in the line based on the information received from the CPE device 130. For example, where stability or quality is determined to be poor, then a further decision is made as to the

type of noise/disturbance that is causing the poor line stability. The type of noise/disturbance may be compared to the noise at the CPE device 130 before a line failure and after a line failure including a so-called "SOS event" or an SRA event, where the modem in the DSL receiver remains operational, but reduces its data rate. SOS relates to sudden and severe noise conditions, where a rapid rate adaptation (RRA) solution, known as SOS in the ITU-T standard, is a promising mitigation strategy to sustain the link and prevent the DSL modem to retrain. SRA (Seamless Rate Adaptation) relates to slow to moderately varying noise cases, where rates are adaptively reduced. A significant difference between the measured noises indicates that the line failure occurred because of a substantial increase of the noise level. Comparable noise levels before and after the line failure indicate that causes other than an increase in the noise lead to the line failure. Notably, a major advantage of the CPE-centric management systems and methods described herein relates to noise analysis/mitigation because the CO-side (e.g., DSLAM) does not necessarily experience the same noise as the end user. For example, duration, timing, periodicity of noise, and characterization of noise is often particular to the end of the line from which it is measured.

A CPE-side noise measurement before the line failure is preferably made at least a few seconds before the line failure occurs. The noise measurement after the line failure should be made after the line has reinitialized (or after the SOS or SRA procedure to reduce data rate has concluded) and is in stable condition (e.g. signal to noise ratio (SNR) margin is stable, CV count is Low, etc.). Other embodiments may utilize any other of the many techniques known for evaluating the noise via the CPE-side of the line. In one embodiment, for example, the CPE device 130 reports the mean-square-error (MSE) of its decoder. Such error may correspond to a slicer's output, a trellis decoder's output, or a RS decoder output.

If it is found that the noise before and after the line failure is not significantly different, then it is determined that the line failure may be the result of a power loss, or the result of a severe impulse noise event (for example, a voltage surge on the line). In order to differentiate between power loss and impulse noise event, some additional checks can be performed. For example, a check if line failure is correlated with a loss-of-power

(LPR) failure reported by CPE device, a check if the CPE device is powered by a computer such as via a USB connection to the multimedia/computing device 471, a check if neighboring lines experience failures at the same or similar times indicating a severe impulse noise event, a check if CPE device 130 is in saturation, there's an increase of received signal power, activation of circuit protection logic, overflow bits or similar activated indications. If such exist, then it is likely a severe impulse noise event has occurred. Otherwise, stationary noise is declared. For either power loss or impulse noise events, the information characterizing the line failure can be recorded, for example, the time/day of the failure can be recorded to provide statistical information about the times, days when such events are most likely to happen.

In an embodiment, an impulse noise event duration is estimated by using channel or line performance monitoring parameters and recording the length of time over which these parameters exceed a certain threshold. The impulse noise width and period may also be estimated, if the intervals for measuring performance monitoring parameters are made short enough to be in the order of microseconds. Even if such short intervals are not possible, the repetitive impulse noise can still be approximately characterized based on the collected parameter values. For example, repetitive impulse noise may be characterized as level 1, if CV exceeds a first threshold for a first percentage of intervals, or may be characterized as level 2, if CV exceeds a second threshold for a second percentage of intervals.

The collected data in the various embodiments of the current invention, and used in the analysis embodiments include one or more of the following data, sources of information, and collected operational parameters: data rate data; Signal-to-Noise Ratio ("SNR") margin data; maximum attainable data rate data; aggregate transmitted power data; code violation count data; forward error corrections data; errored seconds data; errored minutes data; retrain counts data; channel attenuation data; noise power spectral density data; crosstalk coupling data; far-end crosstalk coupling data; near-end crosstalk coupling data; echo transfer function data; and data pertaining to crosstalk between the DSL modem pair and a second DSL modem pair operating on a neighboring DSL line.

The collected data in the various embodiments of the current invention, and used in the analysis embodiments, may further include one or more of the following: any stored list of events including DSL physical layer anomalies, defects and faults together with the event time stamps that has led to SOS activation; SOS activation times, durations and average data rate loss; any stored list of events including DSL physical layer anomalies, defects and faults together with the event time stamps that has led to a fast retrain, a failed retrain or a full retrain; INM (Impulse noise monitoring) histograms and impulse noise statistics; echo transfer function or un-cancelled echo PSD; retransmission statistics including the number of retransmitted blocks, number of successfully retransmitted blocks; total number of blocks; average, minimum and maximum throughput.

Diagnosis of Line Conditions

In embodiments, line conditions, such as problems like wiring defects, causing line instability or poor quality are diagnosed at operation 320 by analysis of information collected by the CMC 110 over time. Since the CMC 110 is collecting data from potentially a plurality of sources, but at a minimum is collecting information from the CPE DEVICE 130, the line wiring diagnostics are CPE-centric.

Generally, at operation 320, the analysis module 220 may employ one or more techniques to detect line problems with the information collected from the CPE-side of the line. Because the embodiments described herein use the information collected from the line, for example, during showtime, line wiring conditions/defects may identified without disruption to the end user's DSL service.

In one embodiment, at operation 320 line performance metrics are generated, based on the received information, and then evaluated against a predetermined condition indicative of a line problem, such as a wiring defect. There are many known types of wiring defects in DSL systems. For example in some countries the in-house DSL wiring often includes a redundant third wire that was used for ringing a telephone bell several decades ago. The third-wire is not used any more, but the existence of such third wire in DSL systems creates an unbalanced impedance. Often, a parameter such as the bit distribution of a DSL line with a line problem, such as a wiring defect, may

have abrupt changes and therefore it is possible to differentiate a line with a wiring defect from a typical line by quantifying the variations across frequency bins (tones), and comparing against predetermined thresholds. Generally, when a metric passes the threshold, whether exceeding or falling below the threshold, the line parameter may be considered to have rapid variations.

A reference database accessible to the analysis module 220 (e.g., provided by storage means 240) may include a plurality of a line problems (e.g., wiring defects), each line problem associated with one or more reference metrics. At operation 320, reference information is compared the one or more performance metrics derived from the CPE information to identify the line problem, such as a wiring defect. These performance metrics may be the average sum of changes in the parameter values across all or preselected number of tones. The performance metrics may also be the number of tones over which the parameter has changed. Alternatively, the performance metric could also be the sum of absolute values of changes, or their power, across all or preselected number of tones.

In another embodiment, the performance metric is average noise change in the DSL signal. Quiet-Line-Noise (QLN) or Mean Square Error (MSE) per tone may also be utilized, or the noise may be estimated indirectly from SNR, HLOG and PSD. For example, $MSE(n) = PSD(n) + Hlog(n) - SNR(n)$, where n is the frequency tone index. QLN is the measured noise when the modem is neither active nor training. However, the noise may change significantly with time. This noise at later times during operation is referred to herein as MSE noise (Mean-Square-Error noise) or MSE function.

The above metrics can be applied to other DSL line parameters (such as bit distribution, Hlog (Hlin), SNR and measured noise). Hlog (Hlin) and SNR per tone samples are already reported parameters similar to the bit distribution, which then could be used in the analysis. The calculated detection metrics are compared against a pre-chosen threshold.

If any of the metrics are above (or in some embodiments below) their corresponding threshold, the line is considered to have a wiring defect. In another embodiment, a

combination, for example a Boolean or logical combination of the values of the above metrics are compared against a single threshold.

Instruction and Command Signal Generation

As further illustrated in Figure 3A, following the analysis operation 320, a command or instruction signal is sent from the CMC 110 to the CPE device 130 at operation 340, to modify the CPE device operation, and/or a report of the analysis is issued at operation 350. As denoted by the return arrow between operation 340 and operation 310, command signal generation may dynamically modify the CPE device operation in response to changes in the received information.

In an embodiment, the command or instruction signals are communicated over information and communication channels provided between the CPE devices, and the CMC 110. An example of these communications channels are TR-69, Internet protocol (IP), Embedded Operational Channel (EOC), and SNMP.

The signal generation operation 340 is performed by the instruction and command signal generation module 230 (Figure 2). The instruction and command signal generation module 230 is configured to accept a parameter value generated by the analysis module 220 and, at operation 340, generate a signal for use by the CPE device 130 to modify its operation so as to enhance line performance, improve stability, or reduce errors in the modem. The instruction and command signal generation module 230 may or may not be part of the analysis module 220 and/or be implemented in the same hardware, such as a computer system. Instruction and command signal generation module 230 constitutes a means for regulating one or more parameter values in the CPE device 130.

In a particular embodiment, the nature of the analysis results dictates whether a report is issued (e.g., by report generation module 250), the CPE device operation modified via instructions issued to the CPE (e.g., by instruction and command signal generation module 230), or both. For example, diagnosis of certain line problems may result in no generation of an instruction command or signal at operation 340. If the results of the

analysis indicated that there is no need to make any changes to the CPE configuration or settings then no command or signal is generated.

Where an instruction and command signal is issued to the CPE device 130 at operation 340, the signal may include, without limitation: a minimum INP override instruction; a target INP change instruction; a Maximum delay override instruction; a target delay change instruction; a channel initialization policy override instruction; an instruction to turn off specific downstream tones; an instruction to change transmit power over specific downstream tones; an instruction to force a CPE initiated re-training at a scheduled time; an instruction to Lower the maxR (representing the maximum rate); an instruction to change maximum data rate; or an instruction to change target margin. For example, one or more of the following physical layer parameters, could be set by the instruction and command signal: a Maximum Nominal Power Spectral Density (“MAXNOMPSD”); a Maximum Nominal Aggregate Transmitted Power (“MAXNOMATP”); a Gain (“gi”); a Bit loading (“bi”); a Power-Cut-Back (“PCB”); a Maximum Received Power (“MAXRXPWR”); a Power Spectral Density Mask (“PSDMASK”); a Preferred Band (“PREFBAND”); a Target Signal-to-Noise Ratio Margin (“TARSNRM”); a Minimum Signal-to-Noise Ratio Margin (“MINSNRM”); a Maximum Signal-to-Noise Ratio Margin (“MAXSNRM”); a frequency-dependent Bit-Cap (“BCAP”); a frequency-dependent Target Signal-to-Noise Ratio Margin (“TSNRM”); a Transmit Spectrum Shaping (“TSSi”); a specification of bands affected by radio frequency interference; a Carrier Mask (“CARMASK”); a per band preference band indication; a per tone bit cap; a per tone TARSNRM; a minimum data rate; and a maximum data rate.

In an embodiment, the command signal issued to the CPE device 130 at operation 340 modifies the CPE device operation within a channel or line parameter value guard band established by the CO. For example, where a CO establishes a line profile, minimum or maximum values for a given channel or line parameter may also be established. In that case, the command signal issued to the CPE device 130 at operation 340 may modify the CO-established line profile, as constrained within the minimum and maximum values. As such, the CPE-centric management functions performed by the

CMC 110 may be balanced with a CO operator's need to maintain some control over the infrastructure.

Figure 3B is a flow diagram illustrating CO-constrained modification of CPE operation, in accordance with an exemplary embodiment. Some of the blocks and/or operations listed in Figure 3B are optional in accordance with certain embodiments. The numbering of the blocks presented is for the sake of clarity and is not intended to prescribe an order of operations in which the various blocks must occur. As shown in Figure 3B, a CPE operation modification method 355 begins at operation 360 with the CMC 110 determining one or more line parameter values associated with a CO-imposed line constraint. Such parameters value constraints, may for example be included in data collected from the CO at operation 310 of Figure 3A (e.g., pertaining to operational settings of the DSLAM 180).

In many instances, the range of values (minimum and/or maximum) for a given operational command or line parameter specified by the operator at the CO side may represent values which cause a non-optimum performance of the line or even in some cases cause instability. This is because operators typically assign the same line profile to all lines within their network. Operators prefer this simple approach, especially when dealing with hundreds of thousands of lines, further because segments of their network could also have been leased to resellers. However, each line could be experiencing different conditions and impairments. For example, in an environment with strong impulse noises, a very low margin setting for a line could cause the lines to become unstable. A proper setting in such cases would be to increase the minimum margin to a larger value. In yet other instances, the DSLAM MIB might not allow the range of certain parameters to be changed. These limitations would prevent provisioning, improving or optimizing the performance of DSL connections, when such limitations exist.

In such cases, at operation 370, the analysis module 220, determines to what extent one or more limits or range of line parameter values may be changed within the CO-imposed constraints. For example, the diagnostic and analysis techniques described elsewhere herein for the line analysis operation 320 may resolve a first set of line

parameter values and at operation 370 that first set of line parameter values is limited by the CO-imposed constraints. Alternatively, a constrained optimization routine may be performed at operation 370 to incorporate predetermined CO-imposed constraints into the analysis operation 320 to arrive at one or more modified parameter values, limits, or range of values, in view of CO-imposed line constraints. If the results of the analysis indicated that there is no need to make any changes to the CPE configuration or settings then no command or signal is generated, and the method 360 returns to operations 310 or 350 to collect more data as part of ongoing line management and/or issues a report of the analysis cycle.

When the analysis results indicate that existing settings need to be overwritten, if there are no CO-imposed constraints instruction signals are generated for overriding the settings with the new values at operation 370. For example, the instruction generation means (e.g., module 230) overwrites, or otherwise changes the limits or the range of line parameter values by setting the parameter values or their limits on the CPE side, and on the CPE device. Where the instruction generation is further based on CO-constraints, the analysis may also trigger generation of instruction signal at operation 375 for reconciliation of the settings. For example a CO-imposed upper limit may be retained, while a lower limit is increased. An example would be for margin control, where an upper margin limit is kept the same, however the minimum margin is increased, to provide more protection against unexpected noise sources such as impulse noise. Such a setting could for example enable stabilizing the line, or improving the performance of the line when such a change is not possible on the CO side. In another example, one change at operation 375 includes limiting the range of parameters, within the existing range already pre-assigned on the line. In this example embodiment, the original range is set at the CO side, and the new range is being set at the CPE side, and the new range is not the same as the original range. The lower limit is higher than the existing minimum limit, and the upper limit is lower than the existing maximum limit. With limiting the range, the new range could assist with either improving the performance of the line or reducing or eliminating the instability of the line.

Standard parameter settings may also only have a lower limit or only a higher limit. For example, in standard implementations Impulse Noise Protection (INP) parameter is

assigned a minimum INP (MIN INP), value but no maximum INP value. This lower value is normally set at the DSLAM by the line operator. In practice, modems would train to overcome impulse noise, and at times when hit by large impulse noise, the INP value is set to a very large value, which could impair the performance of the DSL connection. Since the DSLAM and the standards do not support an upper limit for INP, this impairment could not be overcome. Embodiments of present invention enable overwriting and setting the upper limit at the CPE side (e.g., at operation 370), by setting an upper limit for the INP. The override setting could be stored by the management center. The new range limits could be stored in the data storage means 240, or at the CPE if such a storage capability is available. The new limit would cap the maximum levels, therefore very large INP values would be avoided.

In addition to the examples provided above, one or more of the following DSL physical layer parameters controlling the operation of the DSL line, could similarly be set by the instruction generating means: SOS triggering controls including controls on SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error. Fast retrain triggering controls including controls on duration of LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error. Full retrain triggering controls including controls on duration LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error. Retransmission controls including MIN and MAX INP for different types of impulse noises (e.g., Repetitive Electrical Impulse Noise (REIN) or Single Isolated Impulse Noise (SHINE)), MIN and MAX delay, FEC overhead ratio within a retransmission block, MAX throughout loss.

Command and control signals may be sent at operation 340 (or 370 and 375) to interfaces controlling the CPE device configuration and settings. Issued command or instruction signals are communicated over information and communication channels provided between the CPE device 130 and the CMC 110. An example of these communications channels are TR-69, Internet protocol (IP), Embedded Operational Channel (EOC), and SNMP. The CPE device 130 may be provided an interface similar to interfaces currently utilized on the CO side (e.g., those for controlling the settings and configurations via the DSLAM, such as the Q interface). The embodiments herein,

such as the physical layer control parameters and the instructions of the examples above, define settings of a CPE interface which may be implemented in either a standardized or vendor-specific manner to directly change and control the configuration and settings of the CPE device 130.

In another embodiment, the CPE devices 130 do not belong to, are not owned by, or otherwise associated with, the same wholesaler or operator networks. For example, CPE devices 130 A-B, could belong to a first wholesaler or operator, and the CPE devices 130 C-D, could belong to a second wholesaler or operator. Similarly, the CPE devices 130 might not belong to the same reseller networks. Furthermore, the binders 175 and 177 could be the same binder and the DSL lines 115-A-D could all be passing through the same binder. Therefore, the CPE devices 130 A-B, and the CPE devices 130 C-D could be sharing the same binder. Lines which share the same binder could experience crosstalk from the other lines in the binder. The crosstalk could include Near-End crosstalk (NEXT) or Far-End crosstalk (FEXT). Furthermore, the lines sharing the same path could be exposed to similar sources of external interference, such as Radio Frequency (RF) interference. When the lines are operated by the same operator or Wholesaler, DSM (Dynamic Spectrum Management) techniques, such as those discussed in the DSM standards (such as the Dynamic Spectrum Management Technical Report (2007), ATIS-PP-0600007) could be used to optimize the performance of the DSL lines in the presence of crosstalk and interference, such as the aforementioned NEXT, FEXT, and RF interference. However, if the lines are operated by different operators, the DSM techniques could not be fully applied, since they are installed at the operator side, and require information from all lines (such as crosstalk information), whereas each operator would only have access to information and data pertaining to DSL lines within their own network, and won't have access to information from lines operated by another operator.

Embodiments of the present invention collect information and operational data and parameters from the CPE side. Although the CPEs may belong to different networks operated by different operators, in embodiments of the present invention, it is possible to collect information from the CPE side, store and process it in one common location, at the CPE Management Center CMC. The CMC would provide the means for

collecting and analyzing information from the CPEs belonging to different operators, because the CMC is not tied to any of the networks of the multitude of operators. Furthermore, using the collection means in the data collection embodiments of the present invention, the CMC can collect information from the CPE devices independent of the particular network the DSL lines operate on and modify the various CPE devices to achieve performance goals.

Analysis Report Generation

At operation 350, analysis report is automatically compiled and issued by the report generation module 250 (Figure 2) to either an end user of the CPE device 130 or to an operator of the CMC 110. The report may be issued via any of the means described in reference to modes of data collection. In one embodiment, the report is issued via a application interface supported by the CMC 110 (e.g., via CMC user interface 172). The application interface may be a graphical user interface (GUI) and/or a Northbound Application Programming Interface (NAPI) via which the performance enhancement or analysis results are accessible.

Report generation may occur in response to an event, such as, but not limited to identification of a line condition change or a passage of a predetermined amount of time since issuance of a previous report. In certain circumstances an analysis report may be issued in addition to a modification of the CPE device operation. In such a case, the analysis report may include a description of the modifications to the CPE device operation.

In the case for diagnosis of a line problem, the reporting function may for example report the presence of a wiring defect, or absence of a wiring defect if a test condition was not true. "Severity" of the problem may also be reported at operation 350. Similarly, any analysis result characterizing the line quality, line stability, line noise type as described herein may be output via an interface of the CMC 110.

Depending on the diagnosis, one or more corrective actions may be provided in the analysis report. For example, instructions to contact an ILEC to request removal of a

bridged tap may be issued, or instructions to seek a contractor for removal of a third wire on the customer premises may be issued.

In embodiments where no operational instruction is issued to the CPE device 130, the CMC need only include a data collection module communicatively coupled to a CPE device, to receive information from the CPE device regarding CPE device operation, an analysis module coupled to the data collection module to analyze the received information for a predetermined operational performance signature indicative of a line problem, and a report generation module coupled to the analysis module to automatically compile or generate a report of the analysis results.

As previously described, the analysis module may obtain and evaluate channel performance monitoring parameters, line performance monitoring parameters, or distributions of the parameters over time, to analyze whether any line instability exists.

A diagnostics application interface may be further coupled to the analysis module to provide a predetermined set of corrective actions associated with the line problem.

Also as previously described, the information received from the CPE device may be operational data generated by the CPE device while in showtime and even where no command to change the CPE device operation is issued to the CPE device, the report generation module may issue the report to a DSL system operator or an end user of the CPE device in response to an event. Exemplary events include identification of a line condition change or a passage of a predetermined amount of time since issuance of a previous report.

In a particular embodiment, the analysis module is to analyze the received information by generating one or more performance metrics, based on the received information, and evaluate the one or metrics against the predetermined condition indicative of the line problem. As previously described, the one or more performance metrics may be any of: an average bit change across a plurality of tones in a DSL signal transmitted on the line, total bit change across a plurality of tones in the DSL signal transmitted on the line, a number of tones which experience at least two bits absolute change compared to

a previous tone, average noise change in the DSL signal, wherein noise change is obtained from one of Hlog, Hlin, Signal-to-Noise Ratio (SNR), Quiet-Line-Noise (QLN), Mean Square Error (MSE) per tone, or a calculation based on one of SNR, Hlog, or Power Spectral Density (PSD).

Even where no command to change the CPE device operation is issued to the CPE device, the data collection module may nevertheless base analysis activities based on information collected from a plurality of sources remote from the CPE device, including one or more of: a diagnostic device, a DSL multiplexer, an end user preference database, end user feedback, an end user-specified Broadband network information table, a Broadband network content delivery system, a home network protocol interface, or an ACS device.

CPE Device

In certain embodiments described herein, the CPE DEVICE 130 includes provisions for communication with the CMC 110 (e.g., Data collection module 210 and Instruction and command signal generation module 230). An exemplary CPE DEVICE 530 depicted in Figure 5, includes a chipset 535 supporting remotely programmable firmware 540 via a remote programming interface 536 through which the CMC 110 may access the CPE device 130 via the Transceiver Unit (TU)/modem 520. The CMC 110 may set the CPE device 530 to report the various operational data parameters described herein when generated by the CPE DEVICE 530 during showtime even if such parameters are not reported under existing standards. Similarly, the remotely programmable firmware 540 may support modification of the CPE device operation in response to receiving an instruction signal from the CMC 110. As such, any of the instruction signal commands issued at operation 340 may be implemented by the CPE device 530.

Figure 6 illustrates a diagrammatic representation of a machine 600 in the exemplary form of a computer system, in accordance with one embodiment, within which a set of instructions, for causing the machine 600 to perform any one or more of the methodologies discussed herein, may be executed. In alternative embodiments, the machine may be connected (e.g., networked) to other machines in a Local Area

Network (LAN), an intranet, an extranet, or the Internet. The machine may operate in the capacity of a server or a client machine in a client-server network environment, or as a peer machine in a peer-to-peer (or distributed) network environment or as a server or series of servers within an on-demand service environment, including an on-demand environment providing database storage services. Certain embodiments of the machine may be in the form of a personal computer (PC), a tablet PC, a set top box (STB), a Personal Digital Assistant (PDA), a cellular telephone, a web appliance, a server, a network router, switch or bridge, computing system, or any machine capable of executing a set of instructions (sequential or otherwise) that specify actions to be taken by that machine. Further, while only a single machine is illustrated, the term “machine” shall also be taken to include any collection of machines (e.g., computers) that individually or jointly execute a set (or multiple sets) of instructions to perform any one or more of the methodologies discussed herein.

The exemplary computer system 600 includes a processor 602, a main memory 604 (e.g., read-only memory (ROM), flash memory, dynamic random access memory (DRAM) such as synchronous DRAM (SDRAM) or Rambus DRAM (RDRAM), etc., static memory such as flash memory, static random access memory (SRAM), volatile but high-data rate RAM, etc.), and a secondary memory 618 (e.g., a persistent storage device including hard disk drives and persistent data base implementations), which communicate with each other via a bus 630. Main memory 604 includes information and instructions and software program components necessary for performing and executing the functions with respect to the various embodiments of the CMC 110 described herein.

Processor 602 represents one or more general-purpose processing devices such as a microprocessor, central processing unit, or the like. More particularly, the processor 602 may be a complex instruction set computing (CISC) microprocessor, reduced instruction set computing (RISC) microprocessor, very long instruction word (VLIW) microprocessor, processor implementing other instruction sets, or processors implementing a combination of instruction sets. Processor 602 may also be one or more special-purpose processing devices such as an application specific integrated circuit (ASIC), a field programmable gate array (FPGA), a digital signal processor (DSP),

network processor, or the like. Processor 602 is configured to execute the processing logic 626 for performing the operations and functionality which is discussed herein.

The computer system 600 may further include a network interface card 608. The computer system 600 also may include a user interface 610 (such as a video display unit, a liquid crystal display (LCD), or a cathode ray tube (CRT)), an alphanumeric input device 612 (e.g., a keyboard), a cursor control device 614 (e.g., a mouse), and a signal generation device 616 (e.g., an integrated speaker). The computer system 600 may further include peripheral device 636 (e.g., wireless or wired communication devices, memory devices, storage devices, audio processing devices, video processing devices, etc.).

The secondary memory 618 may include a non-transitory machine-readable storage medium (or more specifically a non-transitory machine-accessible storage medium) 631 on which is stored one or more sets of instructions (e.g., software 622) embodying any one or more of the methodologies or functions described herein. Software 622 may also reside, or alternatively reside within main memory 604, and may further reside completely or at least partially within the processor 602 during execution thereof by the computer system 600, the main memory 604 and the processor 602 also constituting machine-readable storage media. The software 622 may further be transmitted or received over a network 620 via the network interface card 608.

While the subject matter disclosed herein has been described by way of example and in terms of the specific embodiments, it is to be understood that the claimed embodiments are not limited to the explicitly enumerated embodiments disclosed. To the contrary, the disclosure is intended to cover various modifications and similar arrangements as would be apparent to those skilled in the art. Therefore, the scope of the appended claims should be accorded the broadest interpretation so as to encompass all such modifications and similar arrangements. It is to be understood that the above description is intended to be illustrative, and not restrictive. Many other embodiments will be apparent to those of skill in the art upon reading and understanding the above description. The scope of the disclosed subject matter is therefore to be determined in

reference to the appended claims, along with the full scope of equivalents to which such claims are entitled.

CLAIMS

1. A DSL customer premises equipment (CPE) Management Center (CMC) coupled to a Broadband network, the CMC comprising:
 - a data collection module, communicatively coupled to at least one DSL CPE device, to receive information from the CPE device regarding operation of the CPE device;
 - an analysis module coupled to the data collection module to analyze the received information; and
 - a command signal generation module coupled to the analysis module to receive analysis results and to generate a corresponding command signal for transmission to the at least one CPE device to modify the CPE device operation based on the analysis results.
2. The CMC of claim 1, wherein the data collection module is to gather information from a plurality comprising one or more of: a DSL multiplexer, a diagnostic and remedy guidance device, an end user preference database, an end user customer feedback interface, an operational database, an end user Broadband network information database, a Broadband network content delivery system, a customer premises network higher-layer protocol information database, or an ACS device.
3. The CMC of claim 1, further comprising an application device interface, through which end user feedback is provided, coupled with at least one of the CMC, the CPE device, a noise cancellation device, a signal conditioning device, a diagnostic and remedy guidance device, and a controller or input device by which the user can indicate an instantaneous problem, or an ACS device.
4. The CMC of claim 1, wherein the data collection module is further to collect information defining line parameter constraints within which the CPE device is required to operate, wherein the analysis module is to analyze the received information to determine how to modify the CPE device within the line parameter constraints, and wherein the command signal generation module is to issue a command to the CPE

device by changing line parameter values, limits, or a range of line parameter values within the line parameter constraints.

5. The CMC of claim 1, wherein the data collection module is communicatively coupled to a plurality of CPE devices, a first of the plurality associated with a first wholesaler or operator network and a second of the plurality associated with a second wholesaler or operator network, and wherein the command signal generation module is to modify operation of a CPE device of both the first and second wholesaler or operator networks.

6. The CMC of claim 1, wherein the CMC reports modifications to the CPE device operation or analysis results concerning the line to a CMC operator or to an end user of the CPE device.

7. The CMC of claim 1, wherein the command signal is further based on information provided by the CMC operator and analyzed by the analysis module, wherein the information comprises:

- a physical inventory of the Broadband network including characterization of a Broadband link in the Broadband network,
- a history of the broadband link's characterization, and
- a location and use of the broadband link.

8. The CMC of claim 1, wherein the command signal is further based on information provided by the end user and analyzed by the analysis module, wherein said information comprises at least one of:

- the end user's use and preference of Broadband network services and quality, including at least one of desired data rates, quality of services for video, audio and data transmission, and
- time of day usage preferences.

9. The CMC of claim 1, wherein the command signal is further based on information provided by a content delivery service, wherein said information comprises at least one of: motion picture subscription service parameters, streaming video service parameters,

internet television service parameters, music subscription service parameters, network gaming or entertainment service parameters, or Voice over Internet Protocol (VoIP) telephony service parameters.

10. The CMC of claim 1, wherein the plurality of sources communicate with the CMC by way of one or more of the following:

analog POTS, cellular data communications, wireless data communications, Broadband Forum TR-069, IP protocol data communications, electronic mail communications, and a DSL communication channel selected from the group consisting of: Operation, Administration, and Maintenance (OAM) and Embedded Operational Channel (EOC).

11. The CMC of claim 1, wherein the command signal generation module generates the command signal to dynamically modify the CPE device operation in response to changes in the received information.

12. The CMC of claim 1, wherein the received information comprises at least one of:

Downstream attenuation;

Hlog information;

Downstream bit, gain, and SNR table;

Quiet line noise table;

Impulse noise history;

History of CV, downstream or upstream;

History of ES, downstream or upstream;

History of FEC, downstream or upstream;

History of retrains;

History of bit swap or other real time adaptive features;

History of fast retrains and/or SOS's;

Impedance;

DSL physical layer anomalies, defects and faults together with the event time stamps that has led to SOS activation, a fast retrain, a full retrain or a failed retrain;

SOS activation times, durations and average data rate loss;

INM (Impulse noise monitoring) histograms and impulse noise statistics;

echo transfer function or un-cancelled echo PSD; or retransmission statistics.

13. The CMC of claim 12, wherein the analysis module is further to identify a type of noise in the line based on the received information.
14. The CMC of claim 1, wherein the command signal comprises at least one of:
 - a minimum INP override instruction;
 - a target INP change instruction;
 - a Maximum delay override instruction;
 - a target delay change instruction;
 - a channel initialization policy override instruction;
 - an instruction to turn off specific downstream tones;
 - an instruction to change transmit power over specific downstream tones;
 - an instruction to force a CPE initiated re-training at a scheduled time;
 - an instruction to Lower the maxR;
 - an instruction to change maximum data rate;
 - an instruction to change target margin;
 - SOS triggering controls including controls on SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error;
 - fast retrain triggering controls including controls on duration of LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error;
 - full retrain triggering controls including controls on duration LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error; or
 - retransmission controls including MIN and MAX INP for different types of impulse noises (REIN or SHINE), MIN and MAX delay, FEC overhead ratio within a retransmission block, MAX throughout loss.
15. The CMC of claim 14, wherein command signal generation module is to modify the CPE device operation by changing limits or a range of line parameter values pre-assigned to the line at a CO side.

16. A method of managing digital subscriber line (DSL) customer premises equipment (CPE), the method comprising:

collecting information from a CPE device regarding operation of the CPE device through a Broadband network coupled to the digital subscriber line;
analyzing the received information; and
generating a command signal for transmission to the CPE device to modify the CPE device operation based on the analysis results.

17. The method of claim 16, wherein collecting the information further comprises gathering operation information from a plurality of sources, wherein the plurality of sources comprises one or more of: a DSL multiplexer, a diagnostic and remedy guidance device, an end user preference database, an end user customer feedback interface, an operational database, an end user Broadband network information database, a Broadband network content delivery system, a customer premises network higher-layer protocol information database, or an ACS device.

18. The method of claim 16, further comprising:

collect information defining line parameter constraints within which the CPE device is required to operate; and
wherein analyzing the received information further comprises determining how to modify the CPE device within the line parameter constraints, and
wherein generating the command signal generation module further comprises issuing a command to the CPE device which changes line parameter values, limits, or a range of line parameter values within the line parameter constraints.

19. The method of claim 16, wherein collecting information from a CPE device further comprises collecting information from a plurality of CPE devices, a first of the plurality associated with a first wholesaler or operator network and a second of the plurality associated with a second wholesaler or operator network, and wherein generating a command signal for transmission modifies operation of a CPE device from both the first and the second wholesaler or operator networks.

20. The method of claim 16, wherein the command signal is to change limits or a range of line parameter values pre-assigned on the line at a CO side.

21. The method of claim 16, wherein the received information comprises at least one of:

Downstream attenuation;

Hlog information;

Downstream bit, gain, and SNR table;

Quiet line noise table;

Impulse noise history;

History of CV, downstream or upstream;

History of ES, downstream or upstream;

History of FEC, downstream or upstream;

History of retrains;

History of bit swap or other real time adaptive features;

History of fast retrains and/or SOS's; or

Impedance;

DSL physical layer anomalies, defects and faults together with the event time stamps that has led to SOS activation, a fast retrain, a full retrain or a failed retrain;

SOS activation times, durations and average data rate loss;

INM (Impulse noise monitoring) histograms and impulse noise statistics;

echo transfer function or un-cancelled echo PSD; or

retransmission statistics; and

wherein the command signal comprises at least one of:

a minimum INP override instruction;

a target INP change instruction;

a Maximum delay override instruction;

a target delay change instruction;

a channel initialization policy override instruction;

an instruction to turn off specific downstream tones;

an instruction to change transmit power over specific downstream tones;

an instruction to force a CPE initiated re-training at a scheduled time;

an instruction to Lower the maxR;

an instruction to change maximum data rate;

an instruction to change target margin;

SOS triggering controls including controls on SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error;

fast retrain triggering controls including controls on duration of LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error;

full retrain triggering controls including controls on duration LOS and LOF anomalies, SNR margin degradations, FEC, code violation (CV), ES, and SES counts, and probability of bit error; or

retransmission controls including MIN and MAX INP for different types of impulse noises (REIN or SHINE), MIN and MAX delay, FEC overhead ratio within a retransmission block, MAX throughput loss.

22. A computer readable storage media, comprising instruction stored thereon, which when executed by a processing system cause the system to perform the method of claim 16.

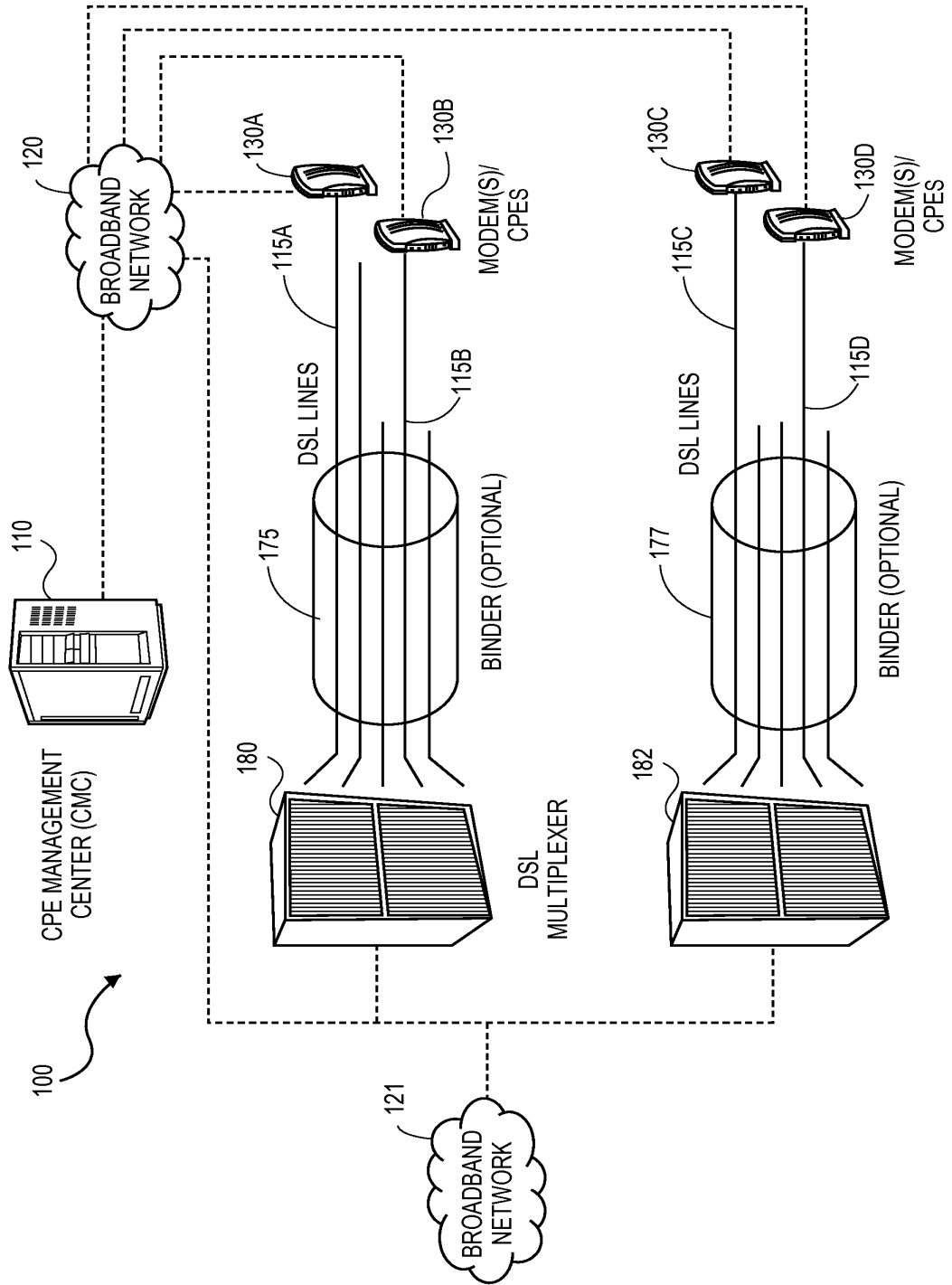


FIG. 1

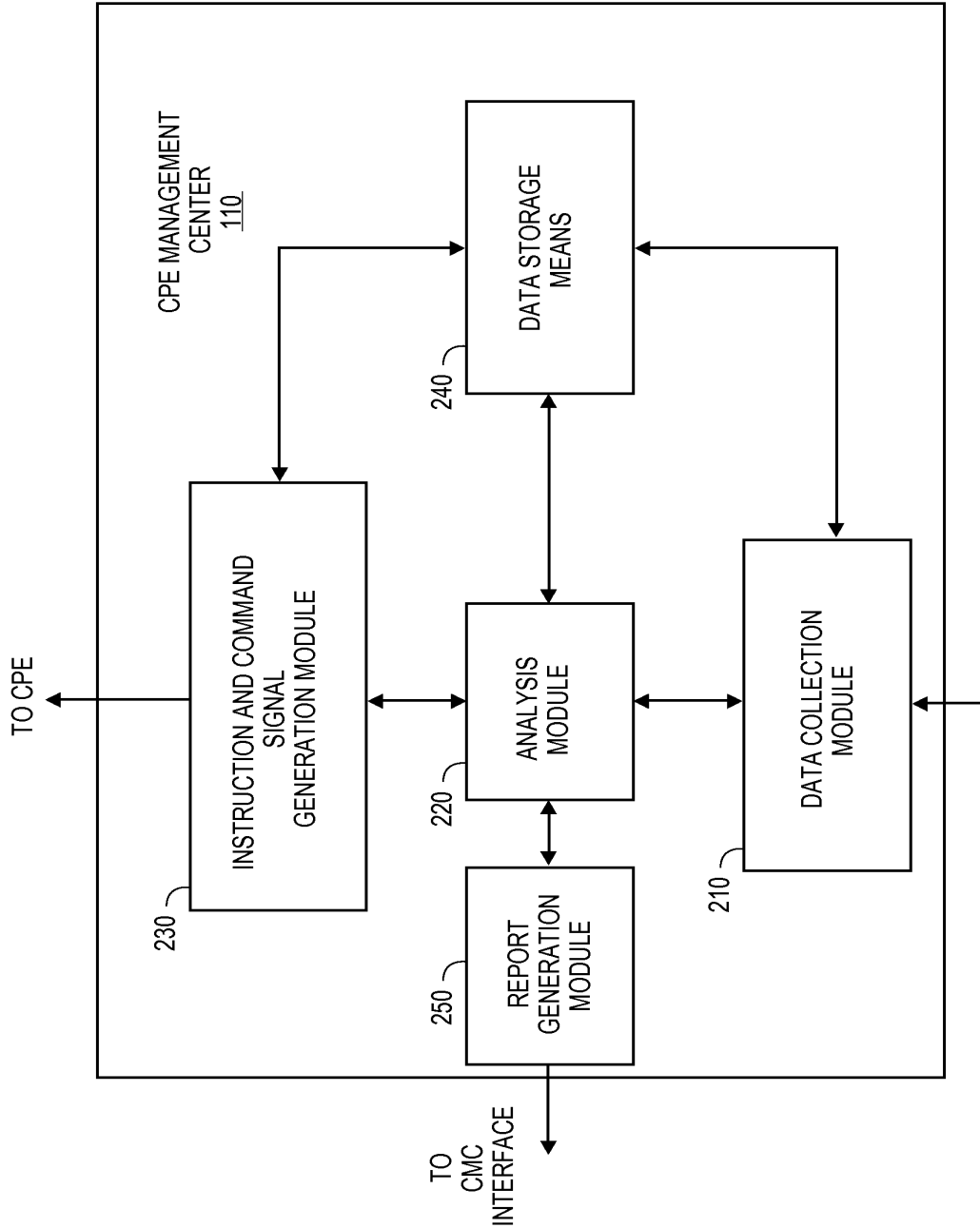


FIG. 2

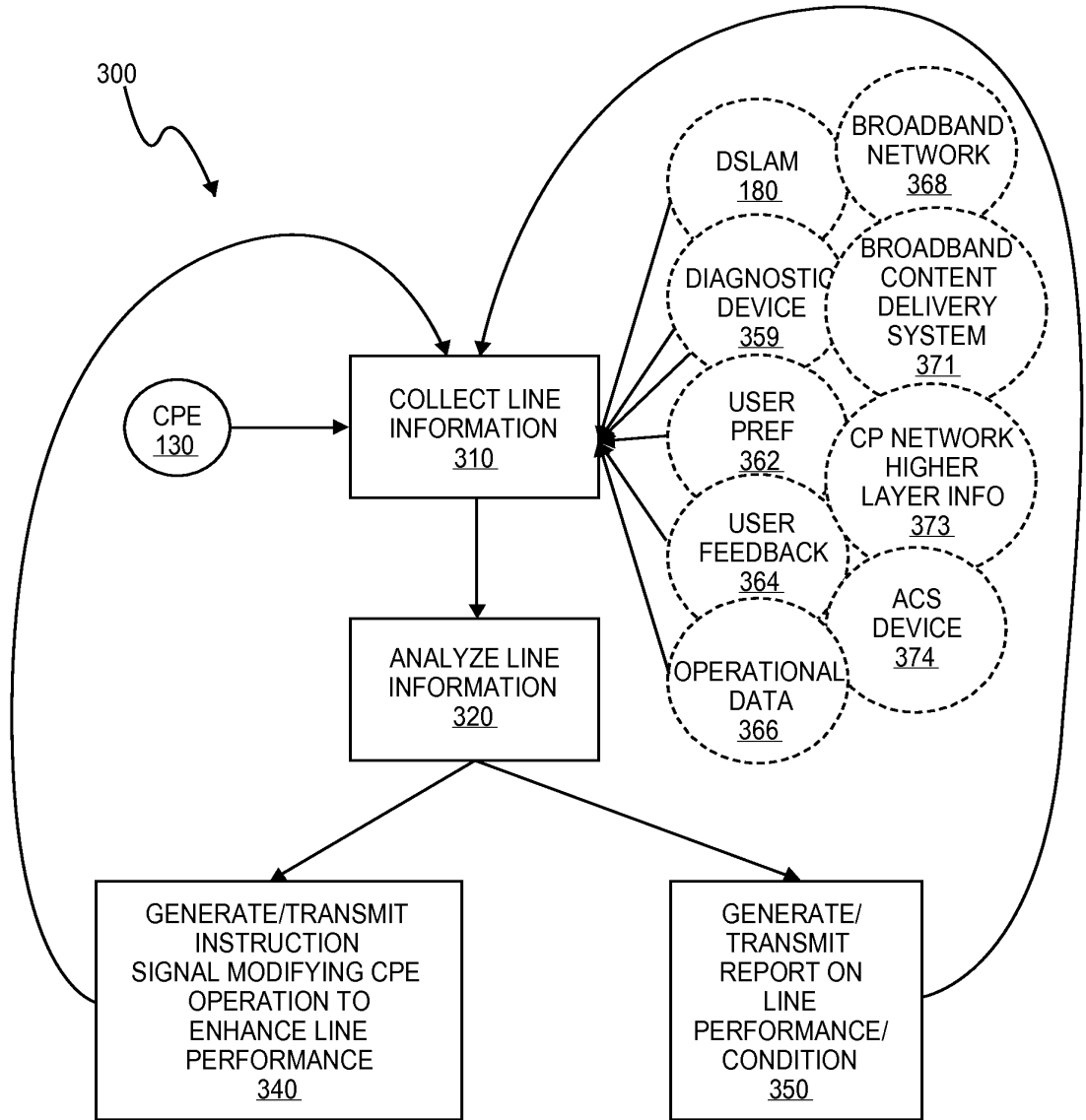


FIG. 3A

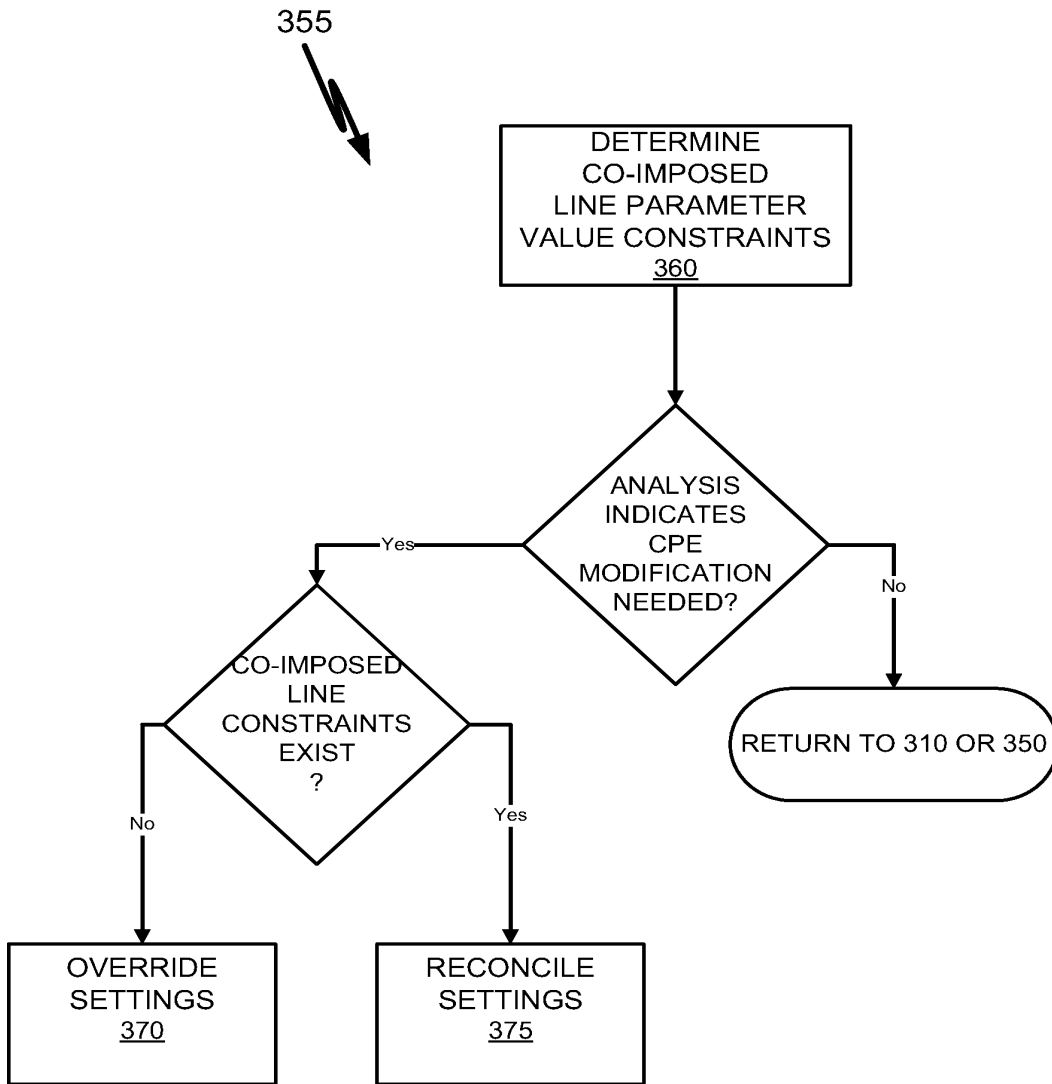


FIG. 3B

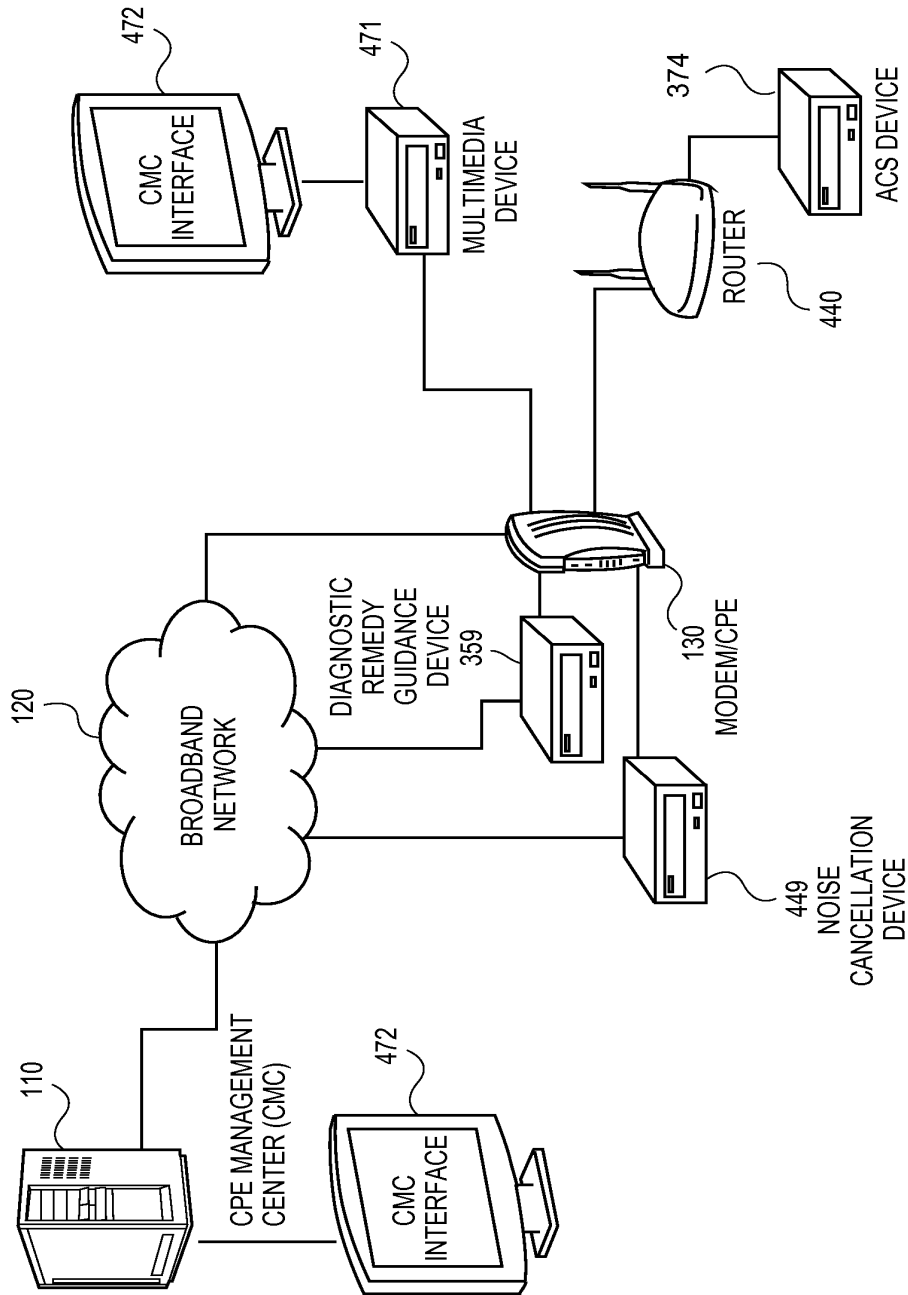


FIG. 4

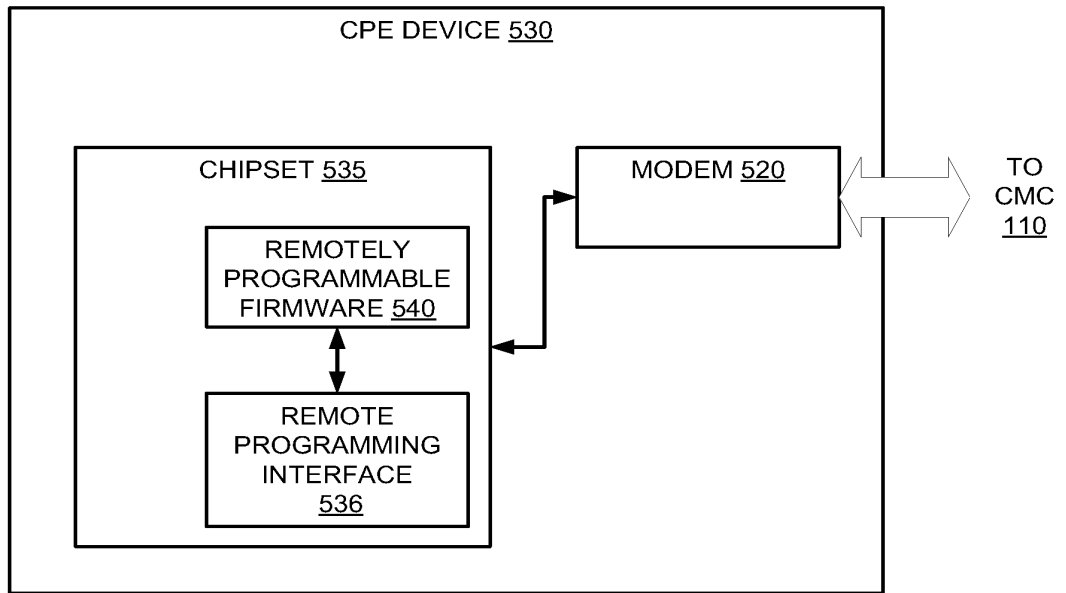


FIG. 5

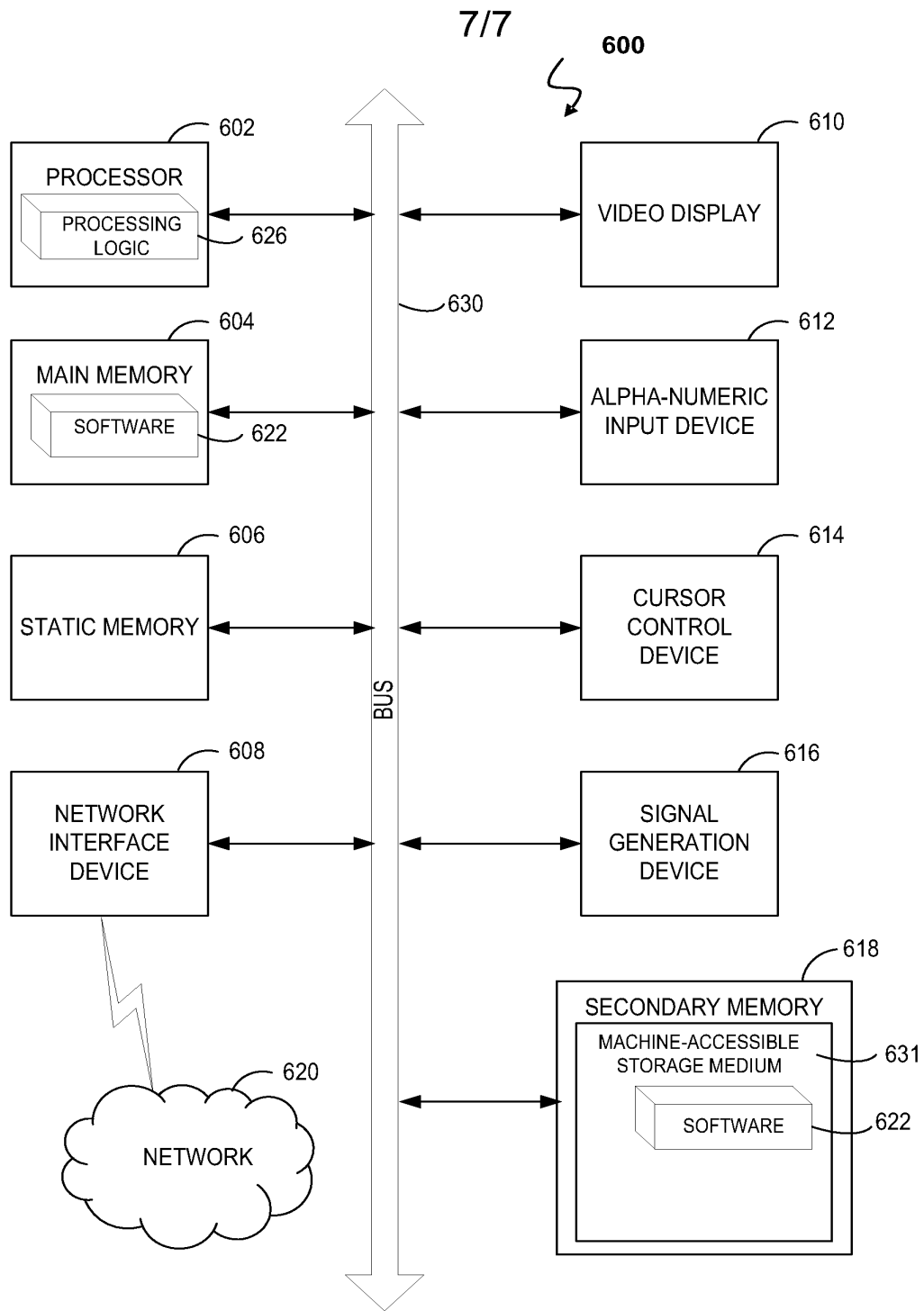


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No PCT/US2010/062604

A. CLASSIFICATION OF SUBJECT MATTER
 INV. H04M11/06 H04L12/28 H04L12/24 H04M3/30
 ADD.

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

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, COMPENDEX, INSPEC, IBM-TDB, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2006/120513 A1 (ADAPTIVE SPECTRUM & SIGNAL [US]; CIOFFI JOHN M [US]; RHEE WONJONG [US]) 16 November 2006 (2006-11-16) page 20 - page 21; figure 4a -----	1-22
X	US 2006/280235 A1 (RHEE WONJONG [US] ET AL) 14 December 2006 (2006-12-14) paragraph [0048] - paragraph [0057]; figure 2 -----	1-22
X	US 2009/028170 A1 (JIANG BAOFENG [US] ET AL) 29 January 2009 (2009-01-29) paragraph [0011] - paragraph [0024] -----	1-22

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	"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
"E" earlier document but published on or after the international filing date	"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
"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)	"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.
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 25 November 2011	Date of mailing of the international search report 01/12/2011
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Hardelin, Thierry
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2010/062604

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006120513	A1	16-11-2006	
		AU 2006245450 A1	16-11-2006
		BR PI0608974 A2	17-02-2010
		CA 2608329 A1	16-11-2006
		EP 1886480 A1	13-02-2008
		JP 2008545288 A	11-12-2008
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US 2009028170	A1	29-01-2009	NONE

Form PCT/ISA/210 (patent family annex) (April 2005)

Electronic Patent Application Fee Transmittal				
Application Number:	14414436			
Filing Date:	12-Jan-2015			
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
First Named Inventor/Applicant Name:	Leonardo Dagum			
Filer:	Michael V. North/Domarina Alkhas			
Attorney Docket Number:	20145-073US			
Filed as Large Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
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	240	240
Total in USD (\$)				240

Electronic Acknowledgement Receipt	
EFS ID:	40233014
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Domarina Alkhas
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	10-AUG-2020
Filing Date:	12-JAN-2015
Time Stamp:	01:04:03
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$240
RAM confirmation Number	E202080204273949
Deposit Account	502776
Authorized User	Domarina Alkhas

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37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)
 37 CFR 1.21 (Miscellaneous fees and charges)
 37 CFR 1.492 (National application filing, search, and examination fees)

37 CFR 1.492(a) (Basic national fee only)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	073US_SIDS_Trans.pdf	26048	no	3
			8e3b09010a28077beb81a45a4d957d0e7b5e9e33		
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	073US_SIDS_SB08.pdf	612486	no	4
			64ed23b54076c16a1336e6446d7bdaa6f81fa2aa		
Warnings:					
Information:					
3	Foreign Reference	073US_SIDS_FR1.pdf	2088607	no	48
			bbb6111ee9503601b89f2c950beb854c99221423		
Warnings:					
Information:					
4	Non Patent Literature	073US_SIDS_NPL1.pdf	717572	no	37
			8cd7391f245543e6ec051e8f8400439f1b09735b		
Warnings:					
Information:					
5	Non Patent Literature	073US_SIDS_NPL2.pdf	47358	no	3
			d1a9a3d956768f66e115dc95c22d559fe5304351		
Warnings:					
Information:					
6	Non Patent Literature	073US_SIDS_NPL3.pdf	314797	no	4
			a0334a67ae05aa70422a974f2327b007d972b34c		
Warnings:					
Information:					

7	Non Patent Literature	073US_SIDS_NPL4.pdf	117366	no	3
			5cc80f1e1f0c1a38759e26d5877a9f52f10d8646		
Warnings:					
Information:					
8	Non Patent Literature	073US_SIDS_NPL5.pdf	371212	no	6
			4fe16e2459ea83d20a3cd200c22498bb643efe43		
Warnings:					
Information:					
9	Non Patent Literature	073US_SIDS_NPL6.pdf	53196	no	4
			c6e61312e41509e063343d06a93e1a210a9e6e1b		
Warnings:					
Information:					
10	Non Patent Literature	073US_SIDS_NPL7.pdf	388616	no	6
			56081796dec72685c73a41744b522328a91bd89f		
Warnings:					
Information:					
11	Fee Worksheet (SB06)	fee-info.pdf	30787	no	2
			f0b2c50c397a25d2c6e44aa4ba4709dd2f0340b0		
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Total Files Size (in bytes):			4768045		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 14/414,436 Confirmation No. : 4662
Inventor(s) : Dagum et al.
Filing Date : January 12, 2015
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Art Unit : 2467
Examiner : MOORE JR, MICHAEL J
Docket No. : 20145-073US
Customer No. : 146571

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: August 10, 2020

By: /Domarina Alkhas/
Domarina Alkhas

INFORMATION DISCLOSURE STATEMENT

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

Dear Examiner Moore:

Filed herewith, in accordance with the provisions of 37 CFR §§ 1.56 and 1.97–1.98, listing various references for consideration by the Examiner, is an Information Disclosure Statement (“IDS”).

The filing of this IDS shall not be construed as a representation that a search has been made, or regarding the completeness of the list of references, or that no other material information exists. Furthermore, the filing of this IDS shall not be construed as a representation that inclusion of a reference in this list is an admission that it is prior art or is pertinent to this application, or as an admission that the information listed is, or may be considered to be, material to the patentability of the above referenced application. The filing of this IDS shall not be construed in any manner as an admission against interest.

PATENT

This IDS is being filed:

- within three months of the filing date of a national application, other than a continued prosecution application under § 1.53(d);
- within three months of the date of entry of the national stage as set forth in § 1.491 in an international application;
- before the mailing of a first Office Action on the merits;
- before the mailing of a first Office Action after the filing of a request for continued examination under § 1.114;
- after three months of the filing date or entry into the national stage or after the mailing of a first Office action on the merits, but before the mailing date of any final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

OR

- Applicant certifies pursuant to 37 CFR § 1.97(e):
 - That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement;

OR

- That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- on or before the payment of the issue fee but after the mailing of a final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

AND

- Applicant certifies pursuant to 37 CFR § 1.97(e):

PATENT

That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement;

OR

That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- Applicant submits that the enclosed Information Disclosure Statement is timely; therefore, no fee is required.
- Except as provided for under 37 CFR § 1.98(a)(2), Applicant has enclosed a copy of each listed reference.
- Pursuant to 37 CFR § 1.704(d), Applicant certifies that each of the references cited herein were first cited in a communication from a foreign patent office in a counterpart application and that this communication was not received by any individual designated in 37 CFR § 1.56(c) more than thirty days prior to the filing of this Information Disclosure Statement.

Consideration of the listed references and favorable action are requested. If any additional fees are due in connection with the filing of this Information Disclosure Statement, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-2776.

Respectfully submitted,

Date: August 10, 2020

By: /Michael V. North/
Michael V. North
Reg. No. 46,963



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/414,436	01/12/2015	Leonardo Dagum	20145-073US	4662
146571	7590	12/09/2020	EXAMINER MOORE JR, MICHAEL J	
North Weber & Baugh LLP - ASSIA 3260 Hillview Avenue, 1st Floor Palo Alto, CA 94304			ART UNIT	PAPER NUMBER
			2467	
			NOTIFICATION DATE	DELIVERY MODE
			12/09/2020	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):

docket1@northweber.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte LEONARDO DAGUM, PHILIP BEDNARZ,
MARC GOLDBURG, ARDAVAN MALEKI TEHRANI, and
WONJONG RHEE

Appeal 2019-003445
Application 14/414,436
Technology Center 2400

Before ERIC S. FRAHM, LARRY J. HUME, and
JAMES W. DEJMEK, *Administrative Patent Judges*.

HUME, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision rejecting claims 1–6, 8, 9, 11–19, 21–36, and 38–40, which are all claims pending in the application. Appellant has canceled claims 7, 10, 20, and 37. *See* Appeal Br. 14 *et seq.* (Claims App.). We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ We use the term “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Adaptive Spectrum Signal Alignment, Inc. Appeal Br. 3.

STATEMENT OF THE CASE²

The claims are directed to a method and system for using a downloadable agent for a communication system, device, or link. *See Spec.* (Title). In particular, Appellant’s disclosed embodiments and claimed invention relate to “a method performed by a downloadable agent for collecting information associated with a communication device and then sending the collected information to another machine for analysis.” *Spec.* ¶ 16.

Exemplary Claim

Claim 1, reproduced below, is illustrative of the subject matter on Appeal (*emphasis* added to contested prior-art limitation):

1. A method performed by a downloadable agent, the method comprising:

collecting WAN performance information, wherein the downloadable agent is executable on a computing device coupled to a LAN of a broadband subscriber, wherein the LAN is coupled by another device to a WAN;

transmitting the WAN performance information to a machine, wherein the machine is operable to:

store the WAN performance information in a database associated with the machine,

² Our decision relies upon Appellant’s Appeal Brief (“Appeal Br.,” filed Oct. 26, 2018); Reply Brief (“Reply Br.,” filed Apr. 1, 2019); Examiner’s Answer (“Ans.,” mailed Feb. 1, 2019); Final Office Action (“Final Act.,” mailed Apr. 24, 2018); and the original Specification (“Spec.,” filed Jan. 12, 2015) (ultimately claiming benefit of US , filed 61/671,672, filed July 13, 2012).

analyze the WAN performance information to generate an analysis result, the analysis result comprises at least throughput; and

report the analysis result to at least one of the broadband subscriber and the broadband subscriber's service provider; and

sending an on-demand change request associated with at least one of throughput, or latency.

REFERENCES

The prior art relied upon by the Examiner as evidence is:

Name	Reference	Date
Zhao et al. ("Zhao")	US 2002/0174421 A1	Nov. 21, 2002
Burnette et al. ("Burnette")	US 2012/0244863 A1	Sept. 27, 2012

REJECTION

Claims 1–6, 8, 9, 11–19, 21–36, and 38–40 stand rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over the combination of Zhao and Burnette. Final Act. 3.

ISSUE

Appellant argues (Appeal Br. 10–13; Reply Br. 5–7) the Examiner's rejection of claim 1 under 35 U.S.C. § 103(a) as being obvious over the combination of Zhao and Burnette is in error. These contentions present us with the following issue:

Did the Examiner err in finding the cited prior art combination teaches or suggests a method performed by a downloadable agent that includes, *inter alia*, the limitation of "sending an on-demand change request associated with

Appeal 2019-003445
Application 14/414,436

at least one of throughput, or latency,” as recited in claim 1, and as commensurately recited in system claim 21?

PRINCIPLES OF LAW

The test for obviousness is what the combined teachings of the prior art would have suggested to the hypothetical person of ordinary skill in the art. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

During prosecution, claims must be given their broadest reasonable interpretation when reading claim language in light of the specification as it would be interpreted by one of ordinary skill in the art. *In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). Under this standard, we interpret claim terms using “the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the applicant’s specification.” *In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997).

ANALYSIS

Based upon our review of the record, we find a preponderance of the evidence supports particular arguments advanced by Appellant with respect to claims 1–6, 8, 9, 11–19, 21–36, and 38–40 for the specific reasons discussed below. We highlight and address specific findings and arguments regarding claim 1 for emphasis as follows.

The Examiner finds Zhao teaches or suggests “the servicing of received requests (change requests) from one or more clients 411-414 based upon measured performance parameters (e.g. throughput, latency).” Final

Appeal 2019-003445
Application 14/414,436

Act. 4 (citing Zhao ¶¶ 64, 110). The Examiner further finds that Zhao teaches or suggests “the site monitor collects server latency data from the received requests from one or more clients 411-414, where the server latency data includes average, minimum and maximum server latency values, which indicates how latency changes in time among the monitored servers.” Ans. 4 (citing Zhao ¶ 110) (emphasis omitted).

Appellant contends the Examiner erred in finding Zhao’s teaching of servicing a received request is equivalent to the limitation in claim 1 of “sending an on-demand change request associated with at least one of throughput, or latency.” Appeal Br. 11. Appellant further argues “[i]n Zhao’s disclosure, the requests from the one or more clients, 411–414 are requests for transmitting measured performance parameters, instead of *on-demand change requests*.” Appeal Br. 12. “Zhao simply discloses collect[ing] or process[ing] server latency data, instead of **change request associated with latency**.” *Id.* “Zhao only discloses collecting server latency data without even disclosing changing latency, no matter in the site monitor, web server, or in client’s side.” Reply Br. 6.

We are persuaded by Appellant’s arguments,³ and agree that Zhao in paragraph 64 merely discloses collecting and organizing information regarding performance parameters, and does not teach or suggest providing a

³ Because we agree with at least one of the dispositive arguments advanced by Appellant, we need not reach the merits of Appellant’s other arguments. *See Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984) (finding an administrative agency is at liberty to reach a decision based on “a single dispositive issue”).

change request associated with latency (or throughput). Specifically, in Figure 5 of Zhao,

site monitor **401** is coupled to each of the site's servers, **402–404**. Each of servers **402–404** may, at a given time, be servicing requests from one or more clients, **411–414**. According to the present disclosure, *performance parameters which are measured at client sites 411–414 can be transmitted up through the hierarchy to the respective servers 402–404. All of this information can then be sent from the servers to site monitor 401, which can be used to organize the data according to selected categories.*

Zhao ¶ 64 (italics added for emphasis).

Accordingly, based upon the findings above, on this record, we are persuaded of at least error in the Examiner's reliance on the cited prior art combination to teach or suggest the disputed limitation of claim 1, such that we find error in the Examiner's resulting legal conclusion of obviousness. Therefore, we do not sustain the Examiner's obviousness rejection of independent claim 1 and independent claim 21, which recites the contested limitation in commensurate form. For the same reasons, we do not sustain the rejection of dependent claims 2–6, 8, 9, 11–19, 21–36, and 38–40, which variously and ultimately depend from independent claims 1 and 21.

CONCLUSION

The Examiner erred with respect to the obviousness rejection of claims 1–6, 8, 9, 11–19, 21–36, and 38–40 under 35 U.S.C. § 103(a) over the cited prior art combination of record, and we do not sustain the rejection.

Appeal 2019-003445
Application 14/414,436

DECISION SUMMARY

Claims Rejected	35 U.S.C. §	Basis / References	Affirmed	Reversed
1-6, 8, 9, 11-19, 21-36, 38-40	103(a)	Obviousness Zhao, Burnette		1-6, 8, 9, 11-19, 21-36, 38-40

REVERSED



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NOTICE OF ALLOWANCE AND FEE(S) DUE

146571 7590 02/24/2021
North Weber & Baugh LLP - ASSIA
3260 Hillview Avenue, 1st Floor
Palo Alto, CA 94304

EXAMINER
MOORE JR, MICHAEL J

ART UNIT PAPER NUMBER

2467

DATE MAILED: 02/24/2021

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
14/414,436 01/12/2015 Leonardo Dagum 20145-073US 4662

TITLE OF INVENTION: METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK

Table with 7 columns: APPLN. TYPE, ENTITY STATUS, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE
nonprovisional UNDISCOUNTED \$1200 \$0.00 \$0.00 \$1200 05/24/2021

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

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If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

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II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

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146571 7590 02/24/2021
 North Weber & Baugh LLP - ASSIA
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Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

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_____ (Signature)
_____ (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/414,436	01/12/2015	Leonardo Dagum	20145-073US	4662

TITLE OF INVENTION: METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	05/24/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
MOORE JR, MICHAEL J	2467	370-252000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
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- 3 _____

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PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE _____ (B) RESIDENCE: (CITY and STATE OR COUNTRY) _____

Please check the appropriate assignee category or categories (will not be printed on the patent): Individual Corporation or other private group entity Government

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- Applicant certifying micro entity status. See 37 CFR 1.29
- Applicant asserting small entity status. See 37 CFR 1.27
- Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
Row 1: 14/414,436, 01/12/2015, Leonardo Dagum, 20145-073US, 4662
Row 2: 146571, 7590, 02/24/2021, EXAMINER MOORE JR, MICHAEL J
Row 3: ART UNIT 2467, PAPER NUMBER

North Weber & Baugh LLP - ASSIA
3260 Hillview Avenue, 1st Floor
Palo Alto, CA 94304

DATE MAILED: 02/24/2021

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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.

Notice of Allowability	Application No. 14/414,436	Applicant(s) Dagum et al.	
	Examiner MICHAEL J MOORE JR	Art Unit 2467	AIA (FITF) Status No

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

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. This communication is responsive to the Patent Trial and Appeal Board decision rendered 12/9/20.
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. 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.

3. The allowed claim(s) is/are See Continuation Sheet. As a result of the allowed claim(s), 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.

4. 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)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. Notice of References Cited (PTO-892)

2. Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____.

3. Examiner's Comment Regarding Requirement for Deposit
of Biological Material _____.

4. Interview Summary (PTO-413),
Paper No./Mail Date _____.

5. Examiner's Amendment/Comment

6. Examiner's Statement of Reasons for Allowance

7. Other _____.

/MICHAEL J MOORE JR/ Primary Examiner, Art Unit 2467	
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Continuation of 3. The allowed claim(s) is/are: 1-6,8-9,11-19,21-36 and 38-40

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 8/10/20 was filed after the mailing date of the Final Office Action on 4/24/18. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the examiner.

Allowable Subject Matter

3. Claims **1-6, 8, 9, 11-19, 21-36, and 38-40** (*renumbered 1-36, respectively*) are allowed.

4. The following is an examiner's statement of reasons for allowance: In accordance with the decision rendered on 12/9/20 by the Patent Trial and Appeal Board, the rejections of the above claims have accordingly been withdrawn.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion


5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL J. MOORE, JR., whose telephone number is (571)272-3168. The examiner can normally be reached on M-F (9am-4pm).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan A. Phillips can be reached at (571)272-3940. 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 <https://ppair-my.uspto.gov/pair/PrivatePair>. 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.

**/MICHAEL J MOORE JR/
Primary Examiner, Art Unit 2467**


<i>Index of Claims</i>	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14/414,436	Dagum et al.
	Examiner	Art Unit
	MICHAEL J MOORE JR	2467

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


CLAIMS									
<input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47									
CLAIM		DATE							
Final	Original	04/12/2016	07/22/2016	03/23/2017	08/24/2017	04/19/2018	02/17/2021		
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2	2	÷	✓	✓	✓	✓	=		
3	3	÷	✓	✓	✓	✓	=		
4	4	÷	✓	✓	✓	✓	=		
5	5	÷	✓	✓	✓	✓	=		
6	6	÷	✓	✓	✓	✓	=		
	7	-	-	-	-	-	-		
7	8	÷	✓	✓	✓	✓	=		
8	9	÷	✓	✓	✓	✓	=		
	10	÷	✓	✓	✓	-	-		
9	11	÷	✓	✓	✓	✓	=		
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12	14	÷	✓	✓	✓	✓	=		
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15	17	÷	✓	✓	✓	✓	=		
16	18	÷	✓	✓	✓	✓	=		
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	20	-	-	-	-	-	-		
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34	38	÷	✓	✓	✓	✓	=		
35	39	÷	✓	✓	✓	✓	=		
36	40	÷	✓	✓	✓	✓	=		
	41	÷	N	N	-	-	-		
	42	÷	N	N	-	-	-		

<i>Index of Claims</i> 	Application/Control No. 14/414,436	Applicant(s)/Patent Under Reexamination Dagum et al.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

CLAIM		DATE							
Final	Original	04/12/2016	07/22/2016	03/23/2017	08/24/2017	04/19/2018	02/17/2021		
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	92	-	-	-	-	-	-		
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	94	-	-	-	-	-	-		

<i>Index of Claims</i> 	Application/Control No. 14/414,436	Applicant(s)/Patent Under Reexamination Dagum et al.
	Examiner MICHAEL J MOORE JR	Art Unit 2467


CLAIM		DATE							
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	109	÷	✓	N	-	-	-		
	110	-	-	-	-	-	-		

Issue Classification 	Application/Control No. 14/414,436	Applicant(s)/Patent Under Reexamination Dagum et al.	
	Examiner MICHAEL J MOORE JR	Art Unit 2467	

CPC				Type	Version	
Symbol						
H04L	/	43	/	50	F	2013-01-01
H04L	/	43	/	0829	I	2013-01-01
H04L	/	43	/	0852	I	2013-01-01
H04L	/	43	/	0888	I	2013-01-01
H04L	/	41	/	26	I	2013-01-01
H04L	/	41	/	32	I	2013-01-01
H04L	/	43	/	04	I	2013-01-01
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H04L	/	41	/	22	A	2013-01-01
H04L	/	41	/	12	A	2013-01-01
H04L	/	43	/	16	A	2013-01-01
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H04L	/	43	/	087	A	2013-01-01
H04L	/	43	/	0882	A	2013-01-01
H04L	/	41	/	0826	A	2013-01-01
Y04S	/	40	/	00	A	2013-01-01

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE			Total Claims Allowed:	
(Assistant Examiner)	(Date)	36		
/MICHAEL J MOORE JR/ Primary Examiner, Art Unit 2467	17 February 2021	O.G. Print Claim(s)	O.G. Print Figure	
(Primary Examiner)	(Date)	1	3	


Issue Classification 	Application/Control No. 14/414,436	Applicant(s)/Patent Under Reexamination Dagum et al.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

INTERNATIONAL CLASSIFICATION			
CLAIMED			
H04L		12	26
NON-CLAIMED			
H04L		12	26

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
370	252

CROSS REFERENCES(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				


NONE			Total Claims Allowed:	
(Assistant Examiner)	(Date)	36		
/MICHAEL J MOORE JR/ Primary Examiner, Art Unit 2467 (Primary Examiner)	17 February 2021 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 3	

Issue Classification 	Application/Control No. 14/414,436	Applicant(s)/Patent Under Reexamination Dagum et al.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIMS															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
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6	6		20	31	34		48		62		76		90		104
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8	9	20	23		37		51		65		79		93		107
	10	21	24	34	38		52		66		80		94		108
9	11	22	25	35	39		53		67		81		95		109
10	12	23	26	36	40		54		68		82		96		110
11	13	24	27		41		55		69		83		97		
12	14	25	28		42		56		70		84		98		

NONE	Total Claims Allowed:	
(Assistant Examiner)	(Date)	36
/MICHAEL J MOORE JR/ Primary Examiner, Art Unit 2467	17 February 2021	O.G. Print Claim(s)
(Primary Examiner)	(Date)	1
		3

Search Notes 	Application/Control No. 14/414,436	Applicant(s)/Patent Under Reexamination Dagum et al.
	Examiner MICHAEL J MOORE JR	Art Unit 2467


CPC - Searched*		
Symbol	Date	Examiner
H04L43/50.cpc. or H04L12/407.cpc. or H04L41/048.cpc. or H04L41/26.cpc. or H04L41/32.cpc. or H04L43/04.cpc. or H04L43/0829.cpc. or H04L43/0852.cpc. or H04L43/0888.cpc. or H04L43/14.cpc. or H04L41/0681.cpc. or H04L41/0826.cpc. or H04L41/083.cpc. or H04L41/0853.cpc. or H04L41/12.cpc. or H04L41/22.cpc. or H04L41/5038.cpc. or H04L43/0817.cpc. or H04L43/087.cpc. or H04L43/0882.cpc. or H04L43/10.cpc. or H04L43/16.cpc. or H04L67/34.cpc. or Y04S40/00.cpc.	02/17/2021	MM

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

/MICHAEL J MOORE JR/ Primary Examiner, Art Unit 2467	
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<i>Search Notes</i> 	Application/Control No. 14/414,436	Applicant(s)/Patent Under Reexamination Dagum et al.
	Examiner MICHAEL J MOORE JR	Art Unit 2467

Search Notes		
Search Notes	Date	Examiner
Inventorship Search (PALM/EAST)	7/22/16	MM
General EAST Keyword Search - See Search History Printout	7/22/16	MM
Updated Inventorship Search (PALM/EAST)	8/23/17	MM
Updated General EAST Keyword Search - See Search History Printout	8/23/17	MM
Updated Inventorship Search (PALM/EAST)	04/17/2018	MM
Updated General EAST Keyword Search - See Search History Printout	04/17/2018	MM
Updated Inventorship Search (PALM/EAST)	02/17/2021	MM
H04L (EAST CPC Keyword Search of select subgroups - See Search History Printout)	02/17/2021	MM

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	General Interference Search of USPAT and PGPUB claims	02/17/2021	MM

/MICHAEL J MOORE JR/ Primary Examiner, Art Unit 2467	
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	176	dagum-leonardo.in. or bednarz-philip.in. or goldburg-marc.in. or tehrani-ardavan.in. or rhee-wonjong.in.	US-PGPUB; USPAT	OR	OFF	2021/02/17 14:51
L2	8	L1 and (agent and (WAN same performance) and repor\$4)	US-PGPUB; USPAT	OR	OFF	2021/02/17 14:51
L3	127,275	H04L43/50.cpc. or H04L12/407.cpc. or H04L41/048.cpc. or H04L41/26.cpc. or H04L41/32.cpc. or H04L43/04.cpc. or H04L43/0829.cpc. or H04L43/0852.cpc. or H04L43/0888.cpc. or H04L43/14.cpc. or H04L41/0681.cpc. or H04L41/0826.cpc. or H04L41/083.cpc. or H04L41/0853.cpc. or H04L41/12.cpc. or H04L41/22.cpc. or H04L41/5038.cpc. or H04L43/0817.cpc. or H04L43/087.cpc. or H04L43/0882.cpc. or H04L43/10.cpc. or H04L43/16.cpc. or H04L67/34.cpc. or Y04S40/00.cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	OFF	2021/02/17 14:58
L4	22	L3 and (agent same measur\$6 same WAN) and analy\$4 and repor\$4	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	OFF	2021/02/17 14:59
L5	292	L3 and ((agent same measur\$6) and repor\$4 and (reques\$4 same demand))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	OFF	2021/02/17 15:01
L6	168	L5 and (@ad<"20120713" or @rlad<"20120713")	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	OFF	2021/02/17 15:02
L7	0	((agent same measur\$6) and repor\$4 and (reques\$4 same demand))	FPRS; EPO; JPO	OR	OFF	2021/02/17 15:08
L8	0	((agent and measur\$6) and repor\$4 and (reques\$4 and demand))	FPRS; EPO; JPO	OR	OFF	2021/02/17 15:09

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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L9	25	((agent and measur\$6) and repor\$4 and (reques\$4 and demand)).CLM.	US-PGPUB; USPAT	OR	OFF	2021/02/17 15:09
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2/17/2021 3:13:07 PM

C:\Users\mmoore5\Documents\EAST\Workspaces\mike14414436.wsp

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore, Jr.
	Attorney Docket Number	20145-073US

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	20020174421	A1	2002-11-21	Zhao 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 ²ⁱ	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	2012091725	WO	A	2012-07-05	Adaptive Spectrum And Signal Alignment, Inc.		
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		14414436
	Filing Date		2015-01-12
	First Named Inventor	Leonardo Dagum	
	Art Unit	2467	
	Examiner Name	Michael J. Moore, Jr.	
	Attorney Docket Number	20145-073US	

1	Notification of Re-Examination in the related Chinese Patent Application No. 201280075818.9, mailed on February 27, 2019 (37pgs).	✕
2	Response to Notification of Re-Examination in the related Chinese Patent Application No. 201280075818.9, filed on April 5, 2019 (3pgs).	<input type="checkbox"/>
3	Examination Report in the related European Patent Application No. 12773454.9, mailed on March 11, 2019 (4 pgs).	<input type="checkbox"/>
4	Response to Examination Report in the related European Patent Application No. 12773454.9, dated March 11, 2019, filed on May 22, 2019 (3 pgs).	<input type="checkbox"/>
5	Examination Report in the related European Patent Application No. 12773454.9, mailed on September 18, 2019 (6 pgs).	<input type="checkbox"/>
6	Response to Examination Report in the related European Patent Application No. 12773454.9, dated September 18, 2019, filed on February 3, 2020 (4 pgs).	<input type="checkbox"/>
7	Examination Report in the related European Patent Application No. 12773454.9, mailed on July 1, 2020 (6 pgs).	<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/MICHAEL J MOORE JR/	Date Considered	02/17/2021
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*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	14414436
	Filing Date	2015-01-12
	First Named Inventor	Leonardo Dagum
	Art Unit	2467
	Examiner Name	Michael J. Moore, Jr.
	Attorney Docket Number	20145-073US

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	/Michael North/	Date (YYYY-MM-DD)	2020-08-10
Name/Print	Michael North	Registration Number	46963

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

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.

Complete if Known			
Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		Application Number	14/414,436
		Filing Date	01-12-2015
		First Named Inventor	Leonardo Dagum
		Art Unit	2467
		Examiner Name	MOORE JR, MICHAEL J
		Attorney Docket Number	20145-073US
Sheet	1	of	1

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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
	1	EP Examination Report mailed 3/10/2021 in related European Application No. 12773454.9, Attorney Docket No. [20145-073EP], (6 pgs).	

Examiner Signature	Date Considered
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.
 1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.
 This collection of information is required by 37 CFR 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 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, 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 (1-800-786-9199) 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 Patent Application Fee Transmittal				
Application Number:	14414436			
Filing Date:	12-Jan-2015			
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
First Named Inventor/Applicant Name:	Leonardo Dagum			
Filer:	Michael V. North/Domarina Alkhas			
Attorney Docket Number:	20145-073US			
Filed as Large Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
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	260	260
Total in USD (\$)				260

Electronic Acknowledgement Receipt	
EFS ID:	42301176
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Domarina Alkhas
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	28-MAR-2021
Filing Date:	12-JAN-2015
Time Stamp:	13:14:44
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$260
RAM confirmation Number	E20213RD15162167
Deposit Account	502776
Authorized User	Domarina Alkhas

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)					
37 CFR 1.21 (Miscellaneous fees and charges)					
37 CFR 1.492(a) (Basic national fee only)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	073US_SIDS_Trans.pdf	26070	no	3
			5f0f399f386c0806cff70f13de13e29fe0fdb417		
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	073US_SIDS_SB08b.pdf	321014	no	2
			9109440c150f8f8b7f31dd3017b328b13369a161		
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Non Patent Literature	073US_SIDS_NPL1.pdf	406519	no	6
			c18730f97c7655394b8adc67de29dc8172eab4d0		
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30836	no	2
			f17fc2440f2abb9df61e8e1890758755f56955aa		
Warnings:					
Information:					
Total Files Size (in bytes):			784439		

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

Appl. No. : 14/414,436 Confirmation No. : 4662
Inventor(s) : Dagum et al.
Filing Date : January 12, 2015
Title : METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT
FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
Art Unit : 2467
Examiner : MOORE JR, MICHAEL J
Docket No. : 20145-073US
Customer No. : 146571

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that this correspondence is being electronically transmitted via EFS-Web addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below:

Date: March 28, 2021

By: /Domarina Alkhas/
Domarina Alkhas

INFORMATION DISCLOSURE STATEMENT

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

Dear Examiner Moore:

Filed herewith, in accordance with the provisions of 37 CFR §§ 1.56 and 1.97–1.98, listing various references for consideration by the Examiner, is an Information Disclosure Statement (“IDS”).

The filing of this IDS shall not be construed as a representation that a search has been made, or regarding the completeness of the list of references, or that no other material information exists. Furthermore, the filing of this IDS shall not be construed as a representation that inclusion of a reference in this list is an admission that it is prior art or is pertinent to this application, or as an admission that the information listed is, or may be considered to be, material to the patentability of the above referenced application. The filing of this IDS shall not be construed in any manner as an admission against interest.

PATENT

This IDS is being filed:

- within three months of the filing date of a national application, other than a continued prosecution application under § 1.53(d);
- within three months of the date of entry of the national stage as set forth in § 1.491 in an international application;
- before the mailing of a first Office Action on the merits;
- before the mailing of a first Office Action after the filing of a request for continued examination under § 1.114;
- after three months of the filing date or entry into the national stage or after the mailing of a first Office action on the merits, but before the mailing date of any final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

OR

- Applicant certifies pursuant to 37 CFR § 1.97(e):

- That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement;

OR

- That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- on or before the payment of the issue fee but after the mailing of a final action under § 1.113, a notice of allowance under §1.311, or an action that otherwise closes prosecution in the application;

AND

- enclosed herein is the fee set forth in 37 CFR § 1.17(p);

AND

- Applicant certifies pursuant to 37 CFR § 1.97(e):

PATENT

That each item of information contained in the information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement;

OR

That no item of information contained in this 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 this certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

- Applicant submits that the enclosed Information Disclosure Statement is timely; therefore, no fee is required.
- Except as provided for under 37 CFR § 1.98(a)(2), Applicant has enclosed a copy of each listed reference.
- Pursuant to 37 CFR § 1.704(d), Applicant certifies that each of the references cited herein were first cited in a communication from a foreign patent office in a counterpart application and that this communication was not received by any individual designated in 37 CFR § 1.56(c) more than thirty days prior to the filing of this Information Disclosure Statement.

Consideration of the listed references and favorable action are requested. If any additional fees are due in connection with the filing of this Information Disclosure Statement, the Commissioner is hereby authorized to charge such fees to Deposit Account 50-2776.

Respectfully submitted,

Date: March 28, 2021

By: /Michael V. North/
Michael V. North
Reg. No. 46,963



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.
14/414,436	01/12/2015	Leonardo Dagum	20145-073US	4662
146571	7590	04/14/2021	EXAMINER	
North Weber & Baugh LLP - ASSIA 3260 Hillview Avenue, 1st Floor Palo Alto, CA 94304			MOORE JR, MICHAEL J	
			ART UNIT	PAPER NUMBER
			2467	
			NOTIFICATION DATE	DELIVERY MODE
			04/14/2021	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):

doctet1@northweber.com

Corrected Notice of Allowability	Application No. 14/414,436	Applicant(s) Dagum et al.	
	Examiner MICHAEL J MOORE JR	Art Unit 2467	AIA (FITF) Status No

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

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. This communication is responsive to the Information Disclosure Statement filed 3/28/21.
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. 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.

3. The allowed claim(s) is/are 1-6,8-9,11-19,21-36 and 38-40 . As a result of the allowed claim(s), 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.

4. 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)).

* Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. <input type="checkbox"/> Notice of References Cited (PTO-892)	5. <input type="checkbox"/> Examiner's Amendment/Comment
2. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.	6. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance
3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.	7. <input type="checkbox"/> Other _____.
4. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date. _____.	

/MICHAEL J MOORE JR/ Primary Examiner, Art Unit 2467	
---	--

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.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		Complete if Known	
		Application Number	14/414,436
		Filing Date	01-12-2015
		First Named Inventor	Leonardo Dagum
		Art Unit	2467
		Examiner Name	MOORE JR, MICHAEL J
Sheet	1	of	1
		Attorney Docket Number	20145-073US

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	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
	1	EP Examination Report mailed 3/10/2021 in related European Application No. 12773454.9, Attorney Docket No. [20145-073EP], (6 pgs).	

Examiner Signature	/MICHAEL J MOORE JR/	Date Considered	04/09/2021
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.
 1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.
 This collection of information is required by 37 CFR 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 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, 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 (1-800-786-9199) and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.J.M/

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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.J.M/



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Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY. DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 14/414,436, 01/12/2015, 2467, 6280, 20145-073US, 72, 4

CONFIRMATION NO. 4662
CORRECTED FILING RECEIPT

146571
North Weber & Baugh LLP - ASSIA
3260 Hillview Avenue, 1st Floor
Palo Alto, CA 94304



Date Mailed: 04/15/2021

Receipt is acknowledged of this non-provisional utility 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 FIRST INVENTOR, 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 corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction 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 provided that the request is grantable.

Inventor(s)

Leonardo Dagum, Redwood City, CA;
Philip Bednarz, Palo Alto, CA;
Marc Goldberg, Redwood City, CA;
Ardavan Maleki Tehrani, Menlo Park, CA;
Wonjong Rhee, San Francisco, CA;

Applicant(s)

ADAPTIVE SPECTRUM AND SIGNAL ALIGNMENT, INC., Redwood City, CA
Leonardo Dagum, Redwood City, CA
Philip Bednarz, Palo Alto, CA
Marc Goldberg, Redwood City, CA
Ardavan Maleki Tehrani, Menlo Park, CA
Wongjon Rhee, San Francisco, CA

Assignment For Published Patent Application

Adaptive Spectrum and Signal Alignment, Inc., Redwood City, CA

Power of Attorney: The patent practitioners associated with Customer Number 146571

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/US2012/057152 09/25/2012
which claims benefit of 61/671,672 07/13/2012

Foreign Applications for which priority is claimed (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: No

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 04/06/2015

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/414,436**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

Title

METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK

Preliminary Class

370

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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

page 2 of 4

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 (1-866-999-4258).

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 Assets Control, 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).

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

Document Description: Issue Fee Payment (PTO-85B)

Issue Fee Transmittal Form

Application Number	Filing Date	First Named Inventor	Atty. Docket No.	Confirmation No.
14414436	12-Jan-2015	Leonardo Dagum	20145-073US	4662

TITLE OF INVENTION :

METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK

Entity Status	Application Type	Art Unit	Class - Subclass	EXAMINER
Regular Undiscounted	U.S. National Stage under 35 USC 371	2467	252000	MICHAEL MOORE JR
Issue Fee Due	Publication Due	Total Fee(s) Due	Date Due	Prev. Paid Fee
\$1200	\$0	\$1200	24-May-2021	\$0

1.Change of Correspondence Address and/or Indication Of Fee Address (37 CFR 1.33 & 1.363)

Current Correspondence Address:	Current Indicated Fee Address :
146571 North Weber & Baugh LLP - ASSIA 3260 Hillview Avenue, 1st Floor Palo Alto CA 94304 UNITED STATES 650-856-7539 docket1@northweber.com	
<input type="checkbox"/> Change of correspondence address requested, system generated AIA/122-EFS form attached	<input type="checkbox"/> Fee Address indication requested, system generated SB/47-EFS form attached

2.Entity Status

Change in Entity Status

- Applicant certifying micro entity status; system generated Micro Entity certification form attached. See 37 CFR 1.29.
 Note: Absent a valid certification of micro entity status, issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment. If this box is checked, you will be prompted to choose a micro entity status on the gross income basis (37 CFR 1.29(a)) or the institution of higher education basis (37 CFR 1.29(d)), and make the applicable certification online.
- Applicant asserting small entity status. See 37 CFR 1.27.
 Note: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
- Applicant changing to regular undiscounted fee status.
 Note: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

Document Description: Issue Fee Payment (PTO-85B)

3.The Following Fee(s) Are Submitted:

Issue Fee

I authorize USPTO to apply my previously paid issue fee to the current fees due

Publication Fee

The Director is hereby authorized to apply my previously paid issue fee to the current fee due and to charge deficient fees to Deposit Account Number _____

Advance Order - # of copies _____

If **in addition** to the payment of the issue fee amount submitted with this form, there are any discrepancies in any amount(s) due, the Director is authorized to charge any deficiency, or credit any overpayment, to Deposit Account Number _____.
 The **issue fee must be submitted** with this form. **If payment of the issue fee does not accompany this form, checking this box and providing a deposit account number will NOT be effective to satisfy full payment of the fee(s) due.**

4.Firm and/or Attorney Names To Be Printed

NOTE: If no name is listed, no name will be printed
For printing on the patent front page, list to be displayed as entered

- 1. NORTH WEBER AND BAUGH LLP
- 2. MICHAEL NORTH
- 3.

5.Assignee Name(s) and Residence Data To Be Printed

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

Name	City	State	Country	Category
ASSIA SPE, LLC	Wilmington	DELAWARE	united states	corporation

6.Signature

I certify, in accordance with 37 CFR 1.4(d)(4) that I am an attorney or agent registered to practice before the Patent and Trademark Office who has filed and has been granted power of attorney in this application. I also certify that this Fee(s) Transmittal form is being transmitted to the USPTO via EFS-WEB on the date indicated below.

Signature	/Michael V. North/	Date	05-21-2021
Name	Michael V. North	Registration Number	46963

Electronic Patent Application Fee Transmittal

Application Number:	14414436			
Filing Date:	12-Jan-2015			
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK			
First Named Inventor/Applicant Name:	Leonardo Dagum			
Filer:	Michael V. North/Domarina Alkhas			
Attorney Docket Number:	20145-073US			
Filed as Large Entity				
Filing Fees for U.S. National Stage under 35 USC 371				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY APPL ISSUE FEE	1501	1	1200	1200
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1200

Electronic Acknowledgement Receipt	
EFS ID:	42790290
Application Number:	14414436
International Application Number:	
Confirmation Number:	4662
Title of Invention:	METHOD AND SYSTEM FOR USING A DOWNLOADABLE AGENT FOR A COMMUNICATION SYSTEM, DEVICE, OR LINK
First Named Inventor/Applicant Name:	Leonardo Dagum
Customer Number:	146571
Filer:	Michael V. North/Domarina Alkhas
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-073US
Receipt Date:	21-MAY-2021
Filing Date:	12-JAN-2015
Time Stamp:	15:57:36
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$1200
RAM confirmation Number	E20215KF57311747
Deposit Account	502776
Authorized User	Domarina Alkhas

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)
 37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	Web85b.pdf	46306 90f10603c3d965621f9c638c7c6bc3f59526bdef	no	2

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	32160 560dabfc3cd0307ab15060c8e46cfa5c6b869c51	no	2
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Warnings:

Information:

Total Files Size (in bytes): 78466

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



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Table with 5 columns: APPLICATION NO., ISSUE DATE, PATENT NO., ATTORNEY DOCKET NO., CONFIRMATION NO.
Row 1: 14/414,436, 06/29/2021, 11050654, 20145-073US, 4662

146571 7590 06/09/2021
North Weber & Baugh LLP - ASSIA
3260 Hillview Avenue, 1st Floor
Palo Alto, CA 94304

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 479 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

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

- Leonardo Dagum, Redwood City, CA;
ADAPTIVE SPECTRUM AND SIGNAL ALIGNMENT, INC., Redwood City, CA
Philip Bednarz, Palo Alto, CA;
Leonardo Dagum, Redwood City, CA
Marc Goldberg, Redwood City, CA;
Philip Bednarz, Palo Alto, CA
Ardavan Maleki Tehrani, Menlo Park, CA;
Marc Goldberg, Redwood City, CA
Wonjong Rhee, San Francisco, CA;
Ardavan Maleki Tehrani, Menlo Park, CA
Wongjon Rhee, San Francisco, CA

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