

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/AIA/82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	
Filing Date	2019-06-05
First Named Inventor	Peter Chow
Title	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS
Art Unit	
Examiner Name	
Attorney Docket Number	20145-049USC2

SIGNATURE of Applicant or Patent Practitioner

Signature	/Michael North/	Date (Optional)	2019-06-05
Name	Michael North	Registration Number	46963
Title (if Applicant is a juristic entity)	Patent Attorney		
Applicant Name (if Applicant is a juristic entity)	ASSIA SPE, LLC		

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.

Doc Code: PA..

Document Description: Power of Attorney

PTO/AIA/82B (07-13)

Approved for use through 11/30/2014, OMB 0651-0051

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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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):

ASSIA SPE, LLC

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)

Name

John M. Cioffi

Title

Chief Executive Officer

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.

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	20145-049USC2
		Application Number	
Title of Invention	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS		
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.)
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Inventor Information:

Inventor	1	Remove			
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Peter		Chow		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Los Altos	State/Province	CA	Country of Residence	US
Mailing Address of Inventor:					
Address 1	750 Woodstock Ln.				
Address 2					
City	Los Altos	State/Province	CA		
Postal Code	94022	Country i	US		
Inventor	2	Remove			
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Wonjong		Rhee		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	San Francisco	State/Province	CA	Country of Residence	US
Mailing Address of Inventor:					
Address 1	235 Berry St., Apt. 606				
Address 2					
City	San Francisco	State/Province	CA		
Postal Code	94158	Country i	US		
Inventor	3	Remove			
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Ardavan	Maleki	Tehrani		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	20145-049USC2
		Application Number	
Title of Invention	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS		

City	Atherton	State/Province	CA	Country of Residence	US
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Mailing Address of Inventor:

Address 1	11 Almendral Ave.				
Address 2					
City	Atherton	State/Province	CA		
Postal Code	94027	Country	US		

Inventor	4	Remove
----------	---	---------------------------------------

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Marc		Goldburg	

Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service

City	Redwood City	State/Province	CA	Country of Residence	US
------	--------------	----------------	----	----------------------	----

Mailing Address of Inventor:

Address 1	226 Hillsdale Way				
Address 2					
City	Redwood City	State/Province	CA		
Postal Code	94062	Country	US		

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.**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	146571		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS		
Attorney Docket Number	20145-049USC2	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	9	Suggested Figure for Publication (if any)	

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	20145-049USC2
		Application Number	
Title of Invention	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS		

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **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). Either enter 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:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	146571		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim 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.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	15182513	2016-06-14

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	20145-049USC2
		Application Number	
Title of Invention	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS		
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15182513	Continuation of	13995900	2014-07-08
Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
13995900	a 371 of international	PCTUS11021003	2011-01-12
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. 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. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Remove
			Access Code ⁱ (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	20145-049USC2
		Application Number	
Title of Invention	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h) (1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	20145-049USC2
		Application Number	
Title of Invention	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.			
Applicant		1 Remove	
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section. Clear			
Assignee		Legal Representative under 35 U.S.C. 117	
☐ Person to whom the inventor is obligated to assign.		☐ Person who shows sufficient proprietary interest	
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:			
Name of the Deceased or Legally Incapacitated Inventor:			
If the Applicant is an Organization check here. ☒			
Organization Name		ASSIA SPE, LLC	
Mailing Address Information For Applicant:			
Address 1		1209 Orange St.	
Address 2			
City		Wilmington	State/Province
Country		US	Postal Code
Phone Number			Fax Number
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button. Add			

Assignee Information including Non-Applicant Assignee Information:

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

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	20145-049USC2
		Application Number	
Title of Invention	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS		

Assignee 1				
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.				
Remove				
If the Assignee or Non-Applicant Assignee is an Organization check here. ☐				
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information For Assignee including Non-Applicant Assignee:				
Address 1				
Address 2				
City		State/Province		
Country i		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add				

Signature:[Remove](#)

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet must be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Michael North/		Date (YYYY-MM-DD)	2019-06-05
First Name	Michael	Last Name	North	Registration Number
				46963
Additional Signature may be generated within this form by selecting the Add button. Add				

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	20145-049USC2
		Application Number	
Title of Invention	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS		

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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 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.

**SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK
COMMUNICATIONS****ABSTRACT**

[0121] Described are systems and methods for jointly optimizing Wide Area Network (WAN) and Local Area Network (LAN) network communications. In one embodiment, a management device communicatively interfaced with a WAN and a LAN includes a collection module to collect LAN information from the LAN and WAN information from the WAN; an analysis module to jointly analyze the collected WAN information and the collected LAN information to identify an operational condition; and an implementation module to initiate a management event responsive to the operational condition being identified. In one embodiment, the management event includes generating and transmitting a diagnostics report responsive to a fault being identified. The management device may further generate and execute instructions to remedy the diagnosed fault.

CLAIMS**WHAT IS CLAIMED IS:**

1. A management device, comprising:
 - a Local Area Network (LAN) interface to communicably interface the management device with a LAN;
 - a Wide Area Network (WAN) interface to communicably interface the management device with a WAN, wherein the WAN is to provide broadband connectivity to the LAN;
 - a collection module to collect WAN information from one or more communication layers on the WAN; and
 - an analysis module to identify an operational condition within the LAN in a different communication layer from the one or more communication layers on the WAN by analyzing at least the collected WAN information.
2. The management device of claim 1 wherein the one or more communication layers on the WAN and the different communication layer in the LAN are layers of Open Systems Interconnection (OSI) model.
3. The management device of claim 1 wherein the one or more communication layers on the WAN and the different communication layer in the LAN are layers of TCP/IP model.
4. The management device of claim 1 wherein the collected WAN information comprises a neighborhood analysis relating to internet connectivity provided by the WAN to a plurality of other LANs.
5. The management device of claim 4 further comprises an implementation module to initiate a management event responsive to the operational condition being identified, the

management event comprises instructions to change a configuration of the LAN device based on the neighborhood analysis.

6. The management device of claim 2 wherein the collection module further collects LAN information from one or more communication layers on the LAN for jointly analyzing the collected WAN information and the collected LAN information, the one or more communication layers on the LAN are distinct from the one or more communication layers on the WAN.

7. The management device of claim 6, wherein the operational condition within the LAN identified based on the joint analysis comprises at least one of:

- network congestion within the LAN;
- excess power consumption by communication elements within the LAN;
- a security breach within the LAN; or
- a network intrusion within the LAN.

8. The management device of claim 1, wherein the collection module is to collect the WAN information and the LAN information from one or more sources including:

- 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 WiFi compatible base station;
- a wireless mobile device repeater;

- a wireless mobile device base station;
- 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; or
- an Ethernet connected network switch.

**SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK
COMMUNICATIONS**

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CROSS REFERENCE TO RELATED APPLICATION

[0001] This application is a continuation of and claims priority to previously filed copending U.S. Patent Application No. 15/182,513, entitled “SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS,” naming as inventors Peter Chow, Wonjong Rhee, Ardavan Maleki Tehrani, and Marc Goldberg, and filed June 14, 2016, which is a continuation of U.S. Patent Application No. 13/995,900, entitled “SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS,” naming as inventors Peter Chow, Wonjong Rhee, Ardavan Maleki Tehrani, and Marc Goldberg, and filed July 8, 2014, which claims priority to International PCT Patent Application No. PCT/US11/021003, entitled “SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS,” and filed January 12, 2011, all applications of which are hereby incorporated herein by reference in their entirety and for all purposes.

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A. Technical Field

[0003] The subject matter described herein relates generally to the field of computing, and more particularly, to systems and methods for jointly optimizing WAN and LAN network communications.

B. Background of the Invention

[0004] The subject matter discussed in the background section should not be assumed to be prior art merely as a result of its mention in the background section. Similarly, a problem mentioned in the background section or associated with the subject matter of the background section should not be assumed to have been previously recognized in the prior art. The subject matter in the background section merely represents different approaches, which in and of themselves may also correspond to embodiments of the claimed subject matter.

[0005] A Wide Area Network (WAN) provides interconnectivity amongst many diverse networks. The “Internet” is a Wide Area Network that joins together many other networks, providing a communications path between devices operating within distinct and often geographically dispersed networks. A Local Area Network (LAN) enables multiple distinct devices within an end-user's premises to communicate amongst themselves locally. An end-user's LAN is often connected to the Internet via a WAN back-haul connection to an Internet Service Provider (ISP) that provides the end-user consumer with Internet connectivity and Internet Bandwidth. Devices within the end-user's LAN may communicate with devices external to the LAN over the WAN back-haul connection provided by the end-user's ISP.

[0006] Traditionally, the WAN is controlled, managed and maintained by service providers, such as Internet Service Providers, Telecommunications Operators, etc. Conversely, a LAN is typically managed and maintained at a customer's premises by end users/customers, which may be residential users or commercial/business customers. Moreover, operators and

service providers typically refrain from addressing any LAN related problems, notwithstanding the fact that, at times, some problems and issues exhibited via the LAN may be related to WAN configurations and settings. Correspondingly, some problems and issues exhibited via the WAN may be related to configurations, settings or problems on the LAN side. Furthermore, the WAN might be operated by a reseller, which does not have access to all management functionalities (such as monitoring, provisioning, control) to which the owner or the wholesaler of the WAN system may have access. Access to such functionalities may be achieved by the embodiments described herein. Moreover, the means of control, monitoring and provisioning, as well as control channels on the two networks, WAN and LAN, are typically distinct and separate, even when the WAN and the LAN are interconnected.

[0007] The present state of the art may benefit from systems and methods for jointly monitoring, provisioning and optimizing WAN and LAN network communications which are described herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] 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:

[0010] FIG. 1 illustrates an exemplary architecture in which embodiments may operate;

[0011] FIG. 2 illustrates an alternative exemplary architecture in which embodiments may operate;

[0012] FIG. 3 illustrates an alternative exemplary architecture in which embodiments may operate;

[0013] FIG. 4 illustrates an alternative exemplary architecture in which embodiments may operate;

[0014] FIG. 5 shows a diagrammatic representation of a system in which embodiments may operate, be installed, integrated, or configured;

[0015] FIGS. 6A, 6B, and 6C are flow diagrams illustrating methods for jointly optimizing WAN and LAN network communications in accordance with described embodiments; and

[0016] FIG. 7 illustrates a diagrammatic representation of a machine in the exemplary form of a computer system, in accordance with one embodiment.

DETAILED DESCRIPTION

[0017] Described herein are systems and methods for jointly optimizing WAN and LAN network communications. In accordance with embodiments described herein, end-user consumers, including residential consumers and business consumers, may connect to the Internet by way of a Wide Area Network (WAN) back-haul connection to an Internet Service Provider (ISP). Such Internet Service Providers may include a Digital Subscriber Line (DSL) internet service provider which provides its subscribing end-users with Internet bandwidth at least partially over copper twisted pair telephone lines, such as that conventionally utilized to carry analog telephone service (e.g., Plain Old Telephone Service (POTS); a coaxial cable internet service provider which provides end-users with Internet bandwidth at least partially over coaxial cable, such as that conventionally utilized to carry “cable” television signals; or a fiber optics internet service provider which provides end-users with Internet bandwidth at over fiber optic cable that terminates at a customer's premises. Other variants exist as well, such as ISPs that provide Internet bandwidth as an analog signal over an analog telephone based connection, ISPs that provide Internet bandwidth over a one-way or two-way satellite connection, and ISPs that provide Internet bandwidth at least partially over power lines, such as power lines conventionally utilized to transmit utility power (e.g., electricity) to an end-user's premises, or ISPs that provide Internet bandwidth at least partially over wireless channels, such as WiFi connectivity at hotspots, or mobile data connectivity via technologies and standards such as WiMax, 3G/4G, LTE, etc.

[0018] At an end-user's premises, Internet bandwidth provided via a WAN back-haul connection to an ISP is commonly distributed amongst multiple devices within the end-user's premises via a Local Area Network (LAN), which may be established via a LAN device. Distribution of the Internet Bandwidth provided via the WAN back-haul may further extend to

an area around an end-user's premises, such as to an area outside a home, to a space or area outside of or around a business in which the Internet Bandwidth is accessible via the end-user's LAN wirelessly. At the end-user's premises, network traffic may be distributed within the LAN via wired connections or wireless connections, for example, over coaxial wiring, electrical wiring, twisted-pair telephone wiring, variants of Ethernet/Category-5 type wiring, and various types of wireless radio signals using licensed and unlicensed spectrum and various protocols.

[0019] Some network traffic associated with the end-user's premises remains local to the LAN, while other traffic destined for locations external to the LAN traverse the LAN onto the WAN interface and onto the Internet via the WAN backhaul.

[0020] Besides network traffic traversing the WAN and LAN networks and interfaces, various types of information are available, retrievable, or observable from each of the distinct WAN and LAN networks. The management device described herein collects information collected from the WAN and LAN networks via respective WAN and LAN interfaces to such networks, jointly analyzes the collected WAN information and the collected LAN information to identify an operational condition, and initiates a management event responsive to the operational condition being identified. For example, in some embodiments, the operational condition identified corresponds to a fault within the LAN which is identified based at least in part on the collected WAN information or alternatively, a fault within the WAN which is identified based at least in part on the collected LAN information. In some embodiments, the management event initiated responsive to the operational condition being identified may include generating and transmitting a diagnostic report, conducting additional diagnostics and/or analysis, issuing probes to trigger the output and collection of output from connected devices, such as a LAN device, WAN device, or a network element connected with the management device. In some embodiments, the management device generates and implements instructions responsive to the

operational condition being identified, such as corrective actions to remedy a fault or instructions to trigger the adoption of a new device configuration. Network elements and networked devices may include one or more devices such as network gateways, DSL/CPE modems, Cable modems, WAN/LAN gateways, ONT devices, or any other network device which is communicatively interfaced with the WAN or LAN.

[0021] Using the systems and methodologies described herein, a management device having access and authority to collect information from a WAN connected network and also a LAN connected network is capable of collecting and jointly analyzing information from the WAN and LAN networks to jointly optimize WAN and LAN network communications.

[0022] 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.

[0023] 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.

[0024] 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 Management Device 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.

[0025] The algorithms and displays presented herein are not inherently related to any particular computer or other apparatus nor are embodiments described with reference to any particular programming language. It will be appreciated that a variety of programming languages may be used to implement the teachings of the embodiments as described herein.

[0026] FIG. 1 illustrates an exemplary architecture **100** in which embodiments may operate in compliance with the G.997.1 standard (also known as G.ploam). 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, all with and without bonding.

[0027] The G.997.1 standard specifies the physical layer management for ADSL transmission systems based on the clear, Embedded Operation Channel (EOC) defined in G.997.1 and use of indicator bits and EOC messages defined in G.992.x standards. Moreover, G.997.1 specifies network management elements content for configuration, fault and performance management. In performing these functions, the system utilizes a variety of operational data (which includes performance data) that is available at an Access Node (AN).

[0028] In FIG. 1, users terminal equipment **102** (e.g., a Customer Premises Equipment (CPE) device or a remote terminal device) is coupled to a home network **104**, which in turn is coupled to a Network Termination (NT) Unit **108**. ADSL Transceiver Units (ATU) are further depicted (e.g., a device that provides ADSL modulation of a DSL loop or line). In one embodiment, NT unit **108** includes an ATU-R (ATU Remote), **122** (for example, a transceiver defined by one of the ADSL standards) or any other suitable network termination modem, transceiver or other communication unit. NT unit **108** also includes a Management Entity (ME) **124**. Management Entity **124** can be any suitable hardware device, such as a microprocessor, microcontroller, or circuit state machine in firmware or hardware, capable of performing as required by any applicable standards and/or other criteria. Management Entity **124** collects and stores, among other things, operational data in its Management Information Base (MIB), which is a database of information maintained by each ME capable of being accessed via network management protocols such as Simple Network Management Protocol (SNMP), an administration protocol used to gather information from a network device to provide to an administrator console/program or via Transaction Language 1 (TL1) commands, TL1 being a long-established command language used to program responses and commands between

telecommunication network elements. In one embodiment, Network Termination Unit **108** is communicably interfaced with a management device **170** as described herein. In another embodiment, ATU-R **122** is communicably interfaced with management device **170**.

[0029] Each ATU-R **122** in a system may be coupled with an ATU-C (ATU Central) in a Central Office (CO) or other central location. ATU-C **142** is located at an Access Node (AN) **114** in Central Office **146**. A Management Entity **144** likewise maintains an MIB of operational data pertaining to ATU-C **142**. The Access Node **114** may be coupled to a broadband network **106** or other network, as will be appreciated by those skilled in the art. ATU-R **122** and ATU-C **142** are coupled together by a loop **112**, which in the case of ADSL may be a twisted pair line, such as a telephone line, which may carry other communication services besides DSL based communications. Either management entity **124** or management entity **144** may implement and incorporate a management device **170** as described herein. Management entity **124** or management entity **144** may further store collected WAN information and collected LAN information within an associated MIB.

[0030] Several of the interfaces shown in FIG. **1** are used for determining and collecting operational data. The Q interface **126** provides the interface between the Network Management System (NMS) **116** of the operator and ME **144** in Access Node **114**. Parameters specified in the G.997.1 standard apply at the Q interface **126**. The near-end parameters supported in Management Entity **144** may be derived from ATU-C **142**, while far-end parameters from ATU-R **122** may be derived by either of two interfaces over the UA interface. Indicator bits and EOC messages may be sent using embedded channel **132** and provided at the Physical Medium Dependent (PMD) layer, and may be used to generate the required ATU-R **122** parameters in ME **144**. Alternately, the operations, Administration and Maintenance (OAM) channel and a suitable protocol may be used to retrieve the parameters from ATU-R **122** when

requested by Management Entity **144**. Similarly, the far-end parameters from ATU-C **142** may be derived by either of two interfaces over the U-interface. Indicator bits and EOC message provided at the PMD layer may be used to generate the required ATU-C **142** parameters in Management Entity **124** of NT unit **108**. Alternately, the OAM channel and a suitable protocol may be used to retrieve the parameters from ATU-C **142** when requested by Management Entity **124**.

[0031] At the U interface (also referred to as loop **112**), there are two management interfaces, one at ATU-C **142** (the U-C interface **157**) and one at ATU-R **122** (the U-R interface **158**). Interface **157** provides ATU-C near-end parameters for ATU-R **122** to retrieve over the U interface/loop **112**. Similarly, U-R interface **158** provides ATU-R near-end parameters for ATU-C **142** to retrieve over the U interface/loop **112**. The parameters that apply may be dependent upon the transceiver standard being used (for example, G.992.1 or G.992.2). The G.997.1 standard specifies an optional Operation, Administration, and Maintenance (OAM) communication channel across the U interface. If this channel is implemented, ATU-C and ATU-R pairs may use it for transporting physical layer OAM messages. Thus, the ATU transceivers **122** and **142** of such a system share various operational data maintained in their respective MIBs.

[0032] Depicted within FIG. **1** is management device **170** operating at various locations in accordance with several alternative embodiments. For example, management device **170** is located within home network **104**, such as within a LAN. In an alternative embodiment, management device **170** is located at central office **146** and interfaced to home network **104** (e.g., a LAN) and broadband network **106** (e.g., a WAN) via NMS **116**. In yet another embodiment, management device **170** operates on the broadband network **106** (e.g., on the WAN or Internet).

[0033] As used herein, the terms “user,” “subscriber,” and/or “customer” refer to a person, business and/or organization to which communication services and/or equipment are and/or may potentially be 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. For an example 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. Example customer premises include a residence or an office building.

[0034] As used herein, 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. Example service providers include a telephone operating company, a cable operating company, a wireless operating company, an internet service provider, or any service that may independently or in conjunction with a broadband communications service provider offer services that diagnose or improve broadband communications services (DSL, DSL services, cable, etc.).

[0035] Additionally, as used herein, the term “DSL” refers to any of a variety and/or variant of DSL technology such as, for example, Asymmetric DSL (ADSL), High-speed DSL (HDSL), Symmetric DSL (SDSL), and/or Very high-speed/Very high-bit-rate DSL (VDSL). Such DSL technologies are commonly implemented in accordance with an applicable standard such as, for example, the International Telecommunications Union (I.T.U.) standard G.992.1 (a.k.a. G.dmt) for ADSL modems, the I.T.U. standard G.992.3 (a.k.a. G.dmt.bis, or G.adsl2) for ADSL2 modems, I.T.U. standard G.992.5 (a.k.a. G.adsl2plus) for ADSL2+ modems, I.T.U. standard G.993.1 (a.k.a. G.vdsl) for VDSL modems, I.T.U. standard G.993.2 for VDSL2

modems, I.T.U. standard G.994.1 (G.hs) for modems implementing handshake, and/or the I.T.U. G.997.1 (a.k.a. G.ploam) standard for management of DSL modems.

[0036] References to connecting a DSL modem and/or a DSL communication service to a customer are made with respect to exemplary Digital Subscriber Line (DSL) equipment, DSL services, DSL systems and/or the use of ordinary twisted-pair copper telephone lines for distribution of DSL services, it should be understood that the disclosed methods and apparatus to characterize and/or test a transmission medium for communication systems disclosed herein may be applied to many other types and/or variety of communication equipment, services, technologies and/or systems. For example, other types of systems include wireless distribution systems, wired or cable distribution systems, coaxial cable distribution systems, Ultra High Frequency (UHF)/Very High Frequency (VHF) radio frequency systems, satellite or other extra-terrestrial systems, cellular distribution systems, power-line broadcast systems and/or fiber optic networks. Additionally, combinations of these devices, systems and/or networks may also be used. For example, a combination of twisted-pair and coaxial cable interfaced via a balun connector, or any other physical-channel-continuing combination such as an analog fiber to copper connection with linear optical-to-electrical connection at an Optical Network Unit (ONU) may be used.

[0037] The phrases “coupled to,” “coupled with,” “connected to,” “connected with” and the like are used herein to describe a connection between two elements and/or components and are intended to mean coupled/connected either directly together, or indirectly, for example via one or more intervening elements or via a wired/wireless connection. References to a “communication system” are intended, where applicable, to include reference to any other type of data transmission system.

[0038] FIG. 2 illustrates an alternative exemplary architecture **200** in which embodiments may operate. Architecture **200** depicts a Wide Area Network (WAN) **205** and Local Area Network (LAN) **210**, each communicatively interfaced with management device **170**. WAN **205** and LAN **210** are also communicatively interfaced with each other directly via WAN/LAN connection **285**, over which data may be communicated between WAN **205** and LAN **210** without having to engage or otherwise communicate with management device **170**. For example, management device **170** may carry out WAN/LAN optimizations and communicate with various networked devices in the WAN or in the LAN or both, without serving as an interfacing gateway or as the sole communication link between the LAN and the WAN.

[0039] In accordance with one embodiment, management device **170** includes a Wide Area Network (WAN) interface **215** to communicably interface the management device **170** with the WAN **205** and a Local Area Network (LAN) interface **220** to communicably interface the management device **170** with the LAN **210**. In one embodiment, management device **170** further includes a collection module **225** to collect LAN information **245** from the LAN **210** and to further collect WAN information **240** from the WAN **205**.

[0040] In one embodiment, management device **170** includes an analysis module **230** to jointly analyze the collected WAN information **240** and the collected LAN information **245** to identify an operational condition. In one embodiment, management device **170** further includes an implementation module **235** to initiate a management event responsive to the operational condition being identified.

[0041] In accordance with various embodiments, the operational condition identified based on the collected WAN information **240** and the collected LAN information **245** may represent a variety of observable, detectable, or determinable operational conditions associated with the LAN **210**, associated with the WAN **205**, associated with the devices within either the

WAN or the LAN, or associated with the communication channel **280** related to the WAN and the LAN.

[0042] For example, FIG. **2** depicts various types of information that may be collected from the WAN and/or the LAN. In accordance with certain embodiments, the collected WAN information **240** and/or the collected LAN information **245** may include faults or fault codes **255**, configuration information **260**, status information **265**, and error information **270**. The collected information (**240** or **245**) may take the form of codes, statistics, counters, message strings, and so forth. Other information types or sources of collected WAN and/or LAN information include operational data; active configuration settings of the management device; active configuration settings of networked devices operating within the LAN; active configuration settings of WAN network elements communicatively interfaced with the management device; performance measurements, counters, and/or statistics; and diagnostic information.

[0043] WAN and or LAN information to be analyzed may further include historical margin performance of a WAN backhaul; historical performance data relating to a WAN modem; WAN modem retrain counts; WAN modem training data; WAN error metrics; LAN error metrics; WAN packet counts; LAN packet counts; LAN device resets; LAN transmit power levels; LAN transmit spectrums bands; LAN wireless transmission channels; LAN auto-select radio channels; LAN device Identifier; and LAN data collision counts.

[0044] Such information, data, and counters may correspond to a current configuration or status, or may instead correspond to historical data collected over a period of time. Thus, in accordance with one embodiment, the information analyzed to identify the operational condition includes historical WAN information or historical LAN information, or both. In accordance with one embodiment, historical WAN information and/or historical LAN information are stored within a storage module **295** of the management device **170**. In one embodiment, the analysis

module **230** analyzes current WAN information **240**, current LAN information **245**, historical WAN information, and historical LAN information in the process of identifying the operational condition.

[0045] In one embodiment, an analysis module **230** performs historical performance trending analysis based on the historical WAN information and the historical LAN information. In such an embodiment, implementation module **235** generates and transmits a historical performance trending report describing the historical operational performance of a communication channel **280** related to the WAN **205** and the LAN **210**. In alternative embodiments, the historical performance trending reports describes the historical performance of a LAN device or the historical performance of a WAN device. For example, such a historical performance trending report may describe the volume of data, average data rates, and traffic class for a computer operating within the LAN over a specified time period. Such information may be of interest to a business consumer reviewing its data usage and costs. Such information may be based on data collected from the WAN but provide LAN specific metrics. Similarly, information collected from the LAN may be utilized to provide WAN specific metrics or WAN based trending. For example, errors, retrains, failed connection requests, failed DNS (domain naming service) requests, and similar metrics available from the LAN may be utilized to provide quality trending metrics of the WAN based connectivity and traffic. Although failures may be exhibited and available from the LAN, many such failures may nevertheless be attributable to operational conditions (e.g., configurations, faults, congestion, etc.) within the WAN **205**.

[0046] In one embodiment, the collection module collects or estimates one or more user preferences. For example, the one or more user preferences may be determinable based on user preference information **290** collected from the WAN or the LAN. In such an embodiment, the analysis module **230** analyzes the one or more user preferences and the implementation

module **235** responsively initiates a management event. For example, implementation module **235** may generate instructions to change the operational condition based at least in part on the one or more user preferences. Changing the operational condition may constitute modifying a configuration of a LAN device or a WAN device based on the user preferences, or requesting a WAN operator to alter the configuration of a communication channel **280** related to the WAN and the LAN.

[0047] The management device may collect information from various information sources within the WAN and/or LAN. For example, in one embodiment, a collection module **225** of the management device **170** collects information from one or more sources including: 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 WiFi compatible base-station; a wireless mobile device repeater; a wireless mobile device base-station; 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.

[0048] In some embodiments, the operational condition identified based on the collected WAN information **240** and the collected LAN information **245** may represent a fault diagnosed within the WAN **205** based on the collected LAN information **245** or a fault diagnosed within the LAN **210** based on the collected WAN information **240**. In such an

embodiment, the implementation module **235** initiating a management event responsive to the operational condition being identified includes the implementation module to generate, provide or transmit a diagnostic report and/or information identifying the fault diagnosed within the WAN or the fault diagnosed within the LAN. Such information may be accessed or provided via the Internet, a webpage, a Graphic User Interface (GUI), or any other suitable communication means similar to the means used by the management device **170** to access information.

[0049] For example, a diagnostics report may be generated and sent to a WAN operator, such a DSL or Cable internet service provider. Similarly, a diagnostics report and/or information may be generated, provided or sent to an end-user; accessible or provided via the Internet, a webpage, a Graphic User Interface (GUI), etc. An end-user may benefit from a diagnostic report indicating that a device operating within the end-user's LAN is triggering a large number of malformed packets, such as packets with undeliverable destination addresses. In such an example, the WAN information **240** collected may include counter or statistics information for malformed network traffic packets attributable to a device operating within LAN **210**. Subsequent to analyzing the information collected from the WAN and the LAN, implementation module **235** may then generate a diagnostics report, provide or transmit the report to an end-user associated with LAN **210**, thus alerting the end-user to the problem. Such a report may similarly be of interest to an operator of the WAN **205**, notwithstanding the fact that the fault is attributable to a device operating upon LAN **210**. For example, the WAN operator may undertake to filter or block the malformed network traffic, or assist its consumer in identifying and rectifying the source of the malformed packets within the consumer's LAN so as to improve overall network efficiency.

[0050] In one embodiment, the implementation module **235** initiating the management event responsive to the operational condition being identified includes the implementation

module **235** to generate instructions to remedy a fault diagnosed within the WAN or to generate instructions to remedy a fault diagnosed within the LAN based on the joint analysis, or both. For example, in one embodiment, initiating the management event responsive to the operational condition being identified comprises the implementation module to alter one or more of the following: Forward Error Correction (FEC) parameters, a DSL transmission rate, implement a higher INP (Impulse Noise Protection) parameter setting, a higher margin parameter setting, and/or higher power parameter settings.

[0051] In accordance with various embodiments, the operational condition identified based on the joint analysis may include one or more of: network congestion within the WAN; network congestion within the LAN; excess power consumption by communication elements within the LAN; excess power consumption by communication elements within the WAN; bandwidth utilization of the WAN in excess of a maximum threshold; bandwidth availability of the WAN below a minimum threshold; a security breach within the LAN which is determined by observing anomalies in data traffic; a network intrusion within the LAN; a fault on the WAN or the LAN; errors on the WAN or the LAN connection; usage patterns of the WAN or the LAN resources (e.g., bandwidth, power, etc.); bandwidth utilization on the WAN or the LAN; performance measures on the WAN or the LAN; and quality of the WAN or LAN connection, such as level of stability, rate sustainability, etc.

[0052] In some embodiments, the identified operational condition represents a configuration, such as an operational configuration of a communication channel **280** related to the WAN and the LAN based on the collected LAN information and the collected WAN information. In one embodiment, the implementation module **235** initiating the management event responsive to the operational condition being identified includes the implementation module **235** to generate and transmit an operational report describing the operational

configuration of the communication channel **280** related to the WAN and the LAN. Such a configuration may describe the spectrum over which transceivers within the WAN and/or LAN are communicating, error correction policies or settings, latency policies or settings, data transfer speeds, transmit power levels, and so forth. Such an operational report may enable an end user to optimize LAN configuration settings based on complementary WAN settings, enable a WAN operator to optimize its WAN settings based on complementary LAN settings, or both. Identification of an operational condition need not necessarily correlate to a problem or a diagnosed fault, as the identified configurations or the identified network characteristics may be appropriate or acceptable for a WAN operator and/or an end-user's LAN.

[0053] FIG. 3 illustrates an alternative exemplary architecture **300** in which embodiments may operate. For example, responsive to an operational condition being identified, the implementation module **235** may initiate one or more complementary management events. For example, the responsive management event may be limited to reporting the identified operational condition by generating and sending an appropriate report. Alternatively, in accordance with certain embodiments, the implementation module **235** may undertake specific actions to modify the identified operational condition, such as initiating a configuration change or executing corrective action instructions to affect the identified operational condition.

[0054] Which management event is triggered by a management device **170** may depend on the type of operational condition identified and also on how the management device **170** relates operationally to the WAN **205**, to the LAN **210** and/or to the source or location of the LAN and/or WAN information upon which the identified operational condition is based.

[0055] For example, in one embodiment, the management device is implemented within a Digital Subscriber Line (DSL) modem **305**, operating as a Customer Premises Equipment (CPE) device to communicatively interface a DSL based backhaul **310** provided via

the WAN **205** to the LAN **210**. Such a DSL modem **305** may be accessible and at least partially configurable by an end-user consumer of the DSL service. In an alternative embodiment, the management device may be implemented within a DSL modem operating at a central office. In such an embodiment, the DSL modem may operate under the control of a DSL operator, yet nevertheless have access and authority to collect information from the LAN **210**.

[0056] In one embodiment, the management device **170** is implemented within and operates as a cable modem **315** at an end-user consumer location. In such an embodiment, the cable modem **315** communicatively interfaces a cable network based backhaul **320** provided via the WAN **205** to the LAN **210**.

[0057] In an alternative embodiment, the management device is implemented within a powerline modem at an end-user consumer location. In such an embodiment, the cable modem communicatively interfaces a powerline based (e.g., electric utility based backhaul) provided via the WAN **205** to the LAN **210**. The management device may similarly be implemented within a wireless modem operating to communicatively interface a wireless based backhaul provided via the WAN to the LAN; or be implemented within an Optical Network Terminal (ONT) operating to communicatively interface a fiber optic based backhaul provided via the WAN to the LAN.

[0058] In accordance with disclosed embodiments, the WAN provides Internet connectivity to a Local Area Network via one of: a wireless network connection; a wired network connection; a Digital Subscriber Line (DSL) network connection; a powerline network connection; a Passive Optical Network (PON) based network connection; a fiber optic based network connection; a cable based network connection; and a wireless network connection, such as WiFi connectivity at hotspots, or mobile data connectivity via technologies and standards such as WiMax, 3G/4G, LTE. The management device **170** may be implemented within and operate as an interfacing device between any such WAN based connection and a connected LAN, in

which case the WAN provides Internet connectivity to the management device **170** which may additionally implement an appropriate WAN/LAN interface, such as a WAN to LAN gateway **330** or WAN/LAN bridge.

[0059] The management device **170** need not necessarily operate within a modem or within a device interfacing the respective WAN and LAN networks. For example, in one embodiment, the management device is implemented within a router **335** operating to communicatively interface a WAN backhaul **325** with the LAN. In such an embodiment, the router **335** may operate within the LAN **210** and connect with the WAN back-haul **325** through a WAN/LAN gateway **330** as depicted, or alternatively, the router **335** implementing the functionality and capabilities of the management device (e.g., **170**) may connect directly with a WAN back-haul **325**. In some embodiments, a WAN/LAN gateway **330** device is combined with a LAN based router **335** and implements the management device capabilities.

[0060] In one embodiment, management device **170** is implemented separately from a router **335**, gateway device **330**, computing device **370**, DSL/CPE modem device **305**, and cable modem **315**, for example, management device **170** may operate as a standalone unit. FIG. **3** depicts various alternative deployment examples of management device **170** being implemented separately from such devices and operating within WAN **205** or within LAN **210**, thus enabling management device **170** to collect information from the respective networks. Alternatively, management device **170** may be implemented separately from such devices but interface directly to another device, such as to the WAN/LAN gateway **330** as depicted or to a modem (e.g., **305**, **315**) or as a peripheral device attached to a computing device (e.g., **370**), thus enabling management device to collect information from the respective networks and perform other operations as described herein. Other combinations are also feasible where the management

device **170** is enabled to collect information from each of a WAN **205** and a LAN **210** as described herein.

[0061] In accordance with disclosed embodiments the LAN interfaces one or more networked devices operating within the LAN to the management device via one or more of: an Ethernet based network connection; a wireless based network connection; an Institute of Electrical and Electronics Engineers (IEEE) 802.11 standards based network connection; an 802.11a, 802.11b, 802.11g, and/or 802.11n WiFi compatible network connection; a femto network connection transmitting via a mobile cellular compatible protocol including at least one of a third generation (3G) compatible protocol, a fourth generation (4G) compatible protocol, and a Long Term Evolution (LTE) compatible protocol; a powerline connection; a telephone system connection; a Plain Old Telephone Service (POTS) connection; an ITU G.hn connection; a Coax cable connection; and a wireless network connection, such as WiFi connectivity at hotspots, or mobile data connectivity via technologies and standards such as WiMax, 3G/4G, LTE. The management device **170** may be implemented within and operate as one of the networked devices operating within the LAN, for example, as a computer communicatively interfaced with the LAN **210**.

[0062] In some embodiments, the management device does not operate inline with the communication channel related to the WAN and the LAN in the way that a WAN/LAN gateway **330** or a modem operating between the WAN and the LAN operates. Instead, the management device may be implemented within a computing device **370** remotely located from a WAN/LAN interface through which a communication channel related to the WAN **205** and the LAN **210** is connected. Such a computing device may provide remote monitoring and management functionality for the WAN/LAN interface, such as monitoring, collecting, and analyzing data

associated with an ISP's WAN back-haul **325** or associated with a WAN/LAN gateway **330** device.

[0063] Computing device **370** may operate within the LAN **210** and communicate with LAN devices over LAN **210** connections and protocols and additionally communicate with WAN based devices over a WAN back-haul **325** connecting the LAN to the WAN. Computing device **370** may alternatively operate within the WAN **205**. In such an embodiment, the computing device **370** need not necessarily be associated with a WAN operator, such as an ISP, providing internet services to an end-user consumer. For example, a computing device **370** that implements the management device functionality may operate on the Internet beyond the infrastructure owned or operated by an ISP providing the WAN back-haul **325**, but nevertheless communicate with WAN based devices over the ISP's network via WAN **205** and communicate with LAN based devices via a WAN/LAN gateway **330** which connects LAN **210** to the WAN **205**. In an alternative embodiment, computing device **370** may communicate with WAN based devices and/or LAN based devices via an out-of-band interface. For example, rather than communicating with LAN/WAN based devices over the WAN **205** or LAN **210** networks, a computing device **370** implementing the management device capabilities may communicate over a management interface that connects over a separate communication channel, such as over a wireless cellular connection or by establishing a separate dial-up modem connection over an analog telephone line. In one embodiment, the management devices **170** or multiple management devices **170** are controlled by a third party operator, other than the owner/operator of the LAN and other than an owner/operator of the WAN. For example, a service provider may provide management, support, provisioning, and distribution services for multiple management devices so as to jointly optimize WAN/LAN network communications. Such a third party operator may

contract with either a LAN owner/operator or a WAN owner/operator to provide such joint WAN/LAN network optimization services via one or more management devices **170**.

[0064] In one embodiment, a management device **170** initiating a management event responsive to an operational condition being identified includes the management device **170** generating instructions and to communicate the generated instructions to one or more devices selected from: a network element, a WAN device, and/or a LAN device communicatively interfaced with the management device **170**. In such an embodiment, the generated instructions may be communicated via one of: a TR-069 (Technical Report 069) compatible communications protocol; a Transmission Control Protocol/Internet Protocol (TCP/IP) communications protocol; a Simple Network Management Protocol (SNMP) communications protocol; an out-of-band telephone line protocol; a Digital Subscriber Line Ethernet over Coax (DSL EOC) communications protocol; a cable control channel communications protocol; a powerline control channel communications protocol; a Command Line protocol (CLI); via a wireless device; or via a mobile device.

[0065] In accordance with certain embodiments, one of the above protocol transfer mechanisms is utilized to transfer instructions from the management device **170** over a LAN interface of the management device to LAN based devices, utilized to transfer instructions from the management device **170** over a WAN interface of the management device to WAN based devices, or utilized to transfer instructions from the management device **170** over a management interface of the management device to one or more networked devices.

[0066] In some embodiments, initiating a management event includes the management device **170** generating instructions to change an identified operational condition. In one embodiment, the management device **170** further executes the generated instructions. For example, the management device **170** may execute the commands within the management device

170 locally to change the configuration of the management device. For example, where the management device **170** is implemented within a WAN/LAN gateway or within a modem or a router, the management device may generate instructions and execute the instructions locally to change the configuration of the WAN/LAN gateway, modem, or router.

[0067] Alternatively, the management device may need to send the generated instructions to a distinct device to trigger or initiate a change to an identified operational condition. For example, where a management device **170** is located within a LAN based device and identifies an operational condition within a WAN based device (such as a fault or an unwanted configuration), the management device **170** may send or transmit the generated instructions to a second networked device to trigger or initiate a change. In some embodiments, the management device **170** may be able to remotely execute commands on a second networked device directly (e.g., via a remote command shell or a remote command interface). In alternative embodiments, the management device **170** sends an execution request to a second networked device soliciting execution of the commands or instructions.

[0068] For example, in one embodiment, initiating a management event responsive to the operational condition being identified constitutes an implementation module **235** of the management device **170** to generate commands based on the joint analysis to change a configuration of a LAN device communicatively interfaced with the management device and execute the commands against the LAN device to change the configuration of the LAN device.

[0069] In an alternative embodiment, initiating a management event responsive to the operational condition being identified constitutes an implementation module **235** of the management device to generate a request based on the joint analysis, in which the request specifies a configuration change to be implemented by a WAN operator, and the management

device **170** to additionally send the request to the WAN operator triggering the WAN operator to implement the configuration change.

[0070] For example, the management device may collect or estimate one or more user preferences, analyze the one or more user preferences, and determine that a configuration change implemented by the WAN operator implements one or more of the user preferences. In such an example, an implementation module of the management device may responsively generate instructions to change the operational condition based at least in part on the one or more user preferences and transmit such instructions to the WAN operator. If the management device was located within a WAN based device, such as within a DSL modem operating at a central office, the instructions may be instead executed locally, for example, to alter a DSL connection configuration settings or configuration controlled by the WAN operator. User preferences may specify various configurable or manageable characteristics for either the WAN or the LAN or both. For example, user preferences may indicate that the WAN and/or LAN should be optimized for streaming video, or gaming, or large data transfers, etc. Such optimizations may correspond to distinct operational settings affecting, for example, latency, error correction, transmit power, etc. User preferences may indicate a desired service level, which may correspond to a particular pricing scheme. For example, user preferences may indicate a less expensive rate plan in exchange for a reduced bandwidth transmit rate or a reduced bandwidth cap, or vise-versa.

[0071] In one embodiment, user preferences may be implicitly derived rather than explicitly specified. For example, a WAN operator providing internet bandwidth to an end-user may determine based on network traffic originating from the end-user's LAN that a certain class of network traffic is predominate or prioritized over the communication channel related to the WAN and the end-user's LAN. In such an embodiment, the management device operating at the

WAN, having collected information from the LAN, may responsively alter the operational configuration of the WAN/LAN communication channel to optimize the communication channel for the predominate or prioritized class of network traffic.

[0072] In accordance with embodiments of the invention, initiating a management event responsive to the operational condition being identified includes the management device **170** (e.g., via its implementation module) may perform one or more of the following operations: 1) generate instructions to reduce transmit power of WAN elements (e.g., WAN based transceiver elements) when LAN bandwidth utilization is below a threshold; 2) generate instructions to reduce transmit power of LAN elements (e.g., LAN based transceiver elements) when WAN bandwidth utilization is below a threshold; 3) generate instructions to modify one or more parameters affecting WAN forward error correction (FEC), WAN latency, WAN transmit power levels, and WAN data rate, based on the collected LAN information; 4) generate instructions to modify an active Digital Subscriber Line (DSL) profile or configuration settings based on identifying network traffic related to the WAN and the LAN comprising a data type (e.g., a data class or a class type) corresponding to at least one of: video data, audio data, text data, graphical data, Voice over Internet Protocol (VoIP) data, or network gaming data, wherein the active DSL connection configuration settings is modified to optimize transmission parameters for the identified data type; and 5) generate instructions to reduce power of a DSL transceiver operating within the WAN based on data utilization levels detected within the LAN.

[0073] The above instructions each implement a change to an identified operational condition. Optimizing WAN/LAN based communications may at times, constitute reducing transmit rates and transmit power, so as to achieve reduced energy usage. Reducing transmit rates and power levels on a LAN or WAN based transceiver may be selected when it is determined that the respective network is not being actively utilized. Such optimization may not

only reduce energy usage for the respective LAN or WAN based elements, but may improve network communications for other consumers of the WAN or for other LANs which may benefit from, for example, less contention for network resources.

[0074] The above optimizations may alternatively implement or trigger LAN or WAN configuration changes that alter network characteristics. For example, a WAN configuration may be modified based on collected LAN information that identifies an operational condition within the LAN that corresponds to usage or consumption of a particular class of network traffic. For example, where it is determined that streaming video is being actively consumed by a LAN device, management device **170** may responsively configure the WAN to implement a higher data rate connection with minimized data correction where a streaming video may benefit from an increased data rate and may not be adversely affected by a minimized correction scheme (e.g., stream errors may generate momentary pixilation but may not require correction as the errored frame likely has already passed, and thus, may not be referenced again or even referenceable, by the time correcting data is provided). Conversely, a particular class of data may benefit from minimized latency such as VoIP data which requires a low data rate, but may frustrate human users where a delay attributable to network latency is present. Other examples, may include gaming data which may benefit from low latency, not necessarily require high data rates, but in certain situations may require high data accuracy. Bursty file transfers (e.g., large but intermittent) and steady data streams may similarly be identified and optimized (e.g., accuracy may be very important but latency may be less important).

[0075] In some embodiments, WAN side configurations are altered based on collected LAN information, or LAN side configurations are altered based on collected WAN information, or both LAN and WAN side configurations may be altered based on collected LAN and/or WAN information. For example, a LAN device may overload a WAN back-haul connection by

providing data faster than the WAN is capable of transmitting traffic. In such an instance, network communications may be optimized by reducing the data rate at which LAN information is provided to the WAN. Aligning these rates may reduce collisions and buffering errors due to a traffic backlog. The opposite may equally be true. A WAN back-haul may be capable of providing data to a LAN device faster than the LAN device itself can process the data, thus creating an un-optimized mismatch from the WAN to the LAN device, and thus providing an opportunity for joint optimization.

[0076] In one embodiment where the identified operational condition corresponds to a problem or a fault, the implementation module responsively generates and instantiates execution of instructions to remedy the fault. For example, the instructions may be instantiated within the management device, within a LAN device connected via the LAN interface, within a WAN device connected via the WAN interface, or within a network element connected to the management device via a management interface of the management device.

[0077] In one embodiment, information collected from the LAN **210** and WAN **205** relates to two distinct communication layers. One example of the two communication layers is two layers of the Open Systems Interconnection model (OSI model). The OSI model is a commonly used model describing the different data processing layers, in digital communication systems. The communication layers could also correspond to other communication protocols or layers such as TCP/IP which might not directly correspond to one of the layers of the OSI model.

[0078] For example, information from one layer on the WAN **205** may be used to diagnose or improve the performance on a different layer on the LAN **210**, or vice versa. In one embodiment, information is collected from the LAN **210** (for example, collected from a home network) by the Management device **170**. Based on analysis of the information by the Management device **170**, a management event initiated by the Management device **170**

responsive to the analysis is applied to the WAN **205**. In one example, a management event may include adjusting settings and configurations on a WAN **205** (for example a DSL network) in response to the analysis. Information collected from the LAN **210** may be from different layers of the LAN **210**, such as from the application layer and the networking layer. The settings and configuration on the DSL system may be implemented at the physical layer, by setting physical layer parameters of the DSL system. For example, the DSL system physical layer settings may be implemented through the setting of the DSL connections configuration settings. Implementing physical layer settings may be performed at the Central office (CO) side or at the (Customer Premises Equipment) CPE side. It is noted that in the absence of the Management device **170**, it is not possible to optimize or monitor the performance of the LAN, based on information from the WAN or to optimize or monitor the performance of the WAN, based on information from the LAN. This is because the control mechanisms and control channels on the two networks are distinct and separate. A Management device **170** as described herein addresses such a problem and enables such monitoring and optimizations which are not otherwise feasible.

[0079] In another example, data and information may be collected at a networking layer, or TCP/IP layer from the LAN **210**. Such information may, for example, be related to the performance of the LAN **210**. The information may, for example, indicate packet data rate, packet error rate, throughput, or TCP/IP related information regarding quality of the link, such as packet retransmission rate, etc. For example, where analysis indicates the TCP/IP layer on the LAN **210** side is experiencing excessive dropped packets or a lower than expected throughput, and yet, no known issues with the LAN are detected, the underlying problem may be attributed to the WAN **205** side. In a particular case, where the WAN **205** is a DSL connection, the DSL link settings and configuration could be changed, for example, initiating the change as a management event responsive to the above analysis. DSL connection setting may be

implemented at the physical layer. For example, the DSL coding may be improved by adjusting the Forward Error Correction (FEC) parameters (e.g., channel coding). Alternatively, DSL rate may be decreased to improve link stability and quality. Other management events could include higher INP (Impulse Noise Protection) parameter setting, improved margin parameter settings and/or power parameter settings. In this example, the management device **170** would collect the information, perform the analysis, and initiate a management event, for example, by sending instructions to a DSL controller interfaced via a WAN interface **215** of the management device **170**. The management event thus corresponds to the reconfiguration setting of the DSL connection.

[0080] In the above examples, information on the networking layer of the LAN **210** is used to configure settings at the physical layer on the WAN **205**. Similarly, information and data collected from other layers may be incorporated. For example, information from the application layer on the LAN may be used. Take for example, a video streaming system where an MPEG (Moving Picture Experts Group) data stream is received with errors at the receiving side on the LAN **210**. One or more of channel coding parameters, INP (Impulse Noise Protection) parameters, margin parameter settings, power parameter settings, and/or data rate parameters for the DSL connection may be altered or modified to compensate for the receiving side errors in the video data stream.

[0081] The receiving side may be a TV set, a multi-media gateway, a personal computer, or other device capable of receiving the MPEG video stream. Physical layer profiles on the WAN **205** may be changed to address the problem (e.g., the received errors) on the LAN **210** side. For example, if the WAN **210** is a DSL system and analysis of the WAN **210** shows instability on the DSL line, then the problems on the LAN's **210** application layer may be attributed to the WAN **205** side, in this example, the problem/errors may be attributable to the

DSL system. In such an example, DSL system settings (e.g., settings and parameters on the WAN **205**) may be set to stabilize the WAN DSL connection(s). For example, a new profile or DSL system configuration settings may be set on the DSL system, including, for example: improved coding, higher INP (Impulse Noise Protection) parameter setting, improved margin parameter settings, power parameter settings, and/or a lower data rate. In such an example, the management device **170** would collect the information, perform the analysis, and initiate a management event to, for example, a DSL controller communicatively interfaced to the management device **170**, for example, interfaced via WAN interface **215**. The management event thus corresponding to the reconfiguration of settings on the DSL connection, as described by the examples above.

[0082] In one embodiment, joint analysis includes finding problems or impairments on both the WAN **205** and the LAN **210** by analyzing the collected information from the LAN side and/or the WAN side. Take for example a WAN **205** supported by a DSL connection, and a LAN **210** supported by an HPNA (Home Phoneline Networking Alliance) connection. In the case of HPNA, the same telephone wiring used for the DSL based WAN access may also be used for HPNA based LAN communications within the LAN premises (for example local network communications within a home network). In some HPNA systems the frequencies of operation are above the ones used in the DSL connection. In such cases, impairments associated with the operational frequency bands may affect both the LAN **210** and the WAN **205** in similar ways. For example, radio frequency (RF) interference such as impulse noise or crosstalk affecting the operational frequencies on the DSL line may similarly affect operation of the HPNA system. With HPNA, even if the frequency bands are not overlapping, the sources of interference and crosstalk may nevertheless impact frequencies both on the HPNA based LAN **210** as well as frequencies on the DSL based WAN **205**. For example, a broadband noise source or harmonics

of a crosstalk or interference source covering non-overlapping frequencies bands. Thus, in accordance with one embodiment, information regarding such interference is analyzed on the WAN side (e.g., by analyzing the bit distribution or other related parameters on the DSL connection it may become apparent that the line is being affected by RF interference, such as impulse noise or high power noise). In such as case, the resulting analysis of WAN **205** side information indicates the related problems on the LAN **210** side are related to the RF interference. Conversely, in the absence of analysis done on the WAN **205** (e.g., DSL connection), it would not be possible to directly analyze the LAN **210** information (e.g., the HPNA based system). In such a way, the WAN information enables identifying and detecting or diagnosing the source of problem on the LAN **210**. This made possible despite current HPNA based systems failing to provide relevant data through their control or management interfaces from which information regarding interference may otherwise be analyzed. It is possible to analyze the physical layer information on a DSL connection (such as bit distribution) to infer information about noise or interference. In case the source of the problem is found or diagnosed to be interference or external noise, the settings on the DSL connection may be adjusted to mitigate or reduce the effect of the problem. For example, the DSL coding may be improved by adjusting the FEC parameters, the DSL rate may be decreased to improve the link stability and quality, or the INP settings may be changed to guard against impulse noise, or margin parameter settings could be improved, and/or power settings. In some cases, the mitigation may be done by instructing the LAN user to physically move their LAN devices (such as an HPNA gateway or a WiFi base-station) to a different location, so as to reduce exposure of such a device to the source of interference or external noise.

[0083] In such an embodiment, the management device **170** collects WAN and LAN diagnostics information from the WAN **205** (for example a DSL connection) and from the LAN

210 (for example a HPNA based LAN) respectively, performs joint analysis on the WAN/LAN diagnostics information, and diagnoses a fault. In the above example, the fault being the existence of interference or external noise. Joint analysis may include correlating information on the collected information from the LAN with the information collected from the WAN. For example, information from the LAN may include the time periods when the LANs throughput is below a threshold based on the LAN settings, indicative that a problem is present on the LAN. Joint analysis may further include correlating the above information with the duration of time when external noise or interference was observed on the WAN. High correlation among the two time periods (ascertained from the joint analysis) may be an indication that the problem on the LAN is related to the external noise and interference. In such a case, the management device **170** may responsively initiate a management event to the DSL controller initiating the reconfiguration of settings affecting the DSL connection, as described by the various examples above. A management event may alternatively be issued to the LAN side, for example recommending the location change of the LAN device, as described above.

[0084] In one embodiment, the management device **170** performs joint analysis of data throughput information on the LAN and the WAN. For example, the LAN may include a wireless device (e.g., a Femto cell, WiFi, etc.) and the WAN may include a DSL based connection. In this embodiment, the LAN side throughput performance is optimized or improved by optimizing the settings on the WAN side (e.g., the DSL connection). In another embodiment, the LAN side throughput problem is diagnosed by analyzing information from the WAN side. For example, it is possible that the LAN system, such as the WiFi access point or the FemtoCell base-station, are set to transmit information at the highest possible rate and throughput, yet the WAN side throughput is set to a lower data rate which does not support the needed throughput required by the LAN. Analyzing the information from the LAN would indicate the WAN

settings needs to be adjusted. If the WAN supports a higher throughput, the Management device **170** may initiate a management event to the WAN controller, such as a DSL system controller on the CPE side or CO side, demanding an increase in the supported data rate or throughput. Correspondingly, the LAN may be limited to supporting a lower data rate than the WAN, yet the WAN is nevertheless configured to higher data rate (e.g., a rate greater than that which is supported by the LAN). In such a case, it is possible that a DSL based WAN link is not only wasting power, but may additionally be more prone to instability. DSL links are more susceptible to noise and other impairments when operating at high data rates because they are typically operating at lower margins. In such a case, Management device **170** initiates a management event, sending instructions to the WAN (such as DSL controller) to lower the data rate on the WAN side, making the WAN connection more stable. Additionally, a mismatch between the WAN and the LAN throughputs may cause errors on both networks due to the overloading of buffering mechanisms on the gateways between the WAN and the LAN. For example, network congestion on the LAN side, requiring higher data throughput on the WAN/LAN connection may overwhelm the WAN/LAN gateway (such as the WAN/LAN gateway **330**) between the WAN and the LAN. In such a case, the WAN throughput needs to accordingly increase to overcome the throughput shortage. For example, if the WAN is a DSL connection, the data rate on the DSL connection should be increased to support the higher throughput demand on the WAN side, however, conventional DSL systems and WAN systems are not capable of automatically detecting such demands on the LAN (e.g., detecting the need for an increased data rate and responsively implementing the increases), because the control mechanisms and control channels on the two networks are distinct and separate, hence the need for a Management device **170** as described herein which addresses such a problem.

[0085] In another embodiment, WAN settings are optimized to match the data communication types on the LAN. For example, the data communications types on the LAN may include information on traffic types which are delay sensitive, for example voice communication data. Analyzing the collected information from the LAN, by the Management device **170**, indicates that the data types are voice communications and therefore delay sensitive. In such a case, the Management device **170**, by initiating a management event, would adjust the WAN settings in order to support delay sensitive traffic (e.g., traffic requiring very low latency). For example, when the WAN is a DSL system, the DSL connection configuration settings may be adjusted to induce lower latency. Setting of the adjusted DSL connection configuration settings is initiated by the Management device **170** via triggering a management event. In another example the delay and INP settings, which are two DSL physical layer parameters, are set to their respective minimums, or set to the lowest possible values which allow the DSL communication link to maintain acceptable stability and maintain required quality and performance levels. INP and delay settings may be implemented or changed via management events initiated by the Management device **170**.

[0086] FIG. **4** illustrates an alternative exemplary architecture **400** in which embodiments may operate. In accordance with certain embodiments, collected LAN information includes neighborhood analysis relating to Internet connectivity provided to a plurality of locations in a neighborhood or a shared geographical area **435** with the management device **170**. In such an embodiment, initiating a management event includes a management device generating instructions/commands to change a configuration of a WAN device based on the neighborhood analysis collected. In an alternative embodiment, initiating a management event includes a management device generating instructions to change a configuration of a LAN device based on the neighborhood analysis.

[0087] Neighborhood analysis may be conducted when information from multiple sources may be aggregated to provide a broader analytical context. For example, remote terminals **425A**, **425B**, and **425C** are depicted as traversing a shared back-haul **405** to a WAN **410A**. WAN **410A** includes a management device **170** implemented as described herein. Because remote terminals **425A-C** all traverse a common back-haul **405**, information may be retrievable from each of the remote terminals **425A-C** and correspondingly from Local Area Networks **415A**, **415B**, and **415C** respectively. The information may be collected by management device **170** within WAN **410A** and utilized to optimize the WAN and LAN networks and the communication paths between the respective WAN and LAN networks.

[0088] For example, a shared back-haul **405** may exist with DSL networks in which multiple twisted pair lines traverse a common DSL binder; a shared back-haul **405** may be present with multiple coaxial cable internet customers each contending for WAN based resources over a single coaxial cable over which at least a portion of WAN back-haul is implemented; a shared back-haul **405** may be present with a power line based Internet service provider in which multiple LANs (e.g., **415A-C**) associated with distinct end-users contend for WAN based resources over the same physical transmission lines; a shared back-haul **405** may similarly be present where multiple LANs (e.g., **415A-C**) associated with distinct end-users contend for WAN based resources over the same wireless transmission spectrum; a shared back-haul **405** may be present with fiber optic based connections each contending for WAN based resources; or a share back-haul **405** may comprise of a combination of the above communication means, such as a combination of coaxial cable, fiber and twisted pairs.

[0089] In such embodiments, a management device **170** may collect information from multiple distinct LANs and analyze the collected information from the multiple LANs to identify an operational condition. Such analysis may be referred to as neighborhood analysis. The

management device **170** may then report, diagnose, monitor, or generate instructions to implement an operational change based on the neighborhood analysis. For example, the management device **170** may implement WAN/LAN network optimizations which include increasing transmit power and data rates to one LAN (e.g., **415A**) based on determination that another LAN represented within the neighborhood analysis is inactive or has a low activity rate (e.g., LAN **415C** may be determined to be underutilized). In such an embodiment, a corresponding decrease of transmit power and data rate may be implemented for the underutilized LAN (e.g., **415C** in such an example).

[0090] In another embodiment, neighborhood analysis may indicate that the shared back-haul **405** is saturated due to a demand load in excess of capacity based on analysis of LAN information retrieved from the multiple distinct LANs **415A-C** in which case the management device **170** may responsively implement a load-balancing algorithm on a WAN/LAN interface (e.g., a DSL modem, cable modem, ONT unit, etc.) interfacing each of the respective LANs **415A-C** to the single shared back-haul **405**. In such a way, overall network efficiency may be improved by reducing collisions, buffering queues, data re-transmits, and other excessive overhead waste that may occur due to an overwhelmed network communication path, such as a shared WAN back-haul **405**.

[0091] In accordance with an alternative embodiment, a collection module of a management device **170** collects the neighborhood analysis from a WAN operator (e.g., WAN **410B**), where the neighborhood analysis describes LAN wireless transmission channels for a plurality of locations in a shared geographical area with the management device. For example, within the neighborhood or shared geographical area **435** are multiple distinct LANs **415D**, **415E**, and **415F**. Each of the distinct LANs **415D-F** are transmitting information **440** to WAN **410B**, such as an ISP or Wide Area Network Operator. The information **440** sent via each of the LANs

may describe various characteristics about the LAN from which the information originated. In one embodiment, the WAN **410B** aggregates the information **440** and makes the aggregate information available as neighborhood analysis. Each management device **170** within each of the respective LANs **415D-F** may then collect and analyze the neighborhood analysis, and may additionally implement operational changes within a corresponding LAN **415D-F** based on the information collected from the WAN **410B**.

[0092] Thus, in accordance with one embodiment, instructions are generated by a management device **170** to change the configuration of a LAN device based on the neighborhood analysis. In one embodiment, the generated instructions select a LAN wireless transmission channel for a LAN device communicatively interfaced with the management device **170** that minimizes wireless interference between the LAN device and a plurality of other locations in the neighborhood or shared geographical area **435** with the management device **170**. In some embodiments, each of the management devices within the various LANs **415D-F** implement similar instructions, although, the management devices **170** within the respective LANs **415D-F** need not have operational awareness of any other management device **170** as the neighborhood analysis is collected from WAN **410B**. In alternative embodiments, a management device within the WAN **410B** or located elsewhere may initiate instructions to implement an operational change within the WAN or within multiple distinct LANs.

[0093] In the above embodiment, operational efficiency of the individual LANs may be improved by reducing interference between closely located LANs, based on the neighborhood analysis. Such information may be correlated by a WAN operator based on, for example, mapping overlapping identifiers to a virtually rendered neighborhood or shared geographic area **435** or alternatively, based on actual knowledge of geographic locations for multiple LANs **415**, for example, by cross referencing subscribers' service address information to physical locations.

[0094] Diagnostics may similarly rely upon neighborhood analysis yielded from multiple distinct LANs **415**. For example, multiple LAN devices exhibiting high error counts, or abnormal retrains/modem resets, may be indicative of a fault within the WAN infrastructure rather than a statistically less likely coincidence that multiple LAN side devices are each simultaneously exercising a similar fault. In a complementary way, neighborhood analysis from multiple LANs **415** within a common geographical area or multiple LANs associated with a single shared back-haul **405** may aid in systematically diagnosing a LAN side fault within a particular end-user consumer's local area network where similar devices operating in neighboring LANs **415** do not present corresponding errors or faults within the neighborhood analysis.

[0095] FIG. **5** shows a diagrammatic representation of a system **500** in which embodiments may operate, be installed, integrated, or configured.

[0096] In one embodiment, system **500** includes a memory **595** and a processor or processors **590**. For example, memory **595** may store instructions to be executed and processor(s) **590** may execute such instructions. Processor(s) **590** may also implement or execute implementing logic **560** having logic to implement the methodologies discussed herein. System **500** includes communication bus(es) **515** to transfer transactions, instructions, requests, and data within system **500** among a plurality of peripheral devices communicably interfaced with one or more communication buses **515**. In one embodiment, system **500** includes a communication means **515** to interface, transfer, transact, relay, and and/or communicate information, transactions, instructions, requests, and data within system **500**, and among plurality of peripheral devices. System **500** further includes management interface **525**, for example, to receive requests, return responses, and otherwise interface with network elements located separately from system **500**.

[0097] In some embodiments, management interface **525** communicates information via an out-of-band connection separate from LAN and/or WAN based communications, where “in-band” communications are communications that traverse the same communication means as payload data (e.g., content) being exchanged between networked devices and where “out-of-band” communications are communications that traverse an isolated communication means, separate from the mechanism for communicating the payload data. An out-of-band connection may serve as a redundant or backup interface over which to communicate control data between the management device **170** and other networked devices or between the management device **170** and a third party service provider.

[0098] System **500** further includes LAN interface **530** to communicate information via a LAN based connection, including collecting LAN information from within a LAN, reporting information and diagnostics to other entities within the LAN, and for initiating instructions and commands over the LAN. Information communicated via a LAN interface **530** may, in some embodiments, traverse the LAN to a LAN to WAN interface and continue to a destination within a connected WAN. System **500** further includes WAN interface **535** to communicate information via a WAN based connection, including collecting WAN information from within a WAN, reporting information and diagnostics to other entities within the WAN, and for initiating instructions and commands over the WAN. Information communicated via WAN interface **535** may, in some embodiments, traverse the WAN to a WAN to LAN interface and continue to a LAN based destination.

[0099] System **500** further includes stored historical information **550** that may be analyzed or referenced when conducting long term trending analysis and reporting. System **500** may further include multiple management events **555**, any of which may be initiated responsive to the identification of an operational condition. For example, corrective actions, additional

diagnostics, information probes, configuration change requests, local commands, remote execution commands, and the like may be specified by and triggered as a management event **555**. Similarly, operational reports, configuration reports, network activity reports and diagnostic reports may be generated and sent in accordance with stored management events **555**. The stored historical information **550** and the management events **555** may be stored upon a hard drive, persistent data store, a database, or other storage location within system **500**.

[0100] Distinct within system **500** is Management Device **501** which includes collection module **570**, analysis module **575**, diagnostics module **580**, and implementation module **585**. Management Device **501** may be installed and configured in a compatible system **500** as is depicted by FIG. 5, or provided separately so as to operate in conjunction with appropriate implementing logic **560** or other software.

[0101] In accordance with one embodiment, collection module **570** collects information from available sources, such as LAN information and WAN information via interfaces of system **500**, including one or more of management interface **525**, LAN interface **530**, and/or WAN interface **535**. Analysis module **575** analyzes the information retrieved via collection module **570**. In some embodiments, LAN information and WAN information is jointly analyzed to identify an operational condition within the LAN based on collected WAN information or identify an operational condition within the WAN based on collected LAN information. Analysis module **575** may further perform long term trending analysis based on stored historical information **550** or conduct neighborhood analysis based on aggregation data yielded from multiple separate and distinct LANs. Diagnostics module **580** may conduct specialized diagnostic routines and algorithms in conjunction with or separately from analysis module **575**. Diagnostics module **580** may conduct additional probing diagnostics to retrieve or trigger the output of additional diagnostics information for further analysis. Implementation

module **585** implements and initiates various management events **555** including generating and instantiating instructions for local or remote execution, generating and transmitting configuration change requests, generating and sending operational reports, diagnostic reports, and configuration reports.

[0102] FIGS. **6A**, **6B**, and **6C** are flow diagrams illustrating methods for jointly optimizing WAN and LAN network communications in accordance with described embodiments. Methods **600A**, **600B**, and/or **600C** may be performed by processing logic that may include hardware (e.g., circuitry, dedicated logic, programmable logic, microcode, etc.), software (e.g., instructions run on a processing device to perform various operations such as interfacing functions, collecting, monitoring, diagnosing and reporting information, and executing/imitating management events, commands and instructions responsive to analysis and diagnosis, or some combination thereof. In one embodiment, methods **600A**, **600B**, and **600C** are performed by a Management device such as that depicted at element **170** of FIG. **1** or via a Management Device such as that depicted at element **501** of FIG. **5**. Some of the blocks and/or operations listed below 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.

[0103] Method **600A** begins with processing logic for communicably interfacing a management device with a Local Area Network (LAN) and a Wide Area Network (WAN) as set forth at block **602**. At block **604**, processing logic collects WAN diagnostic information from a WAN and at block **606**, processing logic collects LAN diagnostic information from a LAN.

[0104] At block **608**, processing logic jointly analyzes the collected WAN diagnostic information and the collected LAN diagnostic information to diagnose a fault within the WAN

based at least in part on the LAN diagnostic information or to diagnose a fault within the LAN based at least in part on the WAN diagnostic information.

[0105] At block **610**, processing logic initiates a management event responsive to the fault being identified. Initiating a management event may include performing one or more various functions including: generating and transmitting a diagnostic report identifying the fault diagnosed within the WAN or identifying the fault diagnosed within the LAN based on the joint analysis as set forth at block **612**; generating instructions to remedy the fault diagnosed within the WAN or to remedy the fault diagnosed within the LAN based on the joint analysis as set forth at block **614**; and instantiating execution of the instructions to remedy the fault in at least one of the management device, a LAN device connected via the LAN interface, a WAN device connected via the WAN interface, or a network element connected to the management device via a management interface (block **616**).

[0106] Method **600B** begins with processing logic at block **630** communicably interfacing the management device with a Local Area Network (LAN) and a Wide Area Network (WAN).

[0107] At block **632**, processing logic collects WAN information from the WAN and LAN information from the LAN. At block **634**, processing logic jointly analyzes the collected WAN information and the collected LAN information to identify an operational condition and at block **636**, processing logic initiates a management event responsive to the operational condition being identified.

[0108] Initiating a management event may include performing one or more various functions including: Generating and transmitting an operational report describing the operational configuration of a communication channel related to the WAN and the LAN based on the joint analysis as set forth at block **638**; storing collected WAN information as historical WAN

information and storing collected LAN information as historical LAN information as set forth at block **640**; performing historical performance trending analysis based on stored historical WAN information and stored historical LAN information as set forth at block **642**; and generating and transmitting a historical performance trending report describing the historical operational performance of a communication channel related to the WAN and the LAN as set forth at block **644**.

[0109] At block **646**, processing logic initiates a management event responsive to analysis of the stored historical WAN information or responsive to analysis of the stored historical LAN information, or responsive to analysis of both.

[0110] Method **600C** begins with processing logic at block **660** communicatively interfacing the management device with a Local Area Network (LAN) and a Wide Area Network (WAN). At block **662**, processing logic collects WAN information from the WAN and LAN information from the LAN. At block **664**, processing logic jointly analyzes the collected WAN information and the collected LAN information to identify an operational condition and at block **666**, processing logic initiates a management event responsive to the operational condition being identified.

[0111] Initiating a management event may include performing one or more various functions including: generating and executing commands against a LAN device to change the configuration of the LAN device commands based on the joint analysis as set forth at block **668**; and/or generating and sending a request to a WAN operator triggering the WAN operator to implement a requested configuration change based on the joint analysis as set forth at block **670**.

[0112] At block **672**, processing logic collects neighborhood information that is not yet analyzed from one or more WANs, from one or more LANs, or from a combination of

WANs and LANs. Such information may be collected and subsequently aggregated and/or analyzed by a management device to generate neighborhood analysis.

[0113] At block **674**, processing logic collects neighborhood analysis from a WAN having aggregated LAN information or LAN information corresponding to multiple separate and distinct LANs; and at block **676**, processing logic initiates a management event responsive to analysis of the neighborhood analysis.

[0114] FIG. 7 illustrates a diagrammatic representation of a machine **700** in the exemplary form of a computer system, in accordance with one embodiment, within which a set of instructions, for causing the machine **700** 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), a Wide Area Network, 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.

[0115] The exemplary computer system **700** includes a processor **702**, a main memory **704** (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 **718** (e.g., a persistent storage device including hard disk drives and persistent data base implementations), which communicate with each other via a bus **730**. Main memory **704** includes information and instructions and software program components necessary for performing and executing the functions with respect to the various embodiments of the Management Device as described herein. For example, historical WAN/LAN information **724** may include previously collected LAN information from a LAN and WAN information from a LAN which may be collected over a period of time and referenced later for performing trending analysis. Management events **723** may be stored within main memory **704** and triggered or initiated responsive to analysis of LAN and/or WAN information collected by management device **734**. Main memory **704** and its sub-elements (e.g. **723** and **724**) are operable in conjunction with processing logic **726** and/or software **722** and processor **702** to perform the methodologies discussed herein.

[0116] Processor **702** represents one or more general-purpose processing devices such as a microprocessor, central processing unit, or the like. More particularly, the processor **702** 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 **702** 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 **702** is configured to

execute the processing logic **726** for performing the operations and functionality which is discussed herein.

[0117] The computer system **700** may further include one or more network interface cards **708** to communicatively interface the computer system **700** with one or more networks **720** from which information may be collected for analysis. The computer system **700** also may include a user interface **710** (such as a video display unit, a liquid crystal display (LCD), or a cathode ray tube (CRT)), an alphanumeric input device **712** (e.g., a keyboard), a cursor control device **714** (e.g., a mouse), and a signal generation device **716** (e.g., an integrated speaker). The computer system **700** may further include peripheral device **736** (e.g., wireless or wired communication devices, memory devices, storage devices, audio processing devices, video processing devices, etc.). The computer system **700** may perform the functions of a Management Device **734** capable interfacing networks, monitoring, collecting, analyzing, and reporting information, and initiating, triggering, and executing various management events including the execution of commands and instructions to alter an identified operational condition or perform corrective measures on a diagnosed fault, as well as the various other functions and operations described herein.

[0118] The secondary memory **718** may include a non-transitory machine-readable storage medium (or more specifically a non-transitory machine-accessible storage medium) **731** on which is stored one or more sets of instructions (e.g., software **722**) embodying any one or more of the methodologies or functions described herein. Software **722** may also reside, or alternatively reside within main memory **704**, and may further reside completely or at least partially within the processor **702** during execution thereof by the computer system **700**, the main memory **704** and the processor **702** also constituting machine-readable storage media. The

software **722** may further be transmitted or received over a network **720** via the network interface card **708**.

[0119] 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.

FIG. 1

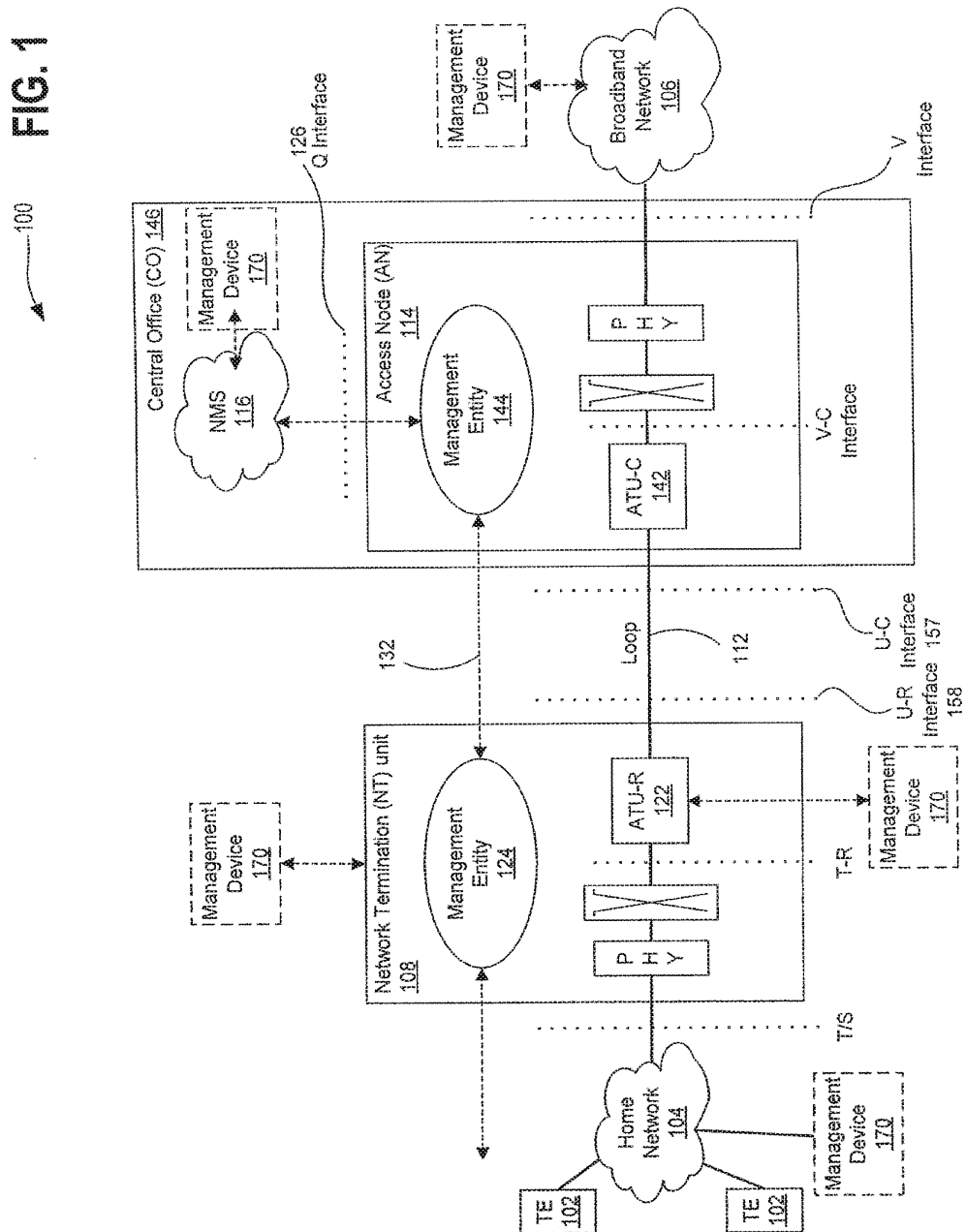


FIG. 2

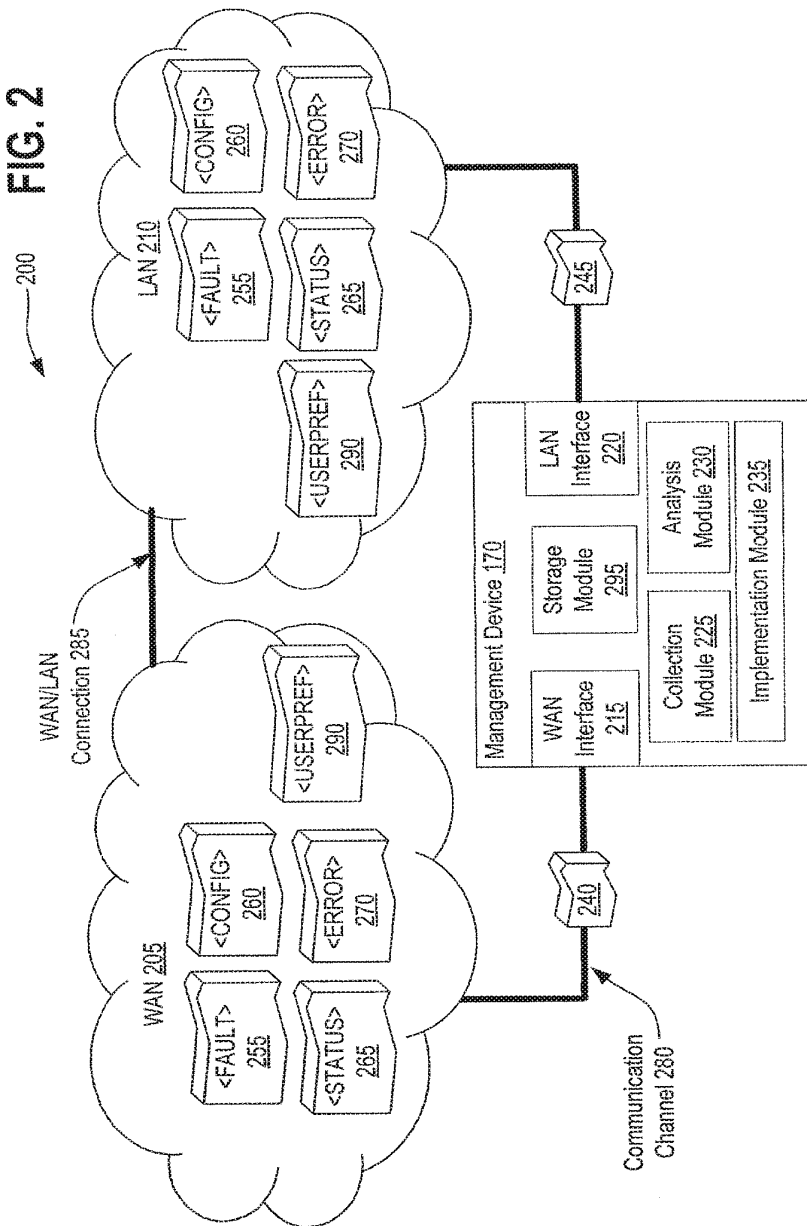
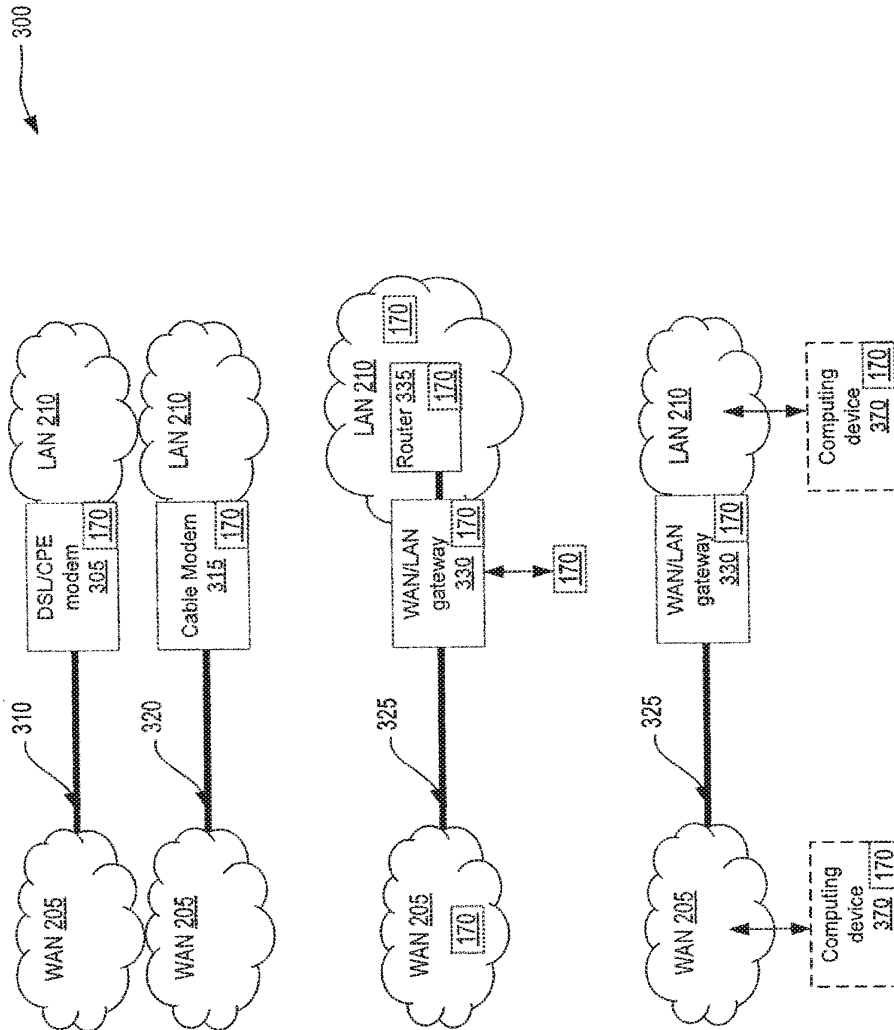
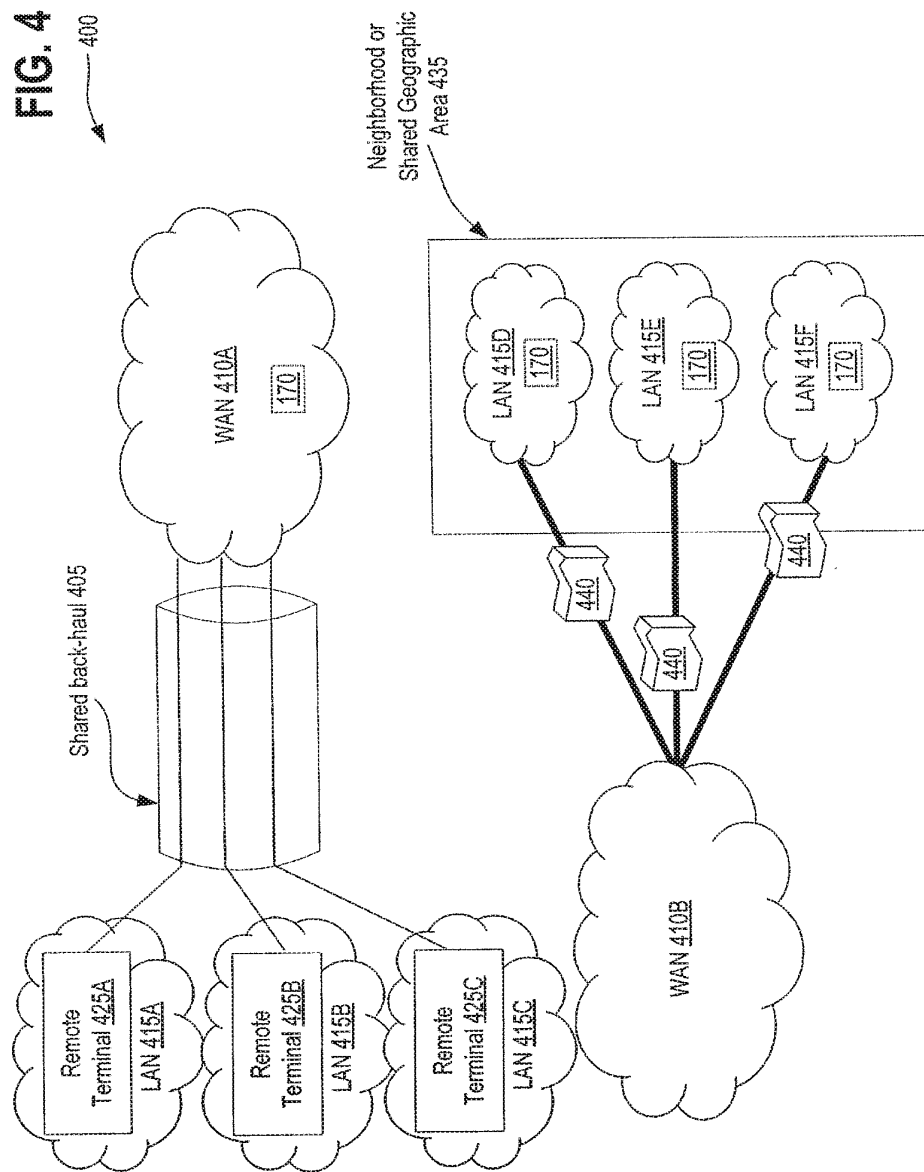


FIG. 3



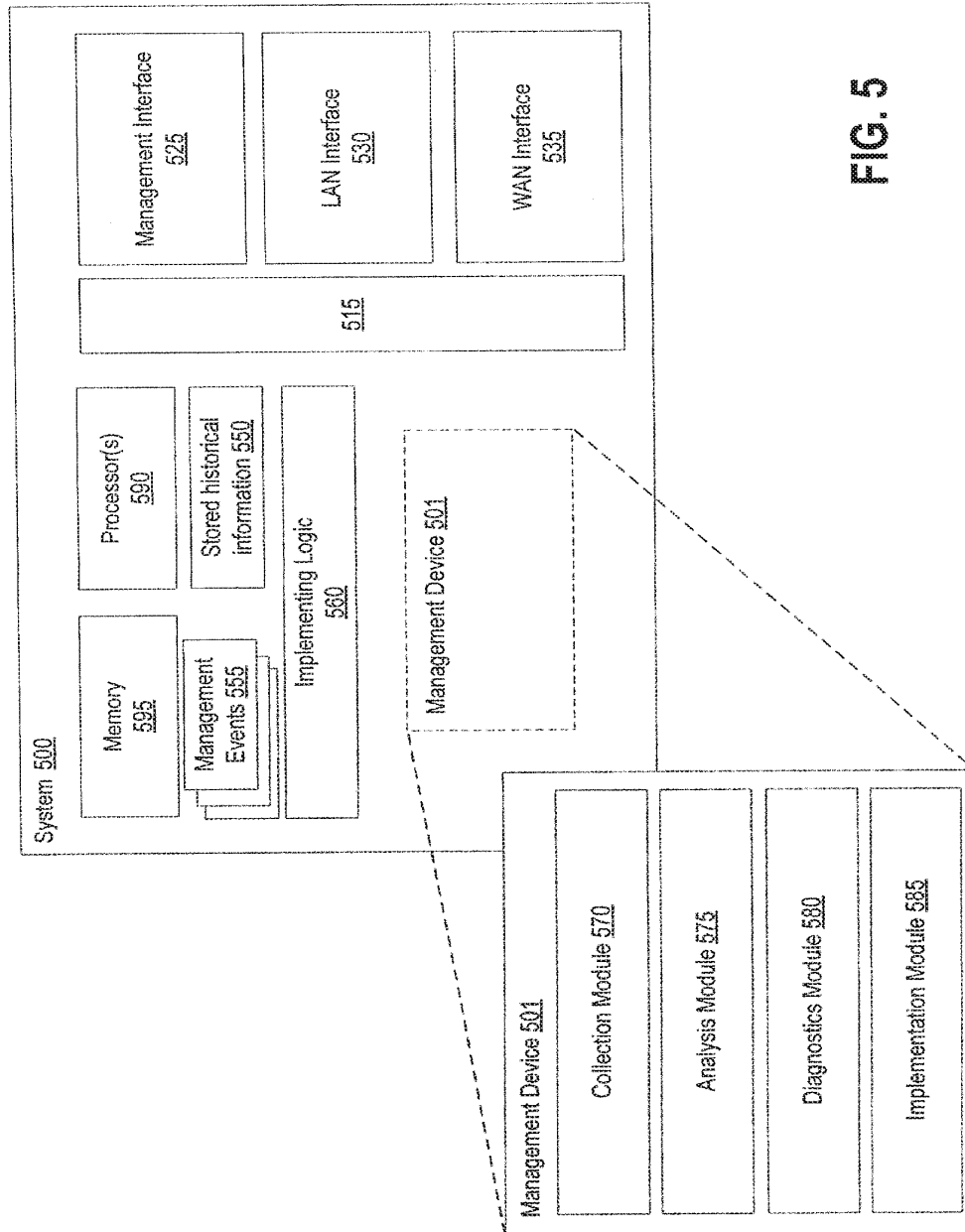
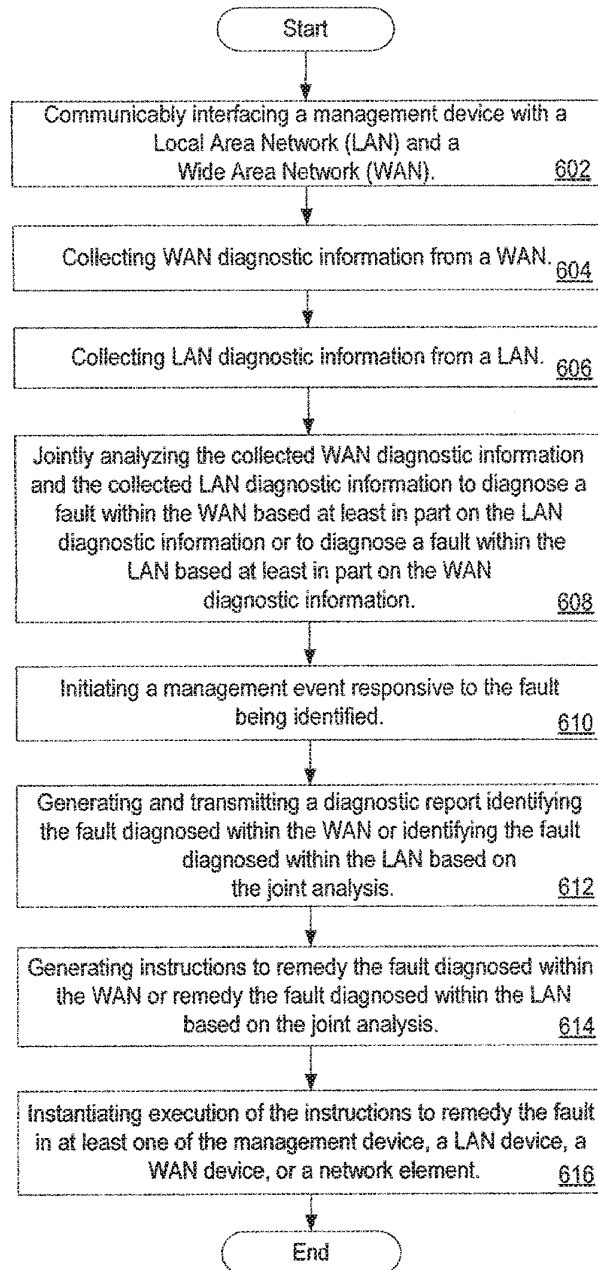


FIG. 5

**FIG. 6A**

600A

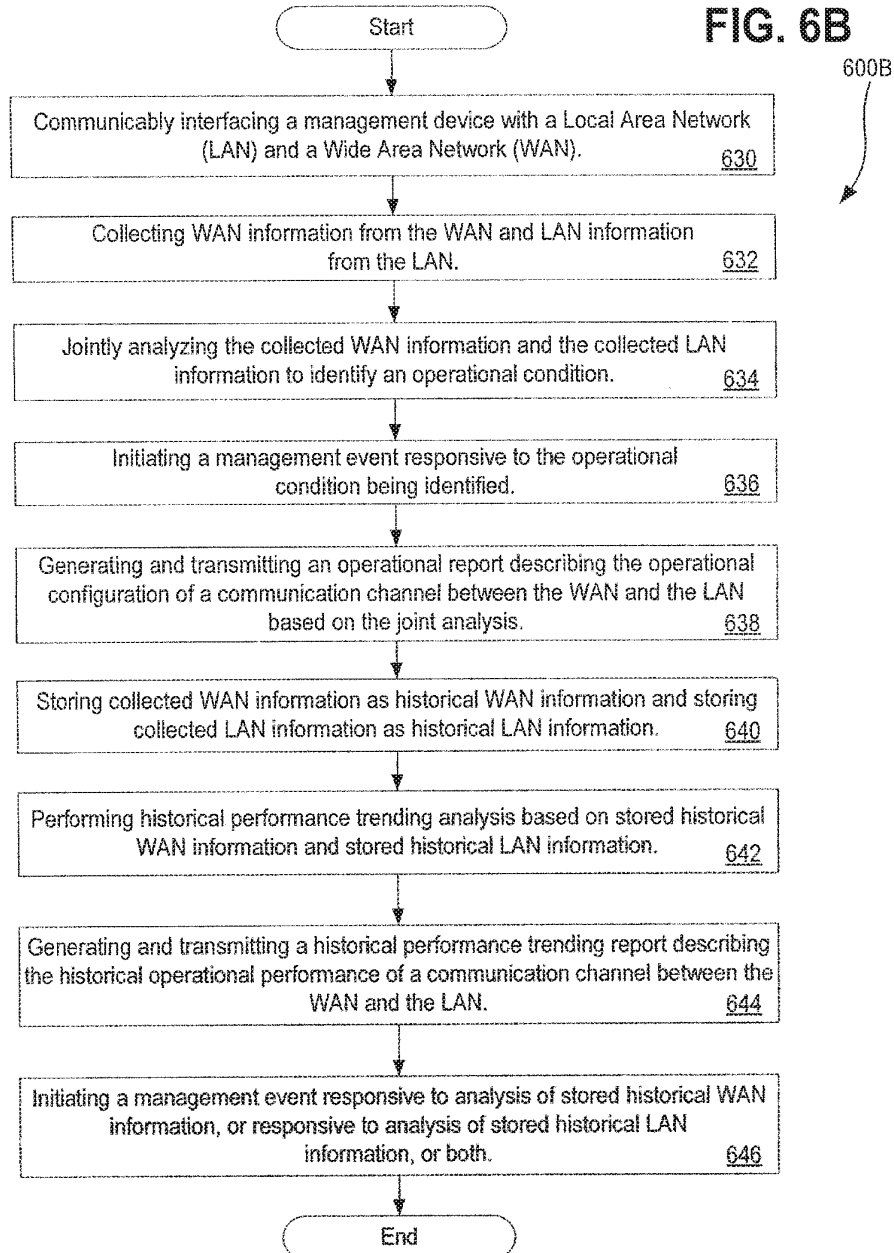
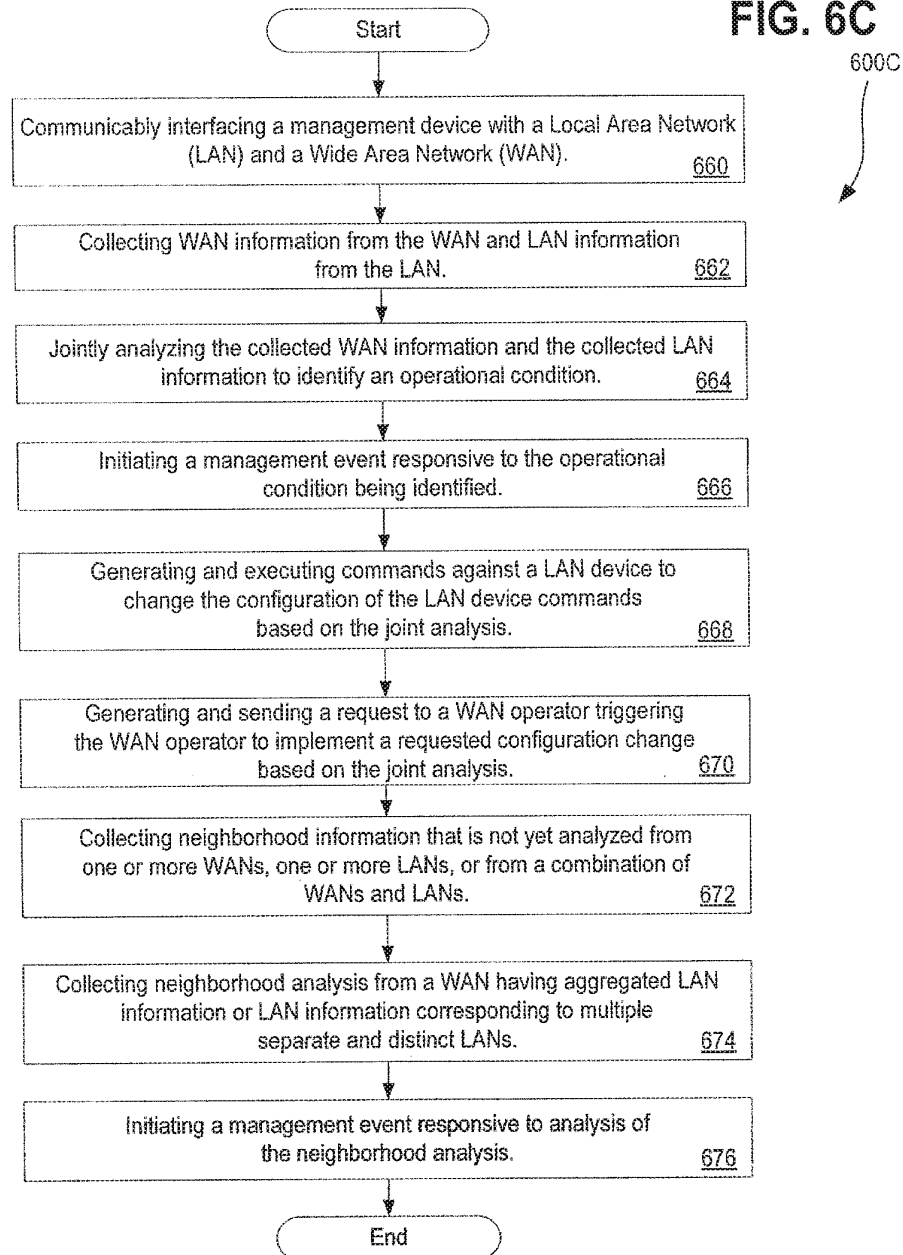
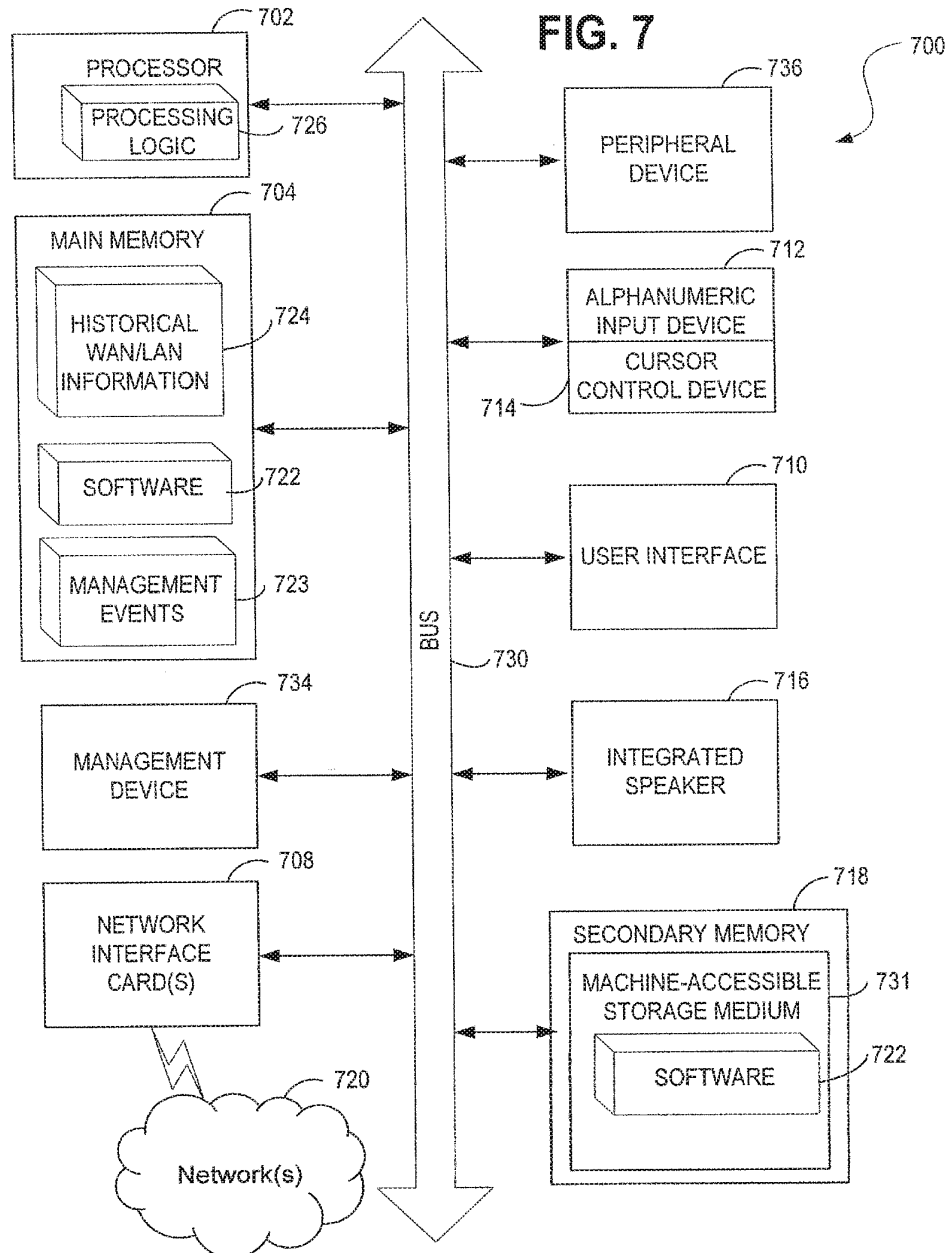
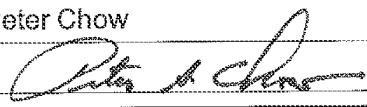
FIG. 6B

FIG. 6C



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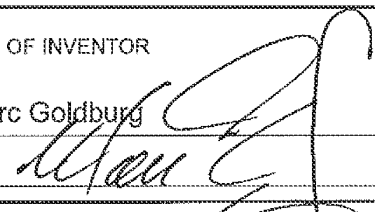
DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	SYSTEM AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORKS COMMUNICATIONS		
As the below named inventor, I hereby declare that: This declaration is directed to: ☐ The attached application, or ☒ United States application or PCT international application number <u>13/995,900</u> filed on <u>June 19, 2013</u> United States application or PCT international application number <u>PCT/US11/21003</u> filed on <u>January 12, 2011</u> The above-identified application was made or authorized to be made by me. I believe that I am the original inventor or an original joint inventor of a claimed invention in the application. I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both. WARNING: Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.			
LEGAL NAME OF INVENTOR	Citizenship: <u>US</u>		
Inventor: <u>Peter Chow</u>	Date (Optional): <u>9/30/13</u>		
Signature: 			
Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.			

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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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This declaration is directed to: ☐ The attached application, or	
☒ United States application or PCT international application number <u>13/995,900</u>	
filed on <u>June 19, 2013</u>	
United States application or PCT international application number <u>PCT/US11/21003</u>	
filed on <u>January 12, 2011</u>	
The above-identified application was made or authorized to be made by me.	
I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.	
I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.	
WARNING:	
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LEGAL NAME OF INVENTOR	Citizenship: <u>US</u>
Inventor: <u>Marc Goldberg</u>	Date (Optional): <u>9/27/13</u>
Signature: 	
Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.	

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PTO/AIA-01 (08-12)

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**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN
APPLICATION DATA SHEET (37 CFR 1.76)**

Title of
Invention

SYSTEM AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORKS
COMMUNICATIONS

As the below named inventor, I hereby declare that:

This declaration
is directed to:



The attached application, or



United States application or PCT international application number 13/995,900

filed on June 19, 2013

United States application or PCT international application number PCT/US11/21003

filed on January 12, 2011

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001
by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identify theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Citizenship: KR

Inventor: Wonjong Rhee

Date (Optional): Oct 2, 2013

Signature: Wonjong Rhee

Notes: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA-01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	SYSTEM AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORKS COMMUNICATIONS
As the below named inventor, I hereby declare that: This declaration is directed to: ☐ The attached application, or ☒ United States application or PCT international application number <u>13/995,900</u> filed on <u>June 19, 2013</u> United States application or PCT international application number <u>PCT/US11/21003</u> filed on <u>January 12, 2011</u> The above-identified application was made or authorized to be made by me. I believe that I am the original inventor or an original joint inventor of a claimed invention in the application. I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.	
WARNING: Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.	
LEGAL NAME OF INVENTOR: _____ Citizenship: <u>US</u> Inventor: <u>Ardavan Maleki Tehrani</u> Date (Optional): <u>9/27/13</u> Signature: <u>Ardavan Maleki Tehrani</u>	
Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.	

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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 Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS		
First Named Inventor/Applicant Name:		Peter Chow		
Filer:		Michael V. North/Nita Miller		
Attorney Docket Number:		20145-049USC2		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	300	300
UTILITY SEARCH FEE	1111	1	660	660
UTILITY EXAMINATION FEE	1311	1	760	760
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 (\$)				1720

Electronic Acknowledgement Receipt	
EFS ID:	36212432
Application Number:	16432364
International Application Number:	
Confirmation Number:	1021
Title of Invention:	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS
First Named Inventor/Applicant Name:	Peter Chow
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-049USC2
Receipt Date:	05-JUN-2019
Filing Date:	
Time Stamp:	15:45:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$1720
RAM confirmation Number	060619INTEFSW15455800
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 1.16 (National application filing, search, and examination fees) 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	Power of Attorney	049USC2_POA.pdf	1844999	no	2
			e760c2e26116a9ad0a902d8b2cde49d7f8badd03		
Warnings:					
Information:					
2	Application Data Sheet	049USC2_ADS.pdf	1823400	no	9
			34bfe4637598f81b9d9ce27ee7082cbb46a229d9		
Warnings:					
Information:					
3		049USC2_Con_Pat_Appl.pdf	258910	yes	54
			20742117f56fcca35520b881e0c36d12921ec5b2		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Abstract		54	54	
	Claims		51	53	
	Specification		1	50	
Warnings:					
Information:					
4	Drawings-only black and white line drawings	049USC2_Figs.pdf	1923318	no	9
			51c4b7918e8169ddf99a81950ce49d9c11fdfb64		
Warnings:					
Information:					
5	Oath or Declaration filed	049USC2_Decls.pdf	714421	no	4
			b502a62acf5da1823791e0626f9e08b4ed5bfe62		

Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	35115	no	2
			07d3859db7057920ba5d0b0bd6f9f2058bdf0a87c		
Warnings:					
Information:					
Total Files Size (in bytes):				6600163	
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 16/432,364				
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	300			
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	660			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760			
TOTAL CLAIMS (37 CFR 1.16(i))	8	minus 20 = *				x 100 =	0.00			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1	minus 3 = *				x 460 =	0.00			
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	1720			
APPLICATION AS AMENDED - PART II										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=		x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=		x	=
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
TOTAL ADD'L FEE									TOTAL ADD'L FEE	
AMENDMENT B		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	=		x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=		x	=
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
TOTAL ADD'L FEE									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.										



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
16/432,364	06/05/2019	2685	1720	20145-049USC2	8	1

CONFIRMATION NO. 1021

FILING RECEIPT

146571
North Weber & Baugh LLP - ASSIA
3260 Hillview Avenue, 1st Floor
Palo Alto, CA 94304



Date Mailed: 06/13/2019

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)

Peter Chow, Los Altos, CA;
Wonjong Rhee, San Francisco, CA;
Ardavan Maleki Tehrani, Atherton, CA;
Marc Goldberg, Redwood City, CA;

Applicant(s)

ASSIA SPE, LLC, Wilmington, DE

Power of Attorney: The patent practitioners associated with Customer Number 146571

Domestic Priority data as claimed by applicant

This application is a CON of 15/182,513 06/14/2016 PAT 10333819
which is a CON of 13/995,900 07/08/2014 PAT 9369370
which is a 371 of PCT/US2011/021003 01/12/2011

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: Yes

Permission to Access Search Results: Yes

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: 06/12/2019

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/432,364**

Projected Publication Date: 09/19/2019

Non-Publication Request: No

Early Publication Request: No
Title

SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK
COMMUNICATIONS

Preliminary Class

340

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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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.

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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>.

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page 2 of 4

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).

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16432364
	Filing Date	2019-06-05
	First Named Inventor	Peter Chow
	Art Unit	
	Examiner Name	
	Attorney Docket Number	20145-049USC2

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Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	6785279	B1	2004-08-31	Barry McKay Crooks	
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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20030145082	A1	2003-07-31	Yong Ho Son	
	2	20040034800	A1	2004-02-19	Anil Singhal et al.	
	3	20050058143	A1	2005-03-17	Hidenori Kikuchi et al.	
	4	20060126613	A1	2006-06-15	Jonathan Marcus Zweig	
	5	20060198356	A1	2006-09-07	Mark Ryan Mayernick	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16432364
	Filing Date		2019-06-05
	First Named Inventor	Peter Chow	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	20145-049USC2	

	6	20060259583	A1	2006-11-16	Katsuneri Matsuura	
	7	20080181240	A1	2008-07-31	Baofeng Jiang et al.	
	8	20090028181	A1	2009-01-29	Ben David Shimon	
	9	20090245278	A1	2009-10-01	Tommy Wing Chau Kee	
	10	20100103941	A1	2010-04-29	Baofeng Jiang et al.	
	11	20100211673	A1	2010-08-19	Bruce Kosbab et al.	
	12	20100238930	A1	2010-09-23	Zhe Shan	
	13	20110058575	A1	2011-03-10	Toshiharu Oshima	
	14	20110182182	A1	2011-07-28	Kai-Yu Yang et al.	
	15	20110277001	A1	2011-11-10	Pramod Balkrishna Kaluskar et al.	
	16	20010047406	A1	2001-11-29	Kenneth S. Araujo et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16432364	
	Filing Date		2019-06-05	
	First Named Inventor	Peter Chow		
	Art Unit			
	Examiner Name			
	Attorney Docket Number	20145-049USC2		

17	20020198952	A1	2002-12-26	Russell W. Bell	
18	20030039240	A1	2003-02-27	Aurja Sutanto	
19	20030145082	A1	2003-07-31	Yong Ho Son	
20	20060164978	A1	2006-07-27	Carl E. Werner	
21	20060218267	A1	2006-09-28	Irfan Z. Khan et al.	
22	20080219168	A1	2008-09-11	Nobuyuki ENOMOTO et al.	
23	20120053901	A1	2012-03-01	Mohammed Arefeen et al.	
24	20150230275	A1	2015-08-13	Kenneth Kerpez et al.	
25	20170111105	A1	2017-04-20	Curtis Ling et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16432364	
	Filing Date		2019-06-05	
	First Named Inventor	Peter Chow		
	Art Unit			
	Examiner Name			
	Attorney Docket Number	20145-049USC2		

	1	101461253	CN	A	2009-06-17		
	2	101690079	CN	A	2010-03-31		
	3	101815000	CN	A	2010-08-25		
	4	2009540671	JP	A	2009-11-19	Adaptive Spectrum and Signal Alignment, Inc.	
	5	2007146048	WO	A1	2007-06-06	Adaptive Spectrum and Signal Alignment, Inc.	
	6	2001205938	JP	A	2001-07-31	Naigai Carbon Ink	
	7	2000020428	JP	A	2000-01-21		

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	1	International Search Report and Written Opinion dated 2011-05-13, in International Patent Application No. PCT/US2011/021003, filed 2011-01-12 (16pgs).	
	2	International Preliminary Report on Patentability dated 2013-07-25, in International Patent Application No. PCT/US2011/021003, filed 2011-01-12 (12pgs).	

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	Examiner Name		
	Attorney Docket Number	20145-049USC2	

3	Bernstein, Jeff et al., "CPE WAN Management Protocol," Technical Report, Forum TR-069, 2004-05-01 (109pgs).	
4	Office Action dated 2014-08-05, in Japanese Patent Application No. 2013549393 (5pgs).	×
5	Office Action dated 2015-03-03, in Japanese Patent Application No. 2013549393 (4pgs).	☒
6	Response as filed 2015-02-04, in Japanese Patent Application No. 2013549393 (30pgs).	☐
7	Response as filed 2015-09-09, in Japanese Patent Application No. 2013549393 (29pgs).	☐
8	Decision of Grant received in Japanese Patent Application No. 2013549393 (3pgs).	☐
9	Office Action dated 2015-04-23, in Chinese Patent Application No. 201180064927.6 (25pgs).	☒
10	Office Action dated 2017-11-02, in Australian Patent Application No. 2016222368 (3pgs).	☐
11	Response filed 2018-02-27, in Australian Patent Application No. 2016222368 (26pgs).	☐
12	Notice of Acceptance for Patent Application dated 2018-03-09, in Australian Patent Application No. 2016222368 (3pgs).	☐
13	Certificate of Grant dated 2018-07-05, in Australian Patent Application No. 2016222368 (1pg).	☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16432364
	Filing Date		2019-06-05
	First Named Inventor	Peter Chow	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	20145-049USC2	

14	Office Action dated 2016-09-22, in Canadian Patent Application No. 2823295 (3pgs).	☐
15	Response filed 2017-03-21, in Canadian Patent Application No. 2823295 (30pgs).	☐
16	Office Action dated 2017-06-21, in Canadian Patent Application No. 2823295 (5pgs).	☐
17	Office Action dated 2018-07-04, in Canadian Patent Application No. 2823295 (3pgs).	☐
18	Response filed 2019-01-03, in Canadian Patent Application No. 2823295 (53pgs).	☐
19	Response filed 2017-12-21, in Canadian Patent Application No. 2823295 (57pgs).	☐
20	Office Action dated 2018-06-28, in Indian Patent Application No. 4985/CHENP/2013 (7pgs).	☐
21	Response filed 2018-12-28, in Indian Patent Application No. 4985/CHENP/2013 (76pgs).	☐

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		16432364
	Filing Date		2019-06-05
	First Named Inventor	Peter Chow	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	20145-049USC2	

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)	2019-07-23
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.
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 COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 8241P049PCT	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/US2011/021003	International filing date (day/month/year) 12/01/2011	(Earliest) Priority Date (day/month/year)
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 3 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(b), 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

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04L12/24 H04L12/28
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 H04M H04Q

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2007/146048 A2 (ADAPTIVE SPECTRUM & SIGNAL [US]; CIOFFI JOHN M [US]; GINIS GEORGE [US]) 21 December 2007 (2007-12-21) abstract paragraphs [0038] - [0056] paragraphs [0061] - [0063] paragraph [0079] paragraph [0095] paragraph [0100] paragraphs [0114] - [0154] figures 2,3,3A, 4, 6A, 7A	1-34
A	JEFF BERSTEIN ET AL: "CPE WAN Management Protocol", TECHNICAL REPORT, FORUM TR-069,, 1 May 2004 (2004-05-01), pages 1-109, XP008128969, Appendix A Appendix B	1-34

☐ 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.
- *G* document member of the same patent family

Date of the actual completion of the international search

6 May 2011

Date of mailing of the international search report

13/05/2011

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

Krause, Sven

Information on patent family members

International application No

PCT/US2011/021003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007146048 A2	21-12-2007	CN 101461253 A	17-06-2009
		EP 2030454 A2	04-03-2009
		JP 2009540671 T	19-11-2009
		US 2009207985 A1	20-08-2009

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.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/US2011/021003

International filing date (day/month/year)
12.01.2011

Priority date (day/month/year)

International Patent Classification (IPC) or both national classification and IPC
INV. H04L12/24 H04L12/28

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 43bis.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 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk - Pays Bas
Tel. +31 70 340 - 2040
Fax: +31 70 340 - 3016

Date of completion of
this opinion

see form
PCT/ISA/210

Authorized Officer

Krause, Sven

Telephone No. +31 70 340-4829



WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2011/021003

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>1-34</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-34</u>
Industrial applicability (IA)	Yes: Claims	<u>1-34</u>
	No: Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

international application No.
PCT/US2011/021003

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

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 WO 2007/146048 A2 (ADAPTIVE SPECTRUM & SIGNAL [US]; CIOFFI JOHN M [US]; GINIS GEORGE [US]) 21 December 2007 (2007-12-21)
- D2 JEFF BERSTEIN ET AL: "CPE WAN Management Protocol", TECHNICAL REPORT, FORUM TR-069, 1 May 2004 (2004-05-01), pages 1-109, XP008128969

2 Clarity (Art. 6 PCT)

The present application does not meet the requirements of Article 6 PCT, because **claims 1, 7, 8, 29, 31 and 33 are not clear**.

- 2.1 Although **claims 1, 8 and 29** have been drafted as separate independent device 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.
- 2.2 Although **claims 31 and 33** have been drafted as separate independent method 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.
- 2.3 **Claim 7** is not clear because it tends to define the device of the invention with respect to another entity, namely a video stream, whereas the presence of errors is independent of whether the streams used are for video or not.

3 Novelty (Art. 33(2) PCT)

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of **claims 1-34** is not new in the sense of Article 33(2) PCT, the reasons being as follows:

Independent Claims 1, 8, 29, 31, 33

- 3.1 Referring to independent **apparatus claim 1**, document D1 discloses (the references within brackets applying to this document:

A management device (controller 225, paragraph 54 //p.10 l.1//, controller 190, paragraph 55 //5th line//, DSL management entity 712, paragraph 95, Figures 2, 3, 3A, 6A, 7A), comprising:

- a Local Area Network interface (interface to Management Entity ME 124, which is part of Local Area Network, paragraph 55 //5th line//, DSL management entity 712 is interfaced to LAN through DSL CPE modem see first line of paragraph 95) to communicably interface the management device with a LAN (Home Network);
- a Wide Area Network interface (interface to Management Entity ME 144, which is part of WAN, paragraph 55 //7th line//, DSL management entity 712 is interfaced to WAN because it is part of WAN) to communicably interface the management device with a WAN, wherein the WAN provides (loops 413, Figure 4, paragraph 56 //4th and 5th lines//) broadband connectivity to the LAN through a Digital Subscription Line connection;
- a collection module (paragraph 62 //1st line//) to collect LAN information (paragraph 154, reading of CPE parameters indicated in the first three lines of paragraph 100, the reading of these parameters being actually the collection of management data, //see also D1, paragraphs 114 and 124// such as the "inform message" with diagnostic results mentioned on page 81 of document D2, in the "Description" column corresponding to the parameter "DiagnosticState", other examples are the "EthernetLinkStatus" of page 82 of D2, "ConnectionStatus" and "UpTime" of page 83 of D2, "EthernetBytesSent" of page 86 of D2, ...) from the LAN and WAN information (paragraph 62 //1st and 4th lines//) from the WAN;
- an analysis module to jointly analyze (paragraphs 63 and 115) the collected WAN information and the collected LAN information (parameters as defined in D2 Annex B as indicated in D1, paragraph 100) to identify (identifying a need as in paragraph 63, lines 8-11, see also problems, errors, faults and performance problems identified in paragraph 115) an operational condition; and

- an implementation module to initiate a management event (paragraph 63, generation of signals) responsive (paragraph 63) to the operational condition being identified.

The subject matter of **claim 1** is therefore not new (Art. 33(2) PCT).

- 3.2 Referring to independent **apparatus claim 8**, document D1 discloses (the references within brackets applying to this document:

A management device (controller 225, paragraph 54 //p.10 l.1//, controller 190, paragraph 55 //5th line//, DSL management entity 712, paragraph 95, Figures 2, 3, 3A, 6A, 7A), comprising:

- a Wide Area Network interface (interface to Management Entity ME 144, which is part of WAN, paragraph 55 //7th line//, DSL management entity 712 is interfaced to WAN because it is part of WAN) to communicably interface the management device with a WAN;
- a Local Area Network interface (interface to Management Entity ME 124, which is part of Local Area Network, paragraph 55 //5th line//, DSL management entity 712 is interfaced to LAN through DSL CPE modem see first line of paragraph 95) to communicably interface the management device with a LAN (Home Network);
- a collection module (paragraph 62 //1st line//) to collect LAN information (paragraph 154, reading of CPE parameters indicated in the first three lines of paragraph 100, the reading of these parameters being actually the collection of management data, such as the "inform message" with diagnostic results mentioned on page 81 of document D2, in the "Description" column corresponding to the parameter "DiagnosticState", other examples are the "EthernetLinkStatus" of page 82 of D2, "ConnectionStatus" and "UpTime" of page 83 of D2, "EthernetBytesSent" of page 86 of D2, ...) from the LAN and WAN information from the WAN;
- an analysis module to jointly analyze (paragraphs 63 and 115) the collected WAN information and the collected LAN information (parameters as defined in D2 Annex B as indicated in D1, paragraph 100) to identify (identifying a need as in paragraph 63, lines 8-11) an operational condition; and
- an implementation module to initiate a management event (paragraph 63, generation of signals) responsive (paragraph 63) to the operational condition being identified.

The subject matter of **claim 8** is therefore not new (Art. 33(2) PCT).

3.3 Referring to independent **apparatus claim 29**, document D1 discloses (the references within brackets applying to this document:

A management device (controller 225, paragraph 54 //p.10 l.1//, controller 190, paragraph 55 //5th line//, DSL management entity 712, paragraph 95, Figures 2, 3, 3A, 6A, 7A), comprising:

- a Wide Area Network interface (interface to Management Entity ME 144, which is part of WAN, paragraph 55 //7th line//, DSL management entity 712 is interfaced to WAN because it is part of WAN) to communicably interface the management device with a WAN;
- a Local Area Network interface (interface to Management Entity ME 124, which is part of Local Area Network, paragraph 55 //5th line//, DSL management entity 712 is interfaced to LAN through DSL CPE modem see first line of paragraph 95) to communicably interface the management device with a LAN (Home Network);
- a collection module (paragraph 62 //1st line//) to collect LAN information (reading of CPE parameters indicated in the first three lines of paragraph 100, the reading of these parameters being actually the collection of management data, such as the "inform message" with diagnostic results mentioned on page 81 of document D2, in the "Description" column corresponding to the parameter "DiagnosticState", other examples are the "EthernetLinkStatus" of page 82 of D2, "ConnectionStatus" and "UpTime" of page 83 of D2, "EthernetBytesSent" of page 86 of D2, ...) from the LAN and WAN information (paragraph 62 //1st and 4th lines//) from the WAN;
- a diagnostics module to jointly analyze (paragraphs 63 and 115) the collected WAN diagnostic information and the collected LAN diagnostic information to diagnose (problems, errors, faults and performance problems identified in paragraph 115) a fault within the WAN based at least in part on the LAN diagnostic information or to diagnose a fault within the LAN based at least in part on the WAN diagnostic information; and
- an implementation module to initiate a management event (paragraph 63, generation of signals) responsive (paragraph 63) to the operational condition being identified.

The subject matter of **claim 29** is therefore not new (Art. 33(2) PCT).

- 3.4 Referring to independent **method claim 31**, document D1 discloses (the references within brackets applying to this document:

A method in a management device (controller 225, paragraph 54 //p.10 l. 1//, controller 190, paragraph 55 //5th line//, DSL management entity 712, paragraph 95, Figures 2, 3, 3A, 6A, 7A), comprising:

- collecting (paragraph 62 //1st and 4th lines//) Wide Area Network information from a WAN communicably interfaced with the management device;
- collecting (paragraph 62, reading of CPE parameters indicated in the first three lines of paragraph 100, the reading of these parameters being actually the collection of management data, such as the "inform message" with diagnostic results mentioned on page 81 of document D2, in the "Description" column corresponding to the parameter "DiagnosticState", other examples are the "EthernetLinkStatus" of page 82 of D2, "ConnectionStatus" and "UpTime" of page 83 of D2, "EthernetBytesSent" of page 86 of D2, ...) Local Area Network information from a LAN communicably interfaced with the management device;
- jointly analyzing (paragraphs 63, 115) the collected WAN information and the collected LAN information (parameters as defined in D2 Annex B as indicated in D1, paragraph 100) to identify (identifying a need as in paragraph 63, lines 8-11) an operational condition; and
- initiating a management event (paragraph 63, generation of signals) responsive (paragraph 63) to the operational condition being identified.

The subject matter of **claim 31** is therefore not new (Art. 33(2) PCT).

- 3.5 Referring to independent apparatus **claim 33**, document D1 discloses (the references within brackets applying to this document:

A non-transitory computer readable storage medium (software memory of controller 225, paragraph 54 //p.10 l.1//, controller 190, paragraph 55 //5th line//, DSL management entity 712, paragraph 95, Figures 2, 3, 3A, 6A, 7A) having instructions stored thereon that, when executed by a processor in a management device, the instructions cause the management device to perform a method comprising:

- collecting (paragraph 62 //1st and 4th lines//) Wide Area Network information from a WAN communicably interfaced with the management device;

- collecting (paragraph 62, reading of CPE parameters indicated in the first three lines of paragraph 100, the reading of these parameters being actually the collection of management data, such as the "inform message" with diagnostic results mentioned on page 81 of document D2, in the "Description" column corresponding to the parameter "DiagnosticState", other examples are the "EthernetLinkStatus" of page 82 of D2, "ConnectionStatus" and "UpTime" of page 83 of D2, "EthernetBytesSent" of page 86 of D2, ...) Local Area Network information from a LAN communicably interfaced with the management device;
- jointly analyzing (paragraphs 63, 115) the collected WAN information and the collected LAN information (parameters as defined in D2 Annex B as indicated in D1, paragraph 100) to identify (identifying a need as in paragraph 63, lines 8-11) an operational condition; and
- initiating a management event (paragraph 63, generation of signals) responsive (paragraph 63) to the operational condition being identified.

The subject matter of **claim 33** is therefore not new (Art. 33(2) PCT).

Dependent Claims 2-7, 9-28, 30, 32, 34

- 3.6 Document D1 also discloses the other features of **dependent claims 2-7, 9-28, 30, 32 and 34** according to the following references, rendering the respective subject matter not novel within the meaning of Art. 33(2) PCT:
- 3.6.1 **Claims 2-3, 7**, layer 2, application layer of LAN: see e.g. paragraph 100 of D1, pages 84 (DNS, ...), 86 of D2.
 - 3.6.2 **Claims 2-3, 5, 7**, layer 1, physical layer of WAN: see e.g. paragraphs 116 and 128 of D1.
 - 3.6.3 **Claims 3-5**, modify settings: see e.g. D1, paragraphs 110-111, 121; see also D2, e.g. A.4.1.6.
 - 3.6.4 **Claim 2, 5**, networking/TCP/IP layer: see e.g. paragraph 100 of D1, pages 84 (DNS, ...), 86 of D2.
 - 3.6.5 **Claim 4**, central office: paragraph 132 Table 3A of D1.
 - 3.6.6 **Claim 5**, dropped packets and throughput: page 86 of D2.

- 3.6.7 **Claim 6, 7** //errors//, FEC, transmission rate, INP, etc., operational report of **claim 11, 16, 17**: implicit in vectoring indicated in the abstract of D1, minimum INP on page 39 of D1, FEC errors on page 45 of D1.
- 3.6.8 **Claim 9-10**, WAN fault, **claim 19, 32, 34**: paragraph 100, status and performance of DSL in paragraph 143 of D1.
- 3.6.9 **Claim 9-10**, LAN fault, **claim 19, 32, 34**: page 86 of D2.
- 3.6.10 **Claim 10** remedy, **claims 11-15, 30**: paragraph 79 of D1, the ordering has impact on the quality of service for various users, thereby remedying the situation for some of them.
- 3.6.11 **Claim 18**, TR-069: D2, whole document.
- 3.6.12 **Claim 20**, DSL: D1, whole document.
- 3.6.13 **Claims 21-22, 28**, wireless: paragraphs 39 and 147 of D1.
- 3.6.14 **Claim 23** transmit power level: D1, paragraph 63, 6th line.
- 3.6.15 **Claim 23-24**: paragraph 63 of D1 //p.13 l.6//.
- 3.6.16 **Claim 25-27**: D1, end of paragraph 62, "any of its components".

Re Item VII

4 **Certain defects in the international application**

4.1 **Two-Part Form**

Independent **claims 1, 8, 29, 31 and 33** are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art document D1 being placed in the preamble (Rule 6.3(b)(i) PCT) and the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

4.2 **Acknowledgement of relevant Prior Art**

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in document D1 is not mentioned in the description, nor is this document identified therein.

4.3 **Reference Signs**

The features of claims 1, 8, 29, 31 and 33 are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)

International application No.

PCT/US2011/021003

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.
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Filing a demand for international preliminary examination	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). 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).
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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 IPER (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
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Bitte beachten Sie, dass angeführte Nichtpatentliteratur (wie z. B. wissenschaftliche oder technische Dokumente) je nach geltendem Recht dem Urheberrechtsschutz und/oder anderen Schutzarten für schriftliche Werke unterliegen könnte. Die Vervielfältigung urheberrechtlich geschützter Texte, ihre Verwendung in anderen elektronischen oder gedruckten Publikationen und ihre Weitergabe an Dritte ist ohne ausdrückliche Zustimmung des Rechtsinhabers nicht gestattet.

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Please be aware that cited works of non-patent literature such as scientific or technical documents or the like may be subject to copyright protection and/or any other protection of written works as appropriate based on applicable laws. Copyrighted texts may not be copied or used in other electronic or printed publications or re-distributed without the express permission of the copyright holder.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference 8241P049PCT	FOR FURTHER ACTION		See item 4 below
International application No. PCT/US2011/021003	International filing date (<i>day/month/year</i>) 12 January 2011 (12.01.2011)	Priority date (<i>day/month/year</i>)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant ADAPTIVE SPECTRUM AND SIGNAL ALIGNMENT, INC.			

1.	This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).		
2.	This REPORT consists of a total of 12 sheets, including this cover sheet.		
In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.			
3.	This report contains indications relating to the following items:		
☒	Box No. I	Basis of the report	
☐	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 Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	
☐	Box No. VI	Certain documents cited	
☒	Box No. VII	Certain defects in the international application	
☐	Box No. VIII	Certain observations on the international application	
4.	The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).		

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Date of issuance of this report 16 July 2013 (16.07.2013) Authorized officer Simin Baharlou e-mail: pt09.pct@wipo.int
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Form PCT/IB/373 (January 2004)

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2011/021003

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>1-34</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-34</u>
Industrial applicability (IA)	Yes: Claims	<u>1-34</u>
	No: Claims	

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2011/021003

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

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 WO 2007/146048 A2 (ADAPTIVE SPECTRUM & SIGNAL [US];
CIOFFI JOHN M [US]; GINIS GEORGE [US]) 21 December 2007
(2007-12-21)
- D2 JEFF BERSTEIN ET AL: "CPE WAN Management Protocol",
TECHNICAL REPORT, FORUM TR-069, 1 May 2004
(2004-05-01), pages 1-109, XP008128969

2 Clarity (Art. 6 PCT)

The present application does not meet the requirements of Article 6 PCT,
because **claims 1, 7, 8, 29, 31 and 33 are not clear.**

- 2.1 Although **claims 1, 8 and 29** have been drafted as separate independent
device 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.
- 2.2 Although **claims 31 and 33** have been drafted as separate independent
method 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.
- 2.3 **Claim 7** is not clear because it tends to define the device of the invention with
respect to another entity, namely a video stream, whereas the presence of
errors is independent of whether the streams used are for video or not.

3 Novelty (Art. 33(2) PCT)

The present application does not meet the criteria of Article 33(1) PCT,
because the subject-matter of **claims 1-34** is not new in the sense of Article
33(2) PCT, the reasons being as follows:

Independent Claims 1, 8, 29, 31, 33

- 3.1 Referring to independent **apparatus claim 1**, document D1 discloses (the references within brackets applying to this document:

A management device (controller 225, paragraph 54 //p.10 l.1//, controller 190, paragraph 55 //5th line//, DSL management entity 712, paragraph 95, Figures 2, 3, 3A, 6A, 7A), comprising:

- a Local Area Network interface (interface to Management Entity ME 124, which is part of Local Area Network, paragraph 55 //5th line//, DSL management entity 712 is interfaced to LAN through DSL CPE modem see first line of paragraph 95) to communicably interface the management device with a LAN (Home Network);
- a Wide Area Network interface (interface to Management Entity ME 144, which is part of WAN, paragraph 55 //7th line//, DSL management entity 712 is interfaced to WAN because it is part of WAN) to communicably interface the management device with a WAN, wherein the WAN provides (loops 413, Figure 4, paragraph 56 //4th and 5th lines//) broadband connectivity to the LAN through a Digital Subscription Line connection;
- a collection module (paragraph 62 //1st line//) to collect LAN information (paragraph 154, reading of CPE parameters indicated in the first three lines of paragraph 100, the reading of these parameters being actually the collection of management data, //see also D1, paragraphs 114 and 124// such as the "inform message" with diagnostic results mentioned on page 81 of document D2, in the "Description" column corresponding to the parameter "DiagnosticState", other examples are the "EthernetLinkStatus" of page 82 of D2, "ConnectionStatus" and "UpTime" of page 83 of D2, "EthernetBytesSent" of page 86 of D2, ...) from the LAN and WAN information (paragraph 62 //1st and 4th lines//) from the WAN;
- an analysis module to jointly analyze (paragraphs 63 and 115) the collected WAN information and the collected LAN information (parameters as defined in D2 Annex B as indicated in D1, paragraph 100) to identify (identifying a need as in paragraph 63, lines 8-11, see also problems, errors, faults and performance problems identified in paragraph 115) an operational condition; and

- an implementation module to initiate a management event (paragraph 63, generation of signals) responsive (paragraph 63) to the operational condition being identified.

The subject matter of **claim 1** is therefore not new (Art. 33(2) PCT).

- 3.2 Referring to independent **apparatus claim 8**, document D1 discloses (the references within brackets applying to this document:

A management device (controller 225, paragraph 54 //p.10 l.1//, controller 190, paragraph 55 //5th line//, DSL management entity 712, paragraph 95, Figures 2, 3, 3A, 6A, 7A), comprising:

- a Wide Area Network interface (interface to Management Entity ME 144, which is part of WAN, paragraph 55 //7th line//, DSL management entity 712 is interfaced to WAN because it is part of WAN) to communicably interface the management device with a WAN;
- a Local Area Network interface (interface to Management Entity ME 124, which is part of Local Area Network, paragraph 55 //5th line//, DSL management entity 712 is interfaced to LAN through DSL CPE modem see first line of paragraph 95) to communicably interface the management device with a LAN (Home Network);
- a collection module (paragraph 62 //1st line//) to collect LAN information (paragraph 154, reading of CPE parameters indicated in the first three lines of paragraph 100, the reading of these parameters being actually the collection of management data, such as the "inform message" with diagnostic results mentioned on page 81 of document D2, in the "Description" column corresponding to the parameter "DiagnosticState", other examples are the "EthernetLinkStatus" of page 82 of D2, "ConnectionStatus" and "UpTime" of page 83 of D2, "EthernetBytesSent" of page 86 of D2, ...) from the LAN and WAN information from the WAN;
- an analysis module to jointly analyze (paragraphs 63 and 115) the collected WAN information and the collected LAN information (parameters as defined in D2 Annex B as indicated in D1, paragraph 100) to identify (identifying a need as in paragraph 63, lines 8-11) an operational condition; and
- an implementation module to initiate a management event (paragraph 63, generation of signals) responsive (paragraph 63) to the operational condition being identified.

The subject matter of **claim 8** is therefore not new (Art. 33(2) PCT).

- 3.3 Referring to independent **apparatus claim 29**, document D1 discloses (the references within brackets applying to this document:

A management device (controller 225, paragraph 54 //p.10 l.1//, controller 190, paragraph 55 //5th line//, DSL management entity 712, paragraph 95, Figures 2, 3, 3A, 6A, 7A), comprising:

- a Wide Area Network interface (interface to Management Entity ME 144, which is part of WAN, paragraph 55 //7th line//, DSL management entity 712 is interfaced to WAN because it is part of WAN) to communicably interface the management device with a WAN;
- a Local Area Network interface (interface to Management Entity ME 124, which is part of Local Area Network, paragraph 55 //5th line//, DSL management entity 712 is interfaced to LAN through DSL CPE modem see first line of paragraph 95) to communicably interface the management device with a LAN (Home Network);
- a collection module (paragraph 62 //1st line//) to collect LAN information (reading of CPE parameters indicated in the first three lines of paragraph 100, the reading of these parameters being actually the collection of management data, such as the "inform message" with diagnostic results mentioned on page 81 of document D2, in the "Description" column corresponding to the parameter "DiagnosticState", other examples are the "EthernetLinkStatus" of page 82 of D2, "ConnectionStatus" and "UpTime" of page 83 of D2, "EthernetBytesSent" of page 86 of D2, ...) from the LAN and WAN information (paragraph 62 //1st and 4th lines//) from the WAN;
- a diagnostics module to jointly analyze (paragraphs 63 and 115) the collected WAN diagnostic information and the collected LAN diagnostic information to diagnose (problems, errors, faults and performance problems identified in paragraph 115) a fault within the WAN based at least in part on the LAN diagnostic information or to diagnose a fault within the LAN based at least in part on the WAN diagnostic information; and
- an implementation module to initiate a management event (paragraph 63, generation of signals) responsive (paragraph 63) to the operational condition being identified.

The subject matter of **claim 29** is therefore not new (Art. 33(2) PCT).

- 3.4 Referring to independent **method claim 31**, document D1 discloses (the references within brackets applying to this document:

A method in a management device (controller 225, paragraph 54 //p.10 l. 1//, controller 190, paragraph 55 //5th line//, DSL management entity 712, paragraph 95, Figures 2, 3, 3A, 6A, 7A), comprising:

- collecting (paragraph 62 //1st and 4th lines//) Wide Area Network information from a WAN communicably interfaced with the management device;
- collecting (paragraph 62, reading of CPE parameters indicated in the first three lines of paragraph 100, the reading of these parameters being actually the collection of management data, such as the "inform message" with diagnostic results mentioned on page 81 of document D2, in the "Description" column corresponding to the parameter "DiagnosticState", other examples are the "EthernetLinkStatus" of page 82 of D2, "ConnectionStatus" and "UpTime" of page 83 of D2, "EthernetBytesSent" of page 86 of D2, ...) Local Area Network information from a LAN communicably interfaced with the management device;
- jointly analyzing (paragraphs 63, 115) the collected WAN information and the collected LAN information (parameters as defined in D2 Annex B as indicated in D1, paragraph 100) to identify (identifying a need as in paragraph 63, lines 8-11) an operational condition; and
- initiating a management event (paragraph 63, generation of signals) responsive (paragraph 63) to the operational condition being identified.

The subject matter of **claim 31** is therefore not new (Art. 33(2) PCT).

- 3.5 Referring to independent apparatus **claim 33**, document D1 discloses (the references within brackets applying to this document:

A non-transitory computer readable storage medium (software memory of controller 225, paragraph 54 //p.10 l.1//, controller 190, paragraph 55 //5th line//, DSL management entity 712, paragraph 95, Figures 2, 3, 3A, 6A, 7A) having instructions stored thereon that, when executed by a processor in a management device, the instructions cause the management device to perform a method comprising:

- collecting (paragraph 62 //1st and 4th lines//) Wide Area Network information from a WAN communicably interfaced with the management device;

- collecting (paragraph 62, reading of CPE parameters indicated in the first three lines of paragraph 100, the reading of these parameters being actually the collection of management data, such as the "inform message" with diagnostic results mentioned on page 81 of document D2, in the "Description" column corresponding to the parameter "DiagnosticState", other examples are the "EthernetLinkStatus" of page 82 of D2, "ConnectionStatus" and "UpTime" of page 83 of D2, "EthernetBytesSent" of page 86 of D2, ...) Local Area Network information from a LAN communicably interfaced with the management device;
- jointly analyzing (paragraphs 63, 115) the collected WAN information and the collected LAN information (parameters as defined in D2 Annex B as indicated in D1, paragraph 100) to identify (identifying a need as in paragraph 63, lines 8-11) an operational condition; and
- initiating a management event (paragraph 63, generation of signals) responsive (paragraph 63) to the operational condition being identified.

The subject matter of **claim 33** is therefore not new (Art. 33(2) PCT).

Dependent Claims 2-7, 9-28, 30, 32, 34

- 3.6 Document D1 also discloses the other features of **dependent claims 2-7, 9-28, 30, 32 and 34** according to the following references, rendering the respective subject matter not novel within the meaning of Art. 33(2) PCT:
 - 3.6.1 **Claims 2-3, 7**, layer 2, application layer of LAN: see e.g. paragraph 100 of D1, pages 84 (DNS, ...), 86 of D2.
 - 3.6.2 **Claims 2-3, 5, 7**, layer 1, physical layer of WAN: see e.g. paragraphs 116 and 128 of D1.
 - 3.6.3 **Claims 3-5**, modify settings: see e.g. D1, paragraphs 110-111, 121; see also D2, e.g. A.4.1.6.
 - 3.6.4 **Claim 2, 5**, networking/TCP/IP layer: see e.g. paragraph 100 of D1, pages 84 (DNS, ...), 86 of D2.
 - 3.6.5 **Claim 4**, central office: paragraph 132 Table 3A of D1.
 - 3.6.6 **Claim 5**, dropped packets and throughput: page 86 of D2.

- 3.6.7 **Claim 6, 7** //errors//, FEC, transmission rate, INP, etc., operational report of **claim 11, 16, 17**: implicit in vectoring indicated in the abstract of D1, minimum INP on page 39 of D1, FEC errors on page 45 of D1.
- 3.6.8 **Claim 9-10**, WAN fault, **claim 19, 32, 34**: paragraph 100, status and performance of DSL in paragraph 143 of D1.
- 3.6.9 **Claim 9-10**, LAN fault, **claim 19, 32, 34**: page 86 of D2.
- 3.6.10 **Claim 10** remedy, **claims 11-15, 30**: paragraph 79 of D1, the ordering has impact on the quality of service for various users, thereby remedying the situation for some of them.
- 3.6.11 **Claim 18**, TR-069: D2, whole document.
- 3.6.12 **Claim 20**, DSL: D1, whole document.
- 3.6.13 **Claims 21-22, 28**, wireless: paragraphs 39 and 147 of D1.
- 3.6.14 **Claim 23** transmit power level: D1, paragraph 63, 6th line.
- 3.6.15 **Claim 23-24**: paragraph 63 of D1 //p.13 l.6//.
- 3.6.16 **Claim 25-27**: D1, end of paragraph 62, "any of its components".

Re Item VII

4 **Certain defects in the international application**

4.1 **Two-Part Form**

Independent **claims 1, 8, 29, 31 and 33** are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art document D1 being placed in the preamble (Rule 6.3(b)(i) PCT) and the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

4.2 **Acknowledgement of relevant Prior Art**

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in document D1 is not mentioned in the description, nor is this document identified therein.

4.3 **Reference Signs**

The features of claims 1, 8, 29, 31 and 33 are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/US2011/021003

Electronic Acknowledgement Receipt	
EFS ID:	36670284
Application Number:	16432364
International Application Number:	
Confirmation Number:	1021
Title of Invention:	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS
First Named Inventor/Applicant Name:	Peter Chow
Customer Number:	146571
Filer:	Michael V. North/Nita Miller
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-049USC2
Receipt Date:	23-JUL-2019
Filing Date:	05-JUN-2019
Time Stamp:	19:44:15
Application Type:	Utility under 35 USC 111(a)

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	049USC2_IDS_Trans.pdf	29822 567693b119377df1ecbb242b020df0d796e77e8a	no	3

Warnings:

Information:					
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Information:					

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Information:					
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Warnings:					
Information:					
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Information:					
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Warnings:					
Information:					
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Warnings:					
Information:					
22	Non Patent Literature	049USC2_IDS_NPL13.pdf	1518625	no	1
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Warnings:					
Information:					

23	Non Patent Literature	049USC2_IDS_NPL14.pdf	271897	no	3
			b126225c6324da904fddac8223cff86bcd572c14		
Warnings:					
Information:					
24	Non Patent Literature	049USC2_IDS_NPL15.pdf	3629060	no	30
			d18cfd8a53ac593abad62c97f39fd66e8b983c18		
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Information:					
25	Non Patent Literature	049USC2_IDS_NPL16.pdf	1733305	no	5
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Warnings:					
Information:					
26	Non Patent Literature	049USC2_IDS_NPL17.pdf	7042744	no	3
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Warnings:					
Information:					
27	Non Patent Literature	049USC2_IDS_NPL18.pdf	18496861	no	53
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Warnings:					
Information:					
28	Non Patent Literature	049USC2_IDS_NPL19.pdf	19359694	no	57
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Warnings:					
Information:					
29	Non Patent Literature	049USC2_IDS_NPL20.pdf	215384	no	7
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Warnings:					
Information:					

30	Non Patent Literature	049USC2_IDS_NPL21.pdf	13413347 3c9cfb259fd359ca9195ea3f0c6ee0191eea563	no	76
Warnings:					
Information:					
Total Files Size (in bytes):			155126880		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Peter Chow *et al.* Confirmation No.: 1021
Appl. No. : 16/432,364
Filing Date : 2019-06-05
Title : SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND
LAN NETWORK COMMUNICATIONS
Docket No. : 20145-049USC2

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: 2019-07-23

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:

- ☐ within three months of the filing date of a national application, other than a continued prosecution application under § 1.53(d);

PATENT

- ☐ 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 not more than three months prior to the filing of this information disclosure statement;

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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. PCT/US11/21003, filed 2011-01-12, 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: 2019-07-23

By: /Michael V. North/
Michael V. North
Reg. No. 46963





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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/432,364	06/05/2019	Peter Chow	20145-049USC2

CONFIRMATION NO. 1021

PUBLICATION NOTICE

146571
North Weber & Baugh LLP - ASSIA
3260 Hillview Avenue, 1st Floor
Palo Alto, CA 94304



Title:SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS

Publication No.US-2019-0288932-A1

Publication Date:09/19/2019

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 Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, 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 <https://portal.uspto.gov/pair/PublicPair>. 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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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/432,364	06/05/2019	Peter Chow	20145-049USC2	1021
146571	7590	10/18/2019		
North Weber & Baugh LLP - ASSIA 3260 Hillview Avenue, 1st Floor Palo Alto, CA 94304			EXAMINER DUONG, DUC T	
			ART UNIT 2467	PAPER NUMBER
			NOTIFICATION DATE 10/18/2019	DELIVERY MODE 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

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Double Patenting

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

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file

provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(I)(1) - 706.02(I)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

3. Claims 1 and 8 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 and 7 of U.S. Patent No. 10,333,819 B2. Although the claims at issue are not identical, they are not patentably distinct from each other because the application's claims 1 and 8 merely broaden the scope of the patented claims 1 and 7 by excluding certain limitations of the parent claim. The application's claims are nearly identical in every other aspect to the patented claims. Thus, the applicant is attempting to broaden the patented claims by excluding certain limitations in the application's claims, and it would have been obvious to one skill in the art, at the time of the invention, to omit such limitations. If the application allowed the application would grant broader protection to the applicant.

Claims 1 and 7 of the patented contain(s) every element of claims 1 and 8 of the instant application and thus anticipate the claim(s) of the instant application. Claims 1 and 8 of the instant application therefore is/are not patently distinct from the earlier patent claim(s) and as such is/are unpatentable over obvious-type double patenting. A later patent/application claim is not patentably distinct from an earlier claim if the later claim is anticipated by the earlier claim. A later patent claim is not patentably distinct from an earlier patent claim if the later claim is obvious over, or anticipated by, the earlier claim. In re Longi, 759 F.2d at 896,225 USPQ at 651 (affirming a holding of obviousness-type double patenting because the claims at issue were obvious over claims in four prior art patents); In re Berg, 140 F.3d at 1437, 46 USPQ2d at 1233 Fed. Cir. 1998 (affirming a holding of obviousness type double patenting where a patent application claim to a genus is anticipated by a patent claim to a species within that genus). ELI LILLY AND COMPANY v BARR LABORATORIES, INC., United States Court of Appeals for the Federal Circuit, ON PETITION FOR REHEARING EN BANC (DECIDED: May 30, 2001). Claims 1 and 8 are generic to the species of invention covered by claims 1 and 7 of the patent. Thus, the generic invention is "anticipated" by the species of the patented invention. Cf., Titanium Metals Corp. v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985 (holding that an earlier species disclosure in the prior art defeats any generic claim). This court's predecessor has held that, without a terminal disclaimer, the species claims preclude issuance of the generic application. In re Van Ornum, 686 F.2d 937, 944,214 USPQ 761,767 (CCPA 1982). Accordingly, absent a terminal disclaimer, claims 1 and 7 were properly rejected under the doctrine

of obviousness-type double patenting. In re Goodman (CA FC) 29 USPQ2d 2010 (12/3/1993).

Claim Rejections - 35 USC § 112

4. 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.

5. Claim 1-8 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 limitations “collection module”, “analysis module”, “implementation module”, and “collection module” invoke 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. However, the written description fails to disclose the corresponding structure, material, or acts for performing the entire claimed function and to clearly link the structure, material, or acts to the function. The specification is devoid of adequate structure to perform the claimed function. In particular, the specification fails to disclose a corresponding structure, material, or acts for the claimed function. Fig. 5 and pages 41-44 of the specification designate “black boxes” to perform the limitations, and as such the specification fails to disclose a specific structure for the claim limitations (i.e. how/what such “module” is implemented with). The reason that the claim is indefinite is that without a limiting specification, which is required by statute, the claim limitation becomes an unbounded purely functional limitation. There are no boundaries or limits

imposed by structure, material or acts. The claim will cover all ways of performing a function, known and unknown. Therefore, the claim is indefinite and is rejected under 35 U.S.C. 112(b) or pre-AIA 35 U.S.C. 112, second paragraph.

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(f) or pre-AIA 35 U.S.C. 112, sixth paragraph;
- (b) Amend the written description of the specification such that it expressly recites what structure, material, or acts perform the entire claimed function, without introducing any new matter (35 U.S.C. 132(a)); or
- (c) Amend the written description of the specification such that it clearly links the structure, material, or acts disclosed therein to the function recited in the claim, 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 and clearly links them to the function 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.

Allowable Subject Matter

6. Claim 1 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), 2nd paragraph, set forth in this Office action.

7. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record Kee et al (US Publication 2019/0245278 A1) discloses a management device 206 (fig. 3) comprising: a Local Area Network (LAN) interface 302 to communicably interface the management device with a LAN; a Wide Area Network (WAN) interface 314 to communicably interface the management device with a WAN, wherein the WAN is to provide broadband connectivity to the LAN; a collection module 312 to collect WAN information from one or more communication layers on the WAN (pages 5-6 paragraphs 0052-0057). However, the prior art of record fails to teach or make obvious **“to identify an operational condition within the LAN in a different communication layer from the one or more communication layers on the WAN by analyzing at least the collected WAN information”**, when the identify is considered within the specific structure of the device recited in claim 1.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Duc T Duong whose telephone number is (571)272-3122. The examiner can normally be reached on Mon-Fri; 9am-6pm.

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 Phillips can be reached on (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.

/DUC T DUONG/
Primary Examiner, Art Unit 2467

<i>Notice of References Cited</i>	Application/Control No. 16/432,364		Applicant(s)/Patent Under Reexamination Chow et al.	
	Examiner Duc T Duong		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-20110191465-A1	08-2011	Hofstaedter; Christian E.	G06F15/173	709/224
*	B	US-6785279-B1	08-2004	Crooks; Barry McKay	H04L12/66	370/392
*	C	US-20060280189-A1	12-2006	McRae; Matthew	H04L12/462	370/401
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

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

*		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.

<i>Search Notes</i> 	Application/Control No. 16/432,364	Applicant(s)/Patent Under Reexamination Chow et al.
	Examiner Duc T Duong	Art Unit 2467

CPC - Searched*		
Symbol	Date	Examiner
See CPC search printout	10/14/2019	DTD

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
East text	10/14/2019	DTD
Inventor name	10/14/2019	DTD
H04L41/04,H04L41/06,H04L41/0604,H04L41/0631,H04L41/0677, H04L41/0695,H04L41/08,H04L41/085,H04L41/0853,H04L41/0856, H04L41/0859 (text search)	10/14/2019	DTD
H04L43/10,H04L43/12,H04L43/50 (text search)	10/14/2019	DTD

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/DUC T DUONG/ 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
S1	4820	(monitor\$3 or detect\$3 or determin\$3) with lan with wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:25
S2	355	(monitor\$3 or detect\$3 or determin\$3 or identify) with lan with wan with (condition or status or state)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:27
S3	278	S2 and (@ad< "20110112" or @rlad< "20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:28
S4	93	S3 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:28
S5	6865	(collect\$3 or snoop\$3 or sniff\$) with lan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:34
S6	3248	(collect\$3 or snoop\$3 or sniff\$) with wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:34
S7	2272	S5 and S6	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:34
S8	175	S7 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:34
S9	150	S8 and (@ad< "20110112" or @rlad< "20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:34
S10	2423	(lan adj2 (interface or port)) same (wan adj2 (interface or port))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:36

S11	730	S10 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:36
S12	348	S11 and ((monitor\$3 or detect\$3 or determin\$3 or identify) with (condition or status or state))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:36
S13	312	S12 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:36
S14	1937247	(monitor\$3 or detect\$3 or determin\$3 or identify) near5 (condition or status or state or failure or fault\$2 or congestion)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:50
S15	41	S10 same S14	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:51
S16	16	S15 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:51
S17	8	S16 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:51
S18	255	(monitor\$3 or detect\$3 or determin\$3 or identify) near5 (condition or status or state or failure or fault\$2 or congestion) with lan near5 wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:14
S19	43	S18 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:15
S20	35	S19 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:15
S21	802	(lan adj2 (interface or port or connection or connector)) same (wan adj2 (interface or port or connection or connector)) same (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:26
S22	673	S21 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:27

S23	172	S22 and "370"/\$.ccls.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:27
S24	712	(monitor\$3 or detect\$3 or determin\$3 or identify) near5 (condition or status or state or failure or fault\$2 or congestion or performance) with (lan or ethernet) with (internet or wan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:35
S25	167	S24 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:35
S26	79	S25 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:35
S27	544	S24 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:41
S28	111	S27 and "370"/\$.ccls.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:43
S29	1226	(management or gateway) same ((lan or ethernet) adj2 (interface or port or connection or connector)) same (wan adj2 (interface or port or connection or connector))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:46
S30	540	S29 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:46
S31	491	S30 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:46
S32	130	(monitor\$3 or detect\$3 or determin\$3 or identify) near5 (condition or status or state or failure or fail\$4 or fault\$2 or congestion or performance) same ((lan or ethernet) adj2 (interface or port or connection or connector)) with ((internet or wan) adj2 (interface or port or connection or connector))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 17:27
S33	106	S32 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 17:27
S34	7	"2007146048"	US-PGPUB;	OR	ON	2015/04/27 17:50

			USPAT; EPO; DERWENT			
S35	250	(monitor\$3 or detect\$3 or determin\$3 or identify) with ((lan or ethernet) adj2 (interface or port)) with ((internet or wan) adj2 (interface or port))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 17:55
S36	209	S35 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 17:55
S37	674	(failure or fail\$4 or fault\$2 or congest\$3) with (lan or ethernet or rj\$145) with (wan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 18:24
S38	674	(failure or fail\$4 or fault\$2 or congest\$3) with (lan or ethernet or rj\$145) with (wan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 19:43
S39	582	S38 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 19:44
S40	55	S39 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 19:44
S41	4408	(monitor\$3 or measur\$3 or analyz\$3) with (lan or ethernet or rj\$145) with (wan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 20:00
S42	158	(monitor\$3 or measur\$3 or analyz\$3) with (lan or ethernet or rj45 or rj-45) with (wan) with performance	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 20:01
S43	171	(monitor\$3 or measur\$3 or analyz\$3 or determin\$3) with (lan or ethernet or rj45 or rj-45) with (wan) with performance	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 20:01
S44	145	S43 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 20:01
S45	3680	(monitor\$3 or detect\$3 or determin\$3 or identify or analyz\$3) near5 (condition or status or state or failure or fail\$4 or fault\$2 or congestion or performance) near5 (lan or ethernet)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:43
S46	159	S45 same (dsl or adsl)	US-PGPUB;	OR	ON	2015/04/29 08:44

			USPAT; EPO; DERWENT			
S47	153	S46 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:44
S48	8955	(collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:46
S49	143	S48 same (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:46
S50	130	S49 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:46
S51	8571	manag\$5 near3 lan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:56
S52	64	S51 same (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:56
S53	51	S52 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:56
S54	10593	((lan or ethernet or rj45 or rj-45) adj2 (interface or port or connection)) same ((wan or internet) adj2 (interface or port or connection))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:08
S55	522	S54 same (collect\$3 or snoop\$3 or sniff\$ or analyz\$3)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:09
S56	423	S55 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:09
S57	376	S54 same (collect\$3)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:10
S58	313	S57 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB;	OR	ON	2015/04/29 09:10

			USPAT; EPO; DERWENT			
S59	6482	(collect\$3 with lan)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:33
S60	410	S59 and (dsl or adsl)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:34
S61	358	S60 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:34
S62	2100	(collect\$3 with lan with wan)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:37
S63	157	S62 and (dsl or adsl)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:37
S64	134	S63 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:37
S65	10608	((lan or ethernet or rj45 or rj-45) adj2 (interface or port or connection)) same ((wan or internet) adj2 (interface or port or connection))	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:53
S66	522	S65 same (collect\$3 or snoop\$3 or sniff\$ or analyz\$3)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:53
S67	423	S66 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:53
S68	468	h04l41/04.cpc.	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:57
S69	0	S67 and S68	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:57
S70	2633	h04l41/06.cpc.	US- PGPUB;	OR	ON	2015/05/03 22:57

			USPAT; EPO; DERWENT			
S71	1	S67 and S70	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:57
S72	436	h04l41/0604.cpc.	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:58
S73	11	S72 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:58
S74	1193	h04l41/0631.cpc.	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:59
S75	0	S67 and S74	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:59
S76	38	S74 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:59
S77	941	h04l41/0677.cpc.	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:59
S78	11	S77 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:59
S79	120	h04l41/0695.cpc.	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:59
S80	0	S79 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:00
S81	1200	h04l41/08.cpc.	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:00
S82	11	S81 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US- PGPUB;	OR	ON	2015/05/03 23:00

			USPAT; EPO; DERWENT			
S83	354	h04l41/085.cpc.	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:00
S84	4	S83 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:00
S85	1493	h04l41/0853.cpc.	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:00
S86	41	S85 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:00
S87	1384	h04l41/0856.cpc.	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:01
S88	41	S87 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:01
S89	214	h04l41/0859.cpc.	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:01
S90	3	S89 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:01
S91	1831	h04l43/04.cpc.	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:02
S92	87	S91 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:03
S93	3292	h04l43/10.cpc.	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:03
S94	127	S93 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US- PGPUB;	OR	ON	2015/05/03 23:03

			USPAT; EPO; DERWENT			
S95	53	S94 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:03
S96	1796	h04l43/12.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:03
S97	48	S96 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:03
S98	5460	h04l43/50.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:04
S99	60	S98 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:04
S100	140	(peter near2 chow).inv.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:04
S101	2	S100 and (lan and wan and manag\$5 and condition).clm.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:05
S102	81	(rhee near2 wonjong).inv.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:05
S103	2	S102 and (lan and wan and manag\$5 and condition).clm.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:05
S104	39	(tehrani near2 ardavan).inv.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:05
S105	2	S104 and (lan and wan and manag\$5 and condition).clm.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:05
S106	29	(goldburg near2 marc).inv.	US-PGPUB;	OR	ON	2015/05/03 23:06

			USPAT; EPO; DERWENT			
S107	2	S106 and (lan and wan and manag\$5 and condition).clm.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:06
S108	6257	h04l43/50.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:35
S109	69	S108 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:35
S110	2369	(collect\$3 with lan with wan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:41
S111	181	S110 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:41
S112	136	S111 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:41
S113	3030	(collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with ((wan or internet or ip) adj2 (connection or interface))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:47
S114	702	(collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with ((lan) adj2 (connection or interface))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:48
S115	188	S113 and S114	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:48
S116	167	S115 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:48
S117	2	"20140321298"	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 18:11
S121	2699	(collect\$3 with lan with wan)	US-PGPUB;	OR	ON	2016/09/19 03:48

			USPAT; EPO; DERWENT			
S122	197	S121 and (dsl or adsl)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:48
S123	136	S122 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:48
S124	2	"9,369,370"	US- PGPUB; USPAT; FPRS	OR	ON	2016/09/19 03:49
S125	7981	(collect\$3 or snoop\$3 or sniff\$3) with lan	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:51
S126	2998	S125 same wan	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:51
S127	231	S126 and (dsl or adsl)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:51
S128	166	S127 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:51
S129	5718	(fault\$3 or fail\$4) with lan	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:53
S130	690	S129 same wan	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:53
S131	102	S130 and (dsl or adsl)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:53
S132	73	S131 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:53
S133	2329	(diagnostic or diagnos\$3) with lan	US- PGPUB; USPAT;	OR	ON	2016/09/19 03:58

			EPO; DERWENT			
S134	630	S133 same wan	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:59
S135	70	S134 and (dsl or adsl)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:59
S136	49	S135 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:59
S137	7530	(collect\$3 or snoop\$3 or sniff\$3 or monitor\$3) with lan with wan	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:31
S138	1167	S137 and (dsl or adsl)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:31
S139	763	S138 and (diagnostic or failure or fault\$2 or congestion)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:32
S140	556	S139 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:32
S141	3996	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing) with lan with wan	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:35
S142	354	S141 and (dsl or adsl)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:36
S143	239	S142 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:36
S144	243	lan with wan with backhaul	US- PGPUB; USPAT; FPRS	OR	ON	2017/06/09 16:44
S145	175	S144 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; EPO;	OR	ON	2017/06/09 16:44

			DERWENT			
S146	17056	lan with wan same dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 16:45
S147	983	lan same (internet or wan (ip adj2 network)) same backhaul	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 16:47
S148	457	S147 and dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 16:47
S149	377	S148 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:47
S150	359	lan with (interface or connect\$3 or couple\$1) with (internet or wan (ip adj2 network)) same backhaul	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 17:03
S151	187	S150 and dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 17:03
S152	13421	lan with (interface or connect\$5 or couple\$1) with (internet or wan (ip adj2 network)) same dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 17:20
S153	3996	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing) with lan with wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 17:22
S154	123	S152 and S153	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 17:22
S155	84	S154 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 17:23
S156	564	lan same wan same backhaul	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 18:54
S157	56	lan same wan same backhaul same dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 18:54
S158	12990	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing) with lan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 18:58
S159	6366	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or	US-PGPUB;	OR	ON	2017/06/09 18:58

		probing) with wan	USPAT; EPO; DERWENT			
S160	4249	S158 and S159	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 18:58
S161	352	S160 and dsl	US- PGPUB; USPAT; FPRS	OR	ON	2017/06/09 18:58
S162	240	S161 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; FPRS	OR	ON	2017/06/09 18:59
S163	4862	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3) with lan near5 (interface or port or media or medium or connection)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 19:05
S164	1914	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3) with wan near5 (interface or port or media or medium or connection)	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 19:05
S165	887	S163 and S164	US- PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:06
S166	629	S165 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:06
S167	449	S166 and (fault\$3 or fail\$4)	US- PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:07
S168	8215	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3) with lan with wan	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 19:19
S169	131	S168 same (fault\$3 or fail\$4)	US- PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:19
S170	87	S169 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:19
S171	14499	(manag\$5 or provision\$3 or optimiz\$3 or monitor\$3) with lan with wan	US- PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 19:28
S172	6855	S171 and (fault\$3 or fail\$4)	US- PGPUB; USPAT;	OR	ON	2017/06/09 19:28

			FPRS			
S173	1242	S172 and dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:28
S174	909	S173 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:29
S175	991	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3) with lan with wan near5 (interface or port or media or medium or connection)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 19:30
S176	27	S175 same (fault\$3 or fail\$4)	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:31
S177	1427	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3) with lan with (internet or wan or broad\$1band) near5 (interface or port or media or medium or connection)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 19:33
S178	48	S177 same (fault\$3 or fail\$4)	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:33
S179	32	S178 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:33
S180	3000	lan with (interface or connect\$5 or couple\$1) with wan with dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/11 00:56
S181	2347544	(monitor\$3 or detect\$3 or determin\$3 or identify) near5 (condition or status or state or failure or fault\$2 or congestion)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/11 00:58
S182	1223	S180 and S181	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/11 00:58
S183	907	S182 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/11 00:59
S184	5107	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3 or meter\$3) with lan near5 (interface or port or media or medium or connection)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/11 01:00
S185	2174	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3 or meter\$3) with wan near5 (interface or port or media	US-PGPUB; USPAT; EPO;	OR	ON	2017/06/11 01:01

		or medium or connection)	DERWENT			
S186	1074	S184 and S185	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/11 01:01
S187	301	S186 and dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/11 01:03
S188	259	S187 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/11 01:03
S189	234	S188 and (fault or fail\$3)	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/11 01:03
S190	424	(fault or fail\$3) with lan with wan	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/11 01:05
S191	323	S190 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/11 01:05
S192	30	(back\$1haul near\$ wan) same lan same dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/11 01:15
S193	2	"20060164978"	US-PGPUB; USPAT; FPRS	OR	ON	2017/09/26 13:03
S194	1	"20160294669"	US-PGPUB; USPAT; FPRS	OR	ON	2017/09/26 16:18
S195	1951	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3 or meter\$3 or monitor\$3 or analy\$5) with (from or between) with wan with lan	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:35
S196	228	S195 and (dsl or adsl)	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:35
S197	154	S196 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:35
S198	1378	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3 or meter\$3 or monitor\$3 or analy\$5) with (data or information or traffic or packet) with (from or between) with wan with lan	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:37
S199	116	S198 and (dsl or adsl or (digital adj2	US-	OR	ON	2019/02/03

		line))	US-PGPUB; USPAT; FPRS			23:40
S200	64	S199 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:40
S201	5127	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3 or meter\$3 or monitor\$3 or analy\$5) with (data or information or traffic or packet) with wan with lan	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:41
S202	646	S201 and (dsl or adsl or (digital adj2 line))	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:42
S203	374	S202 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:42
S206	1	"20190288932"	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 13:36
S207	3	"10,333,819"	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 13:40
S208	5462	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3) with (data or information or traffic or packet) with wan	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 13:46
S209	263	S208 same layer	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 13:47
S210	157	S209 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 13:47
S211	70	S208 same (lan near5 (status or state or condition or configur\$5))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 14:12
S212	19	S211 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 14:12
S213	428	S208 same (lan with (status or state or condition or configur\$5))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 14:32
S214	436	S208 same ((lan or ethernet) with (status or state or condition or configur\$5))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 14:48
S215	120	S214 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB;	OR	ON	2019/10/14 14:48

			USPAT; FPRS			
S216	170	S208 same ((lan or ethernet) with (analy\$4 or diagnos\$5))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 14:55
S217	94	S216 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 14:56
S218	7688	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3) with (data or information or traffic or packet) with (wan or dsl or adsl)	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:00
S219	299	S218 same ((lan or ethernet) with (analy\$4 or diagnos\$5 or optimiz\$5 or perform\$3))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:01
S220	138	S219 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:01
S221	45	S219 same ((lan or ethernet) near5 (status or state or condition or configur\$6 or statistic or parameter or performance))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:16
S222	17	S221 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:16
S223	826	(data or information or traffic or packet) near5 (wan or dsl or adsl) with ((lan or ethernet) near5 (status or state or condition or configur\$6 or statistic or parameter or performance))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:46
S224	45	((data or information or traffic or packet) near5 (wan or dsl or adsl) near5 (collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3)) with ((lan or ethernet) near5 (status or state or condition or configur\$6 or statistic or parameter or performance))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:48
S225	13	S224 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:50
S226	499	(data or information or traffic or packet) near5 (wan or dsl or adsl) with ((lan or ethernet) near5 (analy\$4 or diagnos\$5 or optimiz\$5 or perform\$3))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:51
S227	249	S226 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:52
S228	215	((data or information or traffic or packet) near5 (wan or dsl or adsl)	US-PGPUB;	OR	ON	2019/10/14 15:54

		near5 (receiv\$3 or collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3)) same ((lan or ethernet) near5 (analy\$4 or diagnos\$5 or optimiz\$5 or perform\$3))	USPAT; FPRS			
S229	99	S228 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:55
S230	313	((data or information or traffic or packet) near5 (wan or dsl or adsl) near5 (receiv\$3 or collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3)) same ((lan or vln or ethernet) near5 (status or state or condition or configur\$6 or statistic or parameter or performance))	US- PGPUB; USPAT; FPRS	OR	ON	2019/10/14 16:29
S231	195	S230 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; FPRS	OR	ON	2019/10/14 16:31
S232	55	((data or information or traffic or packet) near5 (wan or dsl or adsl) near5 (receiv\$3 or collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3)) same ((lan or vln or ethernet) near5 (status or state or condition or fault\$3 or fail\$4))	US- PGPUB; USPAT; FPRS	OR	ON	2019/10/14 16:48
S233	17	S232 and (@ad<"20110112" or @rlad<"20110112")	US- PGPUB; USPAT; FPRS	OR	ON	2019/10/14 16:53

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S118	0	((lan adj2 interface) and (wan adj2 interface) and event and collect\$3 and condition).clm.	USPAT	OR	ON	2016/01/08 18:18
S119	0	((lan adj2 interface) and (wan adj2 interface) and event and collect\$3).clm.	USPAT	OR	ON	2016/01/08 18:19
S120	8	((lan adj2 interface) and (wan adj2 interface) and event).clm.	US- PGPUB; USPAT	OR	ON	2016/01/08 18:19
S204	25	((lan adj2 interface) and (wan adj2 interface) and condition).clm.	US- PGPUB; USPAT	OR	ON	2019/02/04 10:07
S205	7	((lan adj2 interface) and (wan adj2 interface) and condition and dsl).clm.	US- PGPUB; USPAT	OR	ON	2019/02/04 10:07

10/ 14/ 2019 5:27:15 PM

C:\Users\dduong\Documents\EAST\Workspaces\16432364.wsp

Bibliographic Data

Application No: 16/432,364

Foreign Priority claimed: ☐ Yes ☒ No

35 USC 119 (a-d) conditions met: ☐ Yes ☒ No ☐ Met After Allowance

Verified and Acknowledged:

/DUC T DUONG/

Examiner's Signature

Initials

Title:

SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN
AND LAN NETWORK COMMUNICATIONS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
06/05/2019	370	2467	20145-049USC2
RULE			

APPLICANTS

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Ardavan Maleki Tehrani Atherton, CA, UNITED STATES

Marc Goldberg Redwood City, CA, UNITED STATES

CONTINUING DATA

This application is a CON of 15182513 06/14/2016 PAT 10333819

15182513 is a CON of 13995900 07/08/2014 PAT 9369370

13995900 is a 371 of PCT/US2011/021003 01/12/2011

FOREIGN APPLICATIONS

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06/12/2019

STATE OR COUNTRY

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UNITED STATES

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\$1,720

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16432364
	Filing Date		2019-06-05
	First Named Inventor	Peter Chow	
	Art Unit		
	Examiner Name		
	Attorney Docket Number		20145-049USC2

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	6785279	B1	2004-08-31	Barry McKay Crooks	
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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20030145082	A1	2003-07-31	Yong Ho Son	
	2	20040034800	A1	2004-02-19	Anil Singhal et al.	
	3	20050058143	A1	2005-03-17	Hidenori Kikuchi et al.	
	4	20060126613	A1	2006-06-15	Jonathan Marcus Zweig	
	5	20060198356	A1	2006-09-07	Mark Ryan Mayernick	

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number		16432364
Filing Date		2019-06-05
First Named Inventor	Peter Chow	
Art Unit	2467	
Examiner Name	Duc Duong	
Attorney Docket Number	20145-049USC2	

6	20060259583	A1	2006-11-16	Katsuneri Matsuura	
7	20080181240	A1	2008-07-31	Baofeng Jiang et al.	
8	20090028181	A1	2009-01-29	Ben David Shimon	
9	20090245278	A1	2009-10-01	Tommy Wing Chau Kee	
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13	20110058575	A1	2011-03-10	Toshiharu Oshima	
14	20110182182	A1	2011-07-28	Kai-Yu Yang et al.	
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16	20010047406	A1	2001-11-29	Kenneth S. Araujo et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16432364
	Filing Date		2019-06-05
	First Named Inventor	Peter Chow	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	20145-049USC2	

17	20020198952	A1	2002-12-26	Russell W. Bell	
18	20030039240	A1	2003-02-27	Aurja Sutanto	
19	20030145082	A1	2003-07-31	Yong Ho Son	
20	20060164978	A1	2006-07-27	Carl E. Werner	
21	20060218267	A1	2006-09-28	Irfan Z. Khan et al.	
22	20080219168	A1	2008-09-11	Nobuyuki ENOMOTO et al.	
23	20120053901	A1	2012-03-01	Mohammed Arefeen et al.	
24	20150230275	A1	2015-08-13	Kenneth Kerpez et al.	
25	20170111105	A1	2017-04-20	Curtis Ling et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16432364	
	Filing Date		2019-06-05	
	First Named Inventor	Peter Chow		
	Art Unit			
	Examiner Name			
	Attorney Docket Number	20145-049USC2		

	1	101461253	CN	A	2009-06-17		
	2	101690079	CN	A	2010-03-31		
	3	101815000	CN	A	2010-08-25		
	4	2009540671	JP	A	2009-11-19	Adaptive Spectrum and Signal Alignment, Inc.	
	5	2007146048	WO	A1	2007-06-06	Adaptive Spectrum and Signal Alignment, Inc.	
	6	2001205938	JP	A	2001-07-31	Naigai Carbon Ink	
	7	2000020428	JP	A	2000-01-21		

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	1	International Search Report and Written Opinion dated 2011-05-13, in International Patent Application No. PCT/US2011/021003, filed 2011-01-12 (16pgs).	
	2	International Preliminary Report on Patentability dated 2013-07-25, in International Patent Application No. PCT/US2011/021003, filed 2011-01-12 (12pgs).	

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	First Named Inventor	Peter Chow	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	20145-049USC2	

3	Bernstein, Jeff et al., "CPE WAN Management Protocol," Technical Report, Forum TR-069, 2004-05-01 (109pgs).	
4	Office Action dated 2014-08-05, in Japanese Patent Application No. 2013549393 (5pgs).	×
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6	Response as filed 2015-02-04, in Japanese Patent Application No. 2013549393 (30pgs).	☐
7	Response as filed 2015-09-09, in Japanese Patent Application No. 2013549393 (29pgs).	☐
8	Decision of Grant received in Japanese Patent Application No. 2013549393 (3pgs).	☐
9	Office Action dated 2015-04-23, in Chinese Patent Application No. 201180064927.6 (25pgs).	☒
10	Office Action dated 2017-11-02, in Australian Patent Application No. 2016222368 (3pgs).	☐
11	Response filed 2018-02-27, in Australian Patent Application No. 2016222368 (26pgs).	☐
12	Notice of Acceptance for Patent Application dated 2018-03-09, in Australian Patent Application No. 2016222368 (3pgs).	☐
13	Certificate of Grant dated 2018-07-05, in Australian Patent Application No. 2016222368 (1pg).	☐

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	Filing Date		2019-06-05
	First Named Inventor	Peter Chow	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	20145-049USC2	

14	Office Action dated 2016-09-22, in Canadian Patent Application No. 2823295 (3pgs).	☐
15	Response filed 2017-03-21, in Canadian Patent Application No. 2823295 (30pgs).	☐
16	Office Action dated 2017-06-21, in Canadian Patent Application No. 2823295 (5pgs).	☐
17	Office Action dated 2018-07-04, in Canadian Patent Application No. 2823295 (3pgs).	☐
18	Response filed 2019-01-03, in Canadian Patent Application No. 2823295 (53pgs).	☐
19	Response filed 2017-12-21, in Canadian Patent Application No. 2823295 (57pgs).	☐
20	Office Action dated 2018-06-28, in Indian Patent Application No. 4985/CHENP/2013 (7pgs).	☐
21	Response filed 2018-12-28, in Indian Patent Application No. 4985/CHENP/2013 (76pgs).	☐

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EXAMINER SIGNATURE

Examiner Signature	/DUC T DUONG/	Date Considered	10/14/2019
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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		16432364
	Filing Date		2019-06-05
	First Named Inventor	Peter Chow	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	20145-049USC2	

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)	2019-07-23
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.
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.
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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.

~~ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /D.T.D/~~

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 <i>(Use as many sheets as necessary)</i>				Complete if Known	
				Application Number	16/432,364
				Filing Date	2019-06-05
				First Named Inventor	Peter Chow
				Art Unit	2467
				Examiner Name	DUONG, DUC T
Sheet		of	1	Attorney Docket Number	20145-049USC2

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	Notice of Allowance mailed 09/06/2019 in Application No. 2,823,295 [Docket No. 20145-049CA] 1 pg.	

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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

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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.

Electronic Patent Application Fee Transmittal				
Application Number:		16432364		
Filing Date:		05-Jun-2019		
Title of Invention:		SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS		
First Named Inventor/Applicant Name:		Peter Chow		
Filer:		Michael V. North/Domarina Alkhas		
Attorney Docket Number:		20145-049USC2		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description		Fee Code	Quantity	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:	37993144
Application Number:	16432364
International Application Number:	
Confirmation Number:	1021
Title of Invention:	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS
First Named Inventor/Applicant Name:	Peter Chow
Customer Number:	146571
Filer:	Michael V. North/Domarina Alkhas
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-049USC2
Receipt Date:	11-DEC-2019
Filing Date:	05-JUN-2019
Time Stamp:	10:24:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$240
RAM confirmation Number	E2019BAA24316745
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 1.16 (National application filing, search, and examination fees) 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	Transmittal Letter	049USC2_Transmittal.pdf	28716	no	3
			e96b02340ffa66bfe9e22b72d48f02425c6991f0		
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	049USC2_SIDS_SB08b.pdf	322500	no	2
			b9dacdc91098d722bbf4ff6e70212e70cd587179		
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Non Patent Literature	049USC2_SIDS_NPL1.pdf	144715	no	1
			98c48456b6e627889b81629485d0fe91604753a2		
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30989	no	2
			2635577f72a0301aa90e8eb98e9a90cfdcdc189		
Warnings:					
Information:					
Total Files Size (in bytes):			526920		

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. : 16/432,364 Confirmation No.: 1021
Inventor(s) : Peter Chow *et al.*
Filing Date : 2019-06-05
Title : SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND
LAN NETWORK COMMUNICATIONS
Art Unit : 2467
Examiner : DUONG, DUC T
Docket No. : 20145-049USC2
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: December 11, 2019

By: /Domarina Alkhas/
Domarina Alkhas

INFORMATION DISCLOSURE STATEMENT

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

Dear Examiner Duong:

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: December 11, 2019

By: /Michael V. North/
Michael V. North
Reg. No. 46963

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Peter Chow *et al.* Confirmation No.: 1021
Appl. No. : 16/432,264
Filed : June 5, 2019
Title : SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS
Examiner : DUONG, DUC T
Art Unit : 2467
Docket No. : 20145-049USC2
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 to the USPTO 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: January 11, 2020 By: /Domarina Alkhas/
Domarina Alkhas

RESPONSE TO NON-FINAL OFFICE ACTION

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

Examiner Duong:

This paper is responsive to the Non-Final Office Action mailed October 18, 2019, and having a shortened statutory period ending January 18, 2020. 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 **5** of this paper.

**TERMINAL DISCLAIMER TO OBIATE A DOUBLE PATENTING
REJECTION OVER A "PRIOR" PATENT**Docket Number (Optional)
20145-049USC2

In re Application of: ASSIA SPE, LLC

Application No.: 16/432,364

Filed: 06/05/2019

For: : SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS

The owner*, ASSIA SPE, LLC, of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term **prior patent** No. 10,333,819 B2 as the term of said prior patent is defined in 35 U.S.C. 154 and 173, and as the term of said **prior patent** is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 and 173 of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;
is held unenforceable;
is found invalid by a court of competent jurisdiction;
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☒ For submissions on behalf of a business/organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the business/organization.

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.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 72,098

/Xin Dai/
Signature

01/11/2019
Date

Xin Dai
Typed or printed name

520-288-8876
Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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.

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

This collection of information is required by 37 CFR 1.321. 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 Patent Application Fee Transmittal				
Application Number:		16432364		
Filing Date:		05-Jun-2019		
Title of Invention:		SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS		
First Named Inventor/Applicant Name:		Peter Chow		
Filer:		Michael V. North/Domarina Alkhas		
Attorney Docket Number:		20145-049USC2		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
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:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	160	160
Total in USD (\$)				160

Electronic Acknowledgement Receipt	
EFS ID:	38270691
Application Number:	16432364
International Application Number:	
Confirmation Number:	1021
Title of Invention:	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS
First Named Inventor/Applicant Name:	Peter Chow
Customer Number:	146571
Filer:	Michael V. North/Domarina Alkhas
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-049USC2
Receipt Date:	11-JAN-2020
Filing Date:	05-JUN-2019
Time Stamp:	14:08:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$160
RAM confirmation Number	E20201AE08442234
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 1.16 (National application filing, search, and examination fees) 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		049USC2_NFOAR.pdf	59099	yes	7
			2528d7d4b798962a94ddd0116935b99efaa08253		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Applicant Arguments/Remarks Made in an Amendment		5	7	
	Claims		2	4	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
Warnings:					
Information:					
2	Terminal Disclaimer Filed	049USC2_TerminalDisclaimer.pdf	180929	no	2
			061ac73da28e7e7ca24b75313a979b979654fda0		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30842	no	2
			e07ff256ec517b4ab91276b034519ee8aec4076f		
Warnings:					
Information:					
Total Files Size (in bytes):			270870		

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.

Appl. No. : 16/432,364
Docket No. : 20145-049USC2
Office Action Date : October 18, 2019
Response Date : January 11, 2020

REMARKS/ARGUMENTS

In the Non-Final Office Action (hereinafter, "Office Action"), mailed October 18, 2019, claims 1-8 are rejected. In this response, claims 1, 5-6, and 8 is amended; no claims are cancelled and no claims are added. Following entry of this response, claims 1-8 will be pending in the application.

Claim Rejections

I. Double Patenting

In the Office Action, the Examiner states that "*Claims 1 and 8 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1 and 7 of U.S. Patent No. 10,333,819 B2. Although the claims at issue are not identical, they are not patentably distinct from each other because the application's claims 1 and 8 merely broaden the scope of the patented claims 1 and 7 by excluding certain limitations of the parent claim. The application's claims are nearly identical in every other aspect to the patented claims.*"

A terminal disclaimer is filed together with this response to overcome the rejection based on nonstatutory double patenting.

Therefore, Applicant respectfully requests withdrawn of the rejection on the ground of nonstatutory double patenting.

II. Rejection of Claims under pre-AIA 35USC § 112

In the Office Action, the Examiner states that "*Claim 1-8 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 limitations "collection module", "analysis module", "implementation module", and "collection module" invoke 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph.*"

Applicant has amended the claim for further clarifications, and respectfully requests withdrawn of the rejections in view of the claim amendments.

Appl. No. : 16/432,364
Docket No. : 20145-049USC2
Office Action Date : October 18, 2019
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Specifically, the terms in the claims “collection module”, “analysis module”, and “implementation module” are amended into “collection logic”, “analysis logic”, and “implementation logic”. respectively.

Applicant respectfully asserts that the amended terms distinctly claim the subject matter and are fully supported by the description of the specification, including but not limited to the following exemplary excerpts.

For example, [0022] discloses that *“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.”* (Emphasis added)

[0106] discloses that *“At block 632, **processing logic collects WAN information from the WAN and LAN information from the LAN.** At block 634, **processing logic jointly analyzes the collected WAN information and the collected LAN information** to identify an operational condition and at block 636, processing logic initiates a management event responsive to the operational condition being identified.”* (Emphasis added)

[0095] discloses that *“In one embodiment, system 500 includes a memory 595 and a processor or processors 590. For example, memory 595 may store instructions to be executed and processor(s) 590 may execute such instructions. Processor(s) 590 may also implement or execute implementing logic 560 having logic to implement the methodologies discussed herein...”* (Emphasis added)

Furthermore, Applicant would like to emphasize that the amended terms “collection logic”, “analysis logic”, and “implementation logic” are included in the claims of the allowed U.S. patent No. 10,333,819 B2, to which the present patent application claims priority. Specifically, in U.S. patent No. 10,333,819 B2, claim 1 recites collection logic and analysis logic, and claim 2 recites an implementation logic. Applicant therefore assumes that the

Appl. No. : 16/432,364
Docket No. : 20145-049USC2
Office Action Date : October 18, 2019
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Examiner agrees that those terms distinctly claim the subject matter and are fully supported by the description of the specification.

Based on at least the aforementioned remarks, Applicant respectfully requests the withdrawn of the rejection under 35 U.S.C. 112.

Allowable Subject Matter

In the Office Action, the Examiner states that *“Claim 1 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), 2nd paragraph, set forth in this Office action.”*

Applicant thanks the Examiner for noticing the allowability of the claim 1 and has amended the claims accordingly as shown in the aforementioned amendments and remarks under the section above.

Therefore, in view of the claim amendments, Applicant respectfully request allowance of the amended claims.

CONCLUSION

In view of the above arguments, Applicant believes that pending claims 1-8 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: January 11, 2020

By: /Xin Dai/
Xin Dai, Ph.D.
Reg. No. 72,098

Appl. No. : 16/432,364
Docket No. : 20145-049USC2
Office Action Date : October 18, 2019
Response Date : January 11, 2020

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:

1. (Currently Amended) A management device, comprising:
 - a Local Area Network (LAN) interface to communicably interface the management device with a LAN;
 - a Wide Area Network (WAN) interface to communicably interface the management device with a WAN, wherein the WAN is to provide broadband connectivity to the LAN;
 - a collection ~~module~~ logic to collect WAN information from one or more communication layers on the WAN; and
 - an analysis ~~module~~ logic to identify an operational condition within the LAN in a different communication layer from the one or more communication layers on the WAN by analyzing at least the collected WAN information.
2. (Original) The management device of claim 1 wherein the one or more communication layers on the WAN and the different communication layer in the LAN are layers of Open Systems Interconnection (OSI) model.
3. (Original) The management device of claim 1 wherein the one or more communication layers on the WAN and the different communication layer in the LAN are layers of TCP/IP model.
4. (Original) The management device of claim 1 wherein the collected WAN information comprises a neighborhood analysis relating to internet connectivity provided by the WAN to a plurality of other LANs.

Appl. No. : 16/432,364
Docket No. : 20145-049USC2
Office Action Date : October 18, 2019
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5. (Currently Amended) The management device of claim 4 further comprises an implementation ~~module~~ logic to initiate a management event responsive to the operational condition being identified, the management event comprises instructions to change a configuration of the LAN device based on the neighborhood analysis.
6. (Currently Amended) The management device of claim 2 wherein the collection ~~module~~ logic further collects LAN information from one or more communication layers on the LAN for jointly analyzing the collected WAN information and the collected LAN information, the one or more communication layers on the LAN are distinct from the one or more communication layers on the WAN.
7. (Original) The management device of claim 6, wherein the operational condition within the LAN identified based on the joint analysis comprises at least one of:
 - network congestion within the LAN;
 - excess power consumption by communication elements within the LAN;
 - a security breach within the LAN; or
 - a network intrusion within the LAN.
8. (Currently Amended) The management device of claim 1, wherein the collection ~~module~~ logic is to collect the WAN information and the LAN information from one or more sources including:
 - 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;

Appl. No. : 16/432,364
Docket No. : 20145-049USC2
Office Action Date : October 18, 2019
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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 WiFi compatible base station;

a wireless mobile device repeater;

a wireless mobile device base station;

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; or

an Ethernet connected network switch.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 16/432,364		Filing Date 06/05/2019		☐ To be Mailed			
ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO											
APPLICATION AS FILED - PART I											
		(Column 1)	(Column 2)								
FOR		NUMBER FILED	NUMBER EXTRA	RATE (\$)		FEE (\$)					
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A	N/A	N/A							
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))		N/A	N/A	N/A							
☐ 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 \$100 =							
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =	*	x \$460 =							
☐ 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).									
☐ 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	01/12/2020	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)				
	Total (37 CFR 1.16(i))	* 8	Minus ** 20	= 0	x \$100 =		0				
	Independent (37 CFR 1.16(h))	* 1	Minus *** 3	= 0	x \$460 =		0				
	☐ Application Size Fee (37 CFR 1.16(s))										
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
						TOTAL ADD'L FEE		0			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)				
	Total (37 CFR 1.16(i))	*	Minus **	=	x \$0 =						
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x \$0 =						
	☐ Application Size Fee (37 CFR 1.16(s))										
☐ 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.						LIE					
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".						/LASHAWN A HINTON/					
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".											
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.											

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

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

Application Number * 16/432,364 *	Application/Control No. 16/432,364	Applicant(s)/Patent under Reexamination Chow et al.	
	Examiner DUONG, DUC T	Art Unit 2467	
Document Code - DISQ		Internal Document - DO NOT MAIL	

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed: <u>11 January 2020</u>	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:
/CHARRISSA S BROWN/ Technology Center: PLRC Telephone: (571)272-1558



UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

146571 7590 04/16/2020
North Weber & Baugh LLP - ASSIA
3260 Hillview Avenue, 1st Floor
Palo Alto, CA 94304

EXAMINER

DUONG, DUC T

ART UNIT

PAPER NUMBER

2467

DATE MAILED: 04/16/2020

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/432,364	06/05/2019	Peter Chow	20145-049USC2	1021

TITLE OF INVENTION: SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0.00	\$0.00	\$1000	07/16/2020

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

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)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

146571 7590 04/16/2020
North Weber & Baugh LLP - ASSIA
3260 Hillview Avenue, 1st Floor
Palo Alto, CA 94304

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/432,364	06/05/2019	Peter Chow	20145-049USC2	1021

TITLE OF INVENTION: SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0.00	\$0.00	\$1000	07/16/2020

EXAMINER	ART UNIT	CLASS-SUBCLASS
DUONG, DUC T	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 _____

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document 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

4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. Change in Entity Status (from status indicated above)

☐ 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. _____



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/432,364	06/05/2019	Peter Chow	20145-049USC2	1021
146571 7590 04/16/2020 North Weber & Baugh LLP - ASSIA 3260 Hillview Avenue, 1st Floor Palo Alto, CA 94304			EXAMINER DUONG, DUC T	
			ART UNIT 2467	PAPER NUMBER
DATE MAILED: 04/16/2020				

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. 16/432,364	Applicant(s) Chow et al.	
	Examiner Duc T Duong	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 amendment filed 1/11/20.
☐ 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 1-8 . 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)	5. ☒ Examiner's Amendment/Comment
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.	7. ☐ Other _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.	

/DUC T DUONG/ Primary Examiner, Art Unit 2467	
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DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Terminal Disclaimer

2. The terminal disclaimer filed on January 11, 2020 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US Patent 10,333,819 B2 has been reviewed and is accepted. The terminal disclaimer has been recorded.

EXAMINER'S AMENDMENT

3. Authorization for this examiner's amendment was given in an interview with Xin Dai on April 7, 2010.

The application has been amended as follows:

Claim 1 is amended as follows:

--1. A management device, comprising:

a Local Area Network (LAN) interface to communicably interface the management device with a LAN;

a Wide Area Network (WAN) interface to communicably interface the management device with a WAN, wherein the WAN is to provide broadband connectivity to the LAN;

one or more processors; and

a memory storing machine-executable instructions, when executed by the one or more processors, configured to:

~~a collection module logic to collect WAN information from one or more communication layers on the WAN; and~~

~~an analysis module logic to identify an operational condition within the LAN in a different communication layer from the one or more communication layers on the WAN by analyzing at least the collected WAN information.--~~

The examiner's amendment above was made to not invokes 35 U.S.C 112(f) and placed the claim in condition of allowance.

Allowable Subject Matter

4. Claims 1-8 are allowed.

The following is an examiner's statement of reasons for allowance: The prior art of record fails to teach or make obvious **"to identify an operational condition within the LAN in a different communication layer from the one or more communication layers on the WAN by analyzing at least the collected WAN information"**, when the identify is considered within the specific structure of the device recited in claim 1.

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 Duc T Duong whose telephone number is (571)272-3122. The examiner can normally be reached on Mon-Fri; 9am-6pm.

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 Phillips can be reached on (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.

/DUC T DUONG/
Primary Examiner, Art Unit 2467

<i>Notice of References Cited</i>	Application/Control No. 16/432,364		Applicant(s)/Patent Under Reexamination Chow et al.	
	Examiner Duc T Duong		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-20020055988-A1	05-2002	CROOKS, BARRY MCKAY	H04L12/2854	709/220
*	B	US-6859452-B1	02-2005	Crooks; Barry McKay	H04L12/4608	370/355
*	C	US-7672319-B1	03-2010	Heath; Jonathan William	H04L12/4625	370/401
*	D	US-20080159124-A1	07-2008	Sasaki; Takanori	H04L12/2856	370/217
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

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

*		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.

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)

Notice of References Cited

Part of Paper No. 20200410

Issue Classification 	Application/Control No. 16/432,364	Applicant(s)/Patent Under Reexamination Chow et al.
	Examiner Duc T Duong	Art Unit 2467

CPC						
Symbol					Type	Version
H04L	/	43	/	50	F	2013-01-01
H04L	/	41	/	083	I	2013-01-01
H04L	/	41	/	0896	I	2013-01-01
H04L	/	41	/	26	I	2013-01-01
H04L	/	43	/	0829	I	2013-01-01
H04L	/	43	/	0888	I	2013-01-01
H04L	/	43	/	16	A	2013-01-01
Y04S	/	40	/	162	A	2013-01-01
Y04S	/	40	/	168	A	2013-01-01

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version
/				

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 8	
/DUC T DUONG/ Primary Examiner, Art Unit 2467 (Primary Examiner) _____ (Date) _____		10 April 2020 O.G. Print Claim(s) 1	O.G. Print Figure 2

U.S. Patent and Trademark Office

Part of Paper No.: 20200410

Issue Classification 	Application/Control No. 16/432,364	Applicant(s)/Patent Under Reexamination Chow et al.
	Examiner Duc T Duong	Art Unit 2467

INTERNATIONAL CLASSIFICATION			
CLAIMED			
H04L		12	24
H04L		12	26

NON-CLAIMED			

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE (Assistant Examiner)		Total Claims Allowed: 8	
/DUC T DUONG/ Primary Examiner, Art Unit 2467 (Primary Examiner)		10 April 2020 (Date)	O.G. Print Claim(s) 1
			O.G. Print Figure 2

Issue Classification 	Application/Control No. 16/432,364	Applicant(s)/Patent Under Reexamination Chow et al.
	Examiner Duc T Duong	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	Final
	1															
	2															
	3															
	4															
	5															
	6															
	7															
	8															

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 8	
/DUC T DUONG/ Primary Examiner, Art Unit 2467 (Primary Examiner) _____ (Date) 10 April 2020		O.G. Print Claim(s) 1	O.G. Print Figure 2

<i>Search Notes</i> 	Application/Control No. 16/432,364	Applicant(s)/Patent Under Reexamination Chow et al.
	Examiner Duc T Duong	Art Unit 2467

CPC - Searched*		
Symbol	Date	Examiner
See CPC search printout	04/10/2020	DTD

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
East text	04/10/2020	DTD
Inventor name	04/10/2020	DTD
Updated H04L41/04,H04L41/06,H04L41/0604,H04L41/0631,H04L41/0677,H04L41/0695,H04L41/08,H04L41/085,H04L41/0853,H04L41/0856,H04L41/0859 (text search)	04/10/2020	DTD
Updated H04L43/10,H04L43/12,H04L43/50 (text search)	04/10/2020	DTD

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	See interference search printout	04/10/2020	DTD

/DUC T DUONG/ 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
S1	4820	(monitor\$3 or detect\$3 or determin\$3) with lan with wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:25
S2	355	(monitor\$3 or detect\$3 or determin\$3 or identify) with lan with wan with (condition or status or state)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:27
S3	278	S2 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:28
S4	93	S3 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:28
S5	6865	(collect\$3 or snoop\$3 or sniff\$) with lan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:34
S6	3248	(collect\$3 or snoop\$3 or sniff\$) with wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:34
S7	2272	S5 and S6	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:34
S8	175	S7 and (dsl or adsl)	US-PGPUB; USPAT;	OR	ON	2015/04/27 15:34

			EPO; DERWENT			
S9	150	S8 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:34
S10	2423	(lan adj2 (interface or port)) same (wan adj2 (interface or port))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:36
S11	730	S10 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:36
S12	348	S11 and ((monitor\$3 or detect\$3 or determin\$3 or identify) with (condition or status or state))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:36
S13	312	S12 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:36
S14	1937247	(monitor\$3 or detect\$3 or determin\$3 or identify) near5 (condition or status or state or failure or fault\$2 or congestion)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:50
S15	41	S10 same S14	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:51
S16	16	S15 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 15:51
S17	8	S16 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT;	OR	ON	2015/04/27 15:51

			EPO; DERWENT			
S18	255	(monitor\$3 or detect\$3 or determin\$3 or identify) near5 (condition or status or state or failure or fault\$2 or congestion) with lan near5 wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:14
S19	43	S18 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:15
S20	35	S19 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:15
S21	802	(lan adj2 (interface or port or connection or connector)) same (wan adj2 (interface or port or connection or connector)) same (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:26
S22	673	S21 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:27
S23	172	S22 and "370"/\$.ccls.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:27
S24	712	(monitor\$3 or detect\$3 or determin\$3 or identify) near5 (condition or status or state or failure or fault\$2 or congestion or performance) with (lan or ethernet) with (internet or wan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:35
S25	167	S24 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:35

S26	79	S25 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:35
S27	544	S24 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:41
S28	111	S27 and "370"/\$.ccls.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:43
S29	1226	(management or gateway) same ((lan or ethernet) adj2 (interface or port or connection or connector)) same (wan adj2 (interface or port or connection or connector))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:46
S30	540	S29 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:46
S31	491	S30 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 16:46
S32	130	(monitor\$3 or detect\$3 or determin\$3 or identify) near5 (condition or status or state or failure or fail\$4 or fault\$2 or congestion or performance) same ((lan or ethernet) adj2 (interface or port or connection or connector)) with ((internet or wan) adj2 (interface or port or connection or connector))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 17:27
S33	106	S32 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 17:27

S34	7	"2007146048"	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 17:50
S35	250	(monitor\$3 or detect\$3 or determin\$3 or identify) with ((lan or ethernet) adj2 (interface or port)) with ((internet or wan) adj2 (interface or port))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 17:55
S36	209	S35 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 17:55
S37	674	(failure or fail\$4 or fault\$2 or congest\$3) with (lan or ethernet or rj\$145) with (wan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 18:24
S38	674	(failure or fail\$4 or fault\$2 or congest\$3) with (lan or ethernet or rj\$145) with (wan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 19:43
S39	582	S38 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 19:44
S40	55	S39 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 19:44
S41	4408	(monitor\$3 or measur\$3 or analyz\$3) with (lan or ethernet or rj\$145) with (wan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 20:00
S42	158	(monitor\$3 or measur\$3 or analyz\$3) with (lan or ethernet or rj45 or rj-45) with (wan) with performance	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 20:01

S43	171	(monitor\$3 or measur\$3 or analyz\$3 or determin\$3) with (lan or ethernet or rj45 or rj-45) with (wan) with performance	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 20:01
S44	145	S43 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/27 20:01
S45	3680	(monitor\$3 or detect\$3 or determin\$3 or identify or analyz\$3) near5 (condition or status or state or failure or fail\$4 or fault\$2 or congestion or performance) near5 (lan or ethernet)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:43
S46	159	S45 same (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:44
S47	153	S46 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:44
S48	8955	(collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:46
S49	143	S48 same (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:46
S50	130	S49 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:46
S51	8571	manag\$5 near3 lan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:56

S52	64	S51 same (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:56
S53	51	S52 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 08:56
S54	10593	((lan or ethernet or rj45 or rj-45) adj2 (interface or port or connection)) same ((wan or internet) adj2 (interface or port or connection))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:08
S55	522	S54 same (collect\$3 or snoop\$3 or sniff\$ or analyz\$3)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:09
S56	423	S55 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:09
S57	376	S54 same (collect\$3)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:10
S58	313	S57 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:10
S59	6482	(collect\$3 with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:33
S60	410	S59 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:34

S61	358	S60 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:34
S62	2100	(collect\$3 with lan with wan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:37
S63	157	S62 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:37
S64	134	S63 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/04/29 09:37
S65	10608	((lan or ethernet or rj45 or rj-45) adj2 (interface or port or connection)) same ((wan or internet) adj2 (interface or port or connection))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:53
S66	522	S65 same (collect\$3 or snoop\$3 or sniff\$ or analyz\$3)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:53
S67	423	S66 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:53
S68	468	h04l41/04.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:57
S69	0	S67 and S68	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:57

S70	2633	h04l41/06.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:57
S71	1	S67 and S70	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:57
S72	436	h04l41/0604.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:58
S73	11	S72 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:58
S74	1193	h04l41/0631.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:59
S75	0	S67 and S74	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:59
S76	38	S74 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:59
S77	941	h04l41/0677.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:59
S78	11	S77 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:59

S79	120	h04l41/0695.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 22:59
S80	0	S79 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:00
S81	1200	h04l41/08.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:00
S82	11	S81 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:00
S83	354	h04l41/085.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:00
S84	4	S83 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:00
S85	1493	h04l41/0853.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:00
S86	41	S85 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:00
S87	1384	h04l41/0856.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:01

S88	41	S87 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:01
S89	214	h04l41/0859.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:01
S90	3	S89 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:01
S91	1831	h04l43/04.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:02
S92	87	S91 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:03
S93	3292	h04l43/10.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:03
S94	127	S93 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:03
S95	53	S94 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:03
S96	1796	h04l43/12.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:03

S97	48	S96 and ((collect\$3 or snoop\$3 or sniff\$3 or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:03
S98	5460	h04l43/50.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:04
S99	60	S98 and ((collect\$3 or snoop\$3 or sniff\$3 or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:04
S100	140	(peter near2 chow).inv.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:04
S101	2	S100 and (lan and wan and manag\$5 and condition).clm.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:05
S102	81	(rhee near2 wonjong).inv.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:05
S103	2	S102 and (lan and wan and manag\$5 and condition).clm.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:05
S104	39	(tehrani near2 ardavan).inv.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:05
S105	2	S104 and (lan and wan and manag\$5 and condition).clm.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:05

S106	29	(goldburg near2 marc).inv.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:06
S107	2	S106 and (lan and wan and manag\$5 and condition).clm.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2015/05/03 23:06
S108	6257	h04l43/50.cpc.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:35
S109	69	S108 and ((collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with lan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:35
S110	2369	(collect\$3 with lan with wan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:41
S111	181	S110 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:41
S112	136	S111 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:41
S113	3030	(collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with ((wan or internet or ip) adj2 (connection or interface))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:47
S114	702	(collect\$3 or snoop\$3 or sniff\$ or analyz\$3) with ((lan) adj2 (connection or interface))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:48

S115	188	S113 and S114	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:48
S116	167	S115 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 17:48
S117	2	"20140321298"	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/01/08 18:11
S121	2699	(collect\$3 with lan with wan)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:48
S122	197	S121 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:48
S123	136	S122 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:48
S124	2	"9,369,370"	US-PGPUB; USPAT; FPRS	OR	ON	2016/09/19 03:49
S125	7981	(collect\$3 or snoop\$3 or sniff\$3) with lan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:51
S126	2998	S125 same wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:51

S127	231	S126 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:51
S128	166	S127 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:51
S129	5718	(fault\$3 or fail\$4) with lan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:53
S130	690	S129 same wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:53
S131	102	S130 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:53
S132	73	S131 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:53
S133	2329	(diagnostic or diagnos\$3) with lan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:58
S134	630	S133 same wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:59
S135	70	S134 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:59

S136	49	S135 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2016/09/19 03:59
S137	7530	(collect\$3 or snoop\$3 or sniff\$3 or monitor\$3) with lan with wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:31
S138	1167	S137 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:31
S139	763	S138 and (diagnostic or failure or fault\$2 or congestion)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:32
S140	556	S139 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:32
S141	3996	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing) with lan with wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:35
S142	354	S141 and (dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:36
S143	239	S142 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:36
S144	243	lan with wan with backhaul	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 16:44

S145	175	S144 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:44
S146	17056	lan with wan same dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 16:45
S147	983	lan same (internet or wan (ip adj2 network)) same backhaul	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 16:47
S148	457	S147 and dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 16:47
S149	377	S148 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 16:47
S150	359	lan with (interface or connect\$3 or couple\$1) with (internet or wan (ip adj2 network)) same backhaul	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 17:03
S151	187	S150 and dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 17:03
S152	13421	lan with (interface or connect\$5 or couple\$1) with (internet or wan (ip adj2 network)) same dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 17:20
S153	3996	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing) with lan with wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 17:22
S154	123	S152 and S153	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 17:22
S155	84	S154 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT;	OR	ON	2017/06/09 17:23

			EPO; DERWENT			
S156	564	lan same wan same backhaul	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 18:54
S157	56	lan same wan same backhaul same dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 18:54
S158	12990	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing) with lan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 18:58
S159	6366	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing) with wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 18:58
S160	4249	S158 and S159	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 18:58
S161	352	S160 and dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 18:58
S162	240	S161 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 18:59
S163	4862	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3) with lan near5 (interface or port or media or medium or connection)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 19:05
S164	1914	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3) with wan near5 (interface or port or media or medium or connection)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 19:05

S165	887	S163 and S164	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:06
S166	629	S165 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:06
S167	449	S166 and (fault\$3 or fail\$4)	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:07
S168	8215	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3) with lan with wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 19:19
S169	131	S168 same (fault\$3 or fail\$4)	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:19
S170	87	S169 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:19
S171	14499	(manag\$5 or provision\$3 or optimiz\$3 or monitor\$3) with lan with wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 19:28
S172	6855	S171 and (fault\$3 or fail\$4)	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:28
S173	1242	S172 and dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:28
S174	909	S173 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:29
S175	991	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3) with lan with wan	US-PGPUB; USPAT;	OR	ON	2017/06/09 19:30

		near5 (interface or port or media or medium or connection)	EPO; DERWENT			
S176	27	S175 same (fault\$3 or fail\$4)	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:31
S177	1427	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3) with lan with (internet or wan or broad\$1band) near5 (interface or port or media or medium or connection)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/09 19:33
S178	48	S177 same (fault\$3 or fail\$4)	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:33
S179	32	S178 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/09 19:33
S180	3000	lan with (interface or connect\$5 or couple\$1) with wan with dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/11 00:56
S181	2347544	(monitor\$3 or detect\$3 or determin\$3 or identify) near5 (condition or status or state or failure or fault\$2 or congestion)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/11 00:58
S182	1223	S180 and S181	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/11 00:58
S183	907	S182 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/11 00:59
S184	5107	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3 or meter\$3) with lan near5 (interface or port or media or medium or connection)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/11 01:00

S185	2174	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3 or meter\$3) with wan near5 (interface or port or media or medium or connection)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/11 01:01
S186	1074	S184 and S185	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/11 01:01
S187	301	S186 and dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/11 01:03
S188	259	S187 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/11 01:03
S189	234	S188 and (fault or fail\$3)	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/11 01:03
S190	424	(fault or fail\$3) with lan with wan	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/11 01:05
S191	323	S190 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2017/06/11 01:05
S192	30	(back\$1haul near5 wan) same lan same dsl	US-PGPUB; USPAT; FPRS	OR	ON	2017/06/11 01:15
S193	2	"20060164978"	US-PGPUB; USPAT; FPRS	OR	ON	2017/09/26 13:03
S194	1	"20160294669"	US-PGPUB; USPAT; FPRS	OR	ON	2017/09/26 16:18

S195	1951	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3 or meter\$3 or monitor\$3 or analy\$5) with (from or between) with wan with lan	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:35
S196	228	S195 and (dsl or adsl)	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:35
S197	154	S196 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:35
S198	1378	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3 or meter\$3 or monitor\$3 or analy\$5) with (data or information or traffic or packet) with (from or between) with wan with lan	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:37
S199	116	S198 and (dsl or adsl or (digital adj2 line))	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:40
S200	64	S199 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:40
S201	5127	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or probe or probing or monitor\$3 or meter\$3 or monitor\$3 or analy\$5) with (data or information or traffic or packet) with wan with lan	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:41
S202	646	S201 and (dsl or adsl or (digital adj2 line))	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:42
S203	374	S202 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/02/03 23:42

S206	1	"20190288932"	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 13:36
S207	3	"10,333,819"	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 13:40
S208	5462	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3) with (data or information or traffic or packet) with wan	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 13:46
S209	263	S208 same layer	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 13:47
S210	157	S209 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 13:47
S211	70	S208 same (lan near5 (status or state or condition or configur\$5))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 14:12
S212	19	S211 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 14:12
S213	428	S208 same (lan with (status or state or condition or configur\$5))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 14:32
S214	436	S208 same ((lan or ethernet) with (status or state or condition or configur\$5))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 14:48
S215	120	S214 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 14:48
S216	170	S208 same ((lan or ethernet) with (analy\$4 or diagnos\$5))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 14:55

S217	94	S216 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 14:56
S218	7688	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3) with (data or information or traffic or packet) with (wan or dsl or adsl)	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:00
S219	299	S218 same ((lan or ethernet) with (analy\$4 or diagnos\$5 or optimiz\$5 or perform\$3))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:01
S220	138	S219 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:01
S221	45	S219 same ((lan or ethernet) near5 (status or state or condition or configur\$6 or statistic or parameter or performance))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:16
S222	17	S221 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:16
S223	826	(data or information or traffic or packet) near5 (wan or dsl or adsl) with ((lan or ethernet) near5 (status or state or condition or configur\$6 or statistic or parameter or performance))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:46
S224	45	((data or information or traffic or packet) near5 (wan or dsl or adsl) near5 (collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3)) with ((lan or ethernet) near5 (status or state or condition or configur\$6 or statistic or parameter or performance))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:48
S225	13	S224 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:50

S226	499	(data or information or traffic or packet) near5 (wan or dsl or adsl) with ((lan or ethernet) near5 (analy\$4 or diagnos\$5 or optimiz\$5 or perform\$3))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:51
S227	249	S226 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:52
S228	215	((data or information or traffic or packet) near5 (wan or dsl or adsl) near5 (receiv\$3 or collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3)) same ((lan or ethernet) near5 (analy\$4 or diagnos\$5 or optimiz\$5 or perform\$3))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:54
S229	99	S228 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 15:55
S230	313	((data or information or traffic or packet) near5 (wan or dsl or adsl) near5 (receiv\$3 or collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3)) same ((lan or vlan or ethernet) near5 (status or state or condition or configur\$6 or statistic or parameter or performance))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 16:29
S231	195	S230 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 16:31
S232	55	((data or information or traffic or packet) near5 (wan or dsl or adsl) near5 (receiv\$3 or collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3)) same ((lan or vlan or ethernet) near5 (status or state or condition or fault\$3 or fail\$4))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 16:48
S233	17	S232 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/14 16:53

S234	55	((data or information or traffic or packet) near5 (wan or dsl or adsl) near5 (receiv\$3 or collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3)) same ((lan or vlan or ethernet) near5 (status or state or condition or fault\$3 or fail\$4))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/23 14:18
S235	17	S234 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/23 14:18
S236	314	((data or information or traffic or packet) near5 (wan or dsl or adsl) near5 (receiv\$3 or collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3)) same ((lan or vlan or ethernet) near5 (status or state or condition or configur\$6 or statistic or parameter or performance))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/23 14:24
S237	195	S236 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/23 14:24
S238	45	((data or information or traffic or packet) near5 (wan or dsl or adsl) near5 (collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3)) with ((lan or ethernet) near5 (status or state or condition or configur\$6 or statistic or parameter or performance))	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/23 14:31
S239	13	S238 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/23 14:31
S240	2	"20140146721"	US-PGPUB; USPAT; FPRS	OR	ON	2019/10/23 14:32
S241	1199	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3) near5 (data or information or traffic or packet) near5 wan	US-PGPUB; USPAT; FPRS	OR	ON	2020/04/09 10:47

S242	11	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3) near5 (data or information or traffic or packet) near5 layer near5 wan	US-PGPUB; USPAT; FPRS	OR	ON	2020/04/09 10:48
S243	2168	(collect\$3 or snoop\$3 or sniff\$3 or gather\$3 or aggregat\$3 or meter\$3) near5 (data or information or traffic or packet) near5 (wan dsl or adsl)	US-PGPUB; USPAT; FPRS	OR	ON	2020/04/09 10:52
S244	4193	(monitor\$3 or detect\$3 or determin\$3 or identify) near5 (condition or status or state or failure or fault\$2 or congestion) near5 (lan or ethernet)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2020/04/09 10:52
S245	36	S243 and S244	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2020/04/09 10:53
S246	8	S245 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2020/04/09 10:54
S247	1749	(analy\$4 or diagnos\$5 or optimiz\$5 or perform\$3) with (together or joint\$2 or combin\$5) with (lan or ethernet) with (wan or dsl or adsl)	US-PGPUB; USPAT; FPRS	OR	ON	2020/04/10 13:25
S248	564	S247 and (osi or layer)	US-PGPUB; USPAT; FPRS	OR	ON	2020/04/10 13:26
S249	278	S248 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2020/04/10 13:27
S250	5040	(manag\$5 or provision\$3 or optimiz\$3 or monitor\$3 or gather\$3 or analyz\$3 or inspect\$3 or snoop\$3 or sniff\$3) with (lan or ethernet) with (wan or dsl or adsl) with (traffic or flow or packet or information)	US-PGPUB; USPAT; FPRS	OR	ON	2020/04/10 13:55

S251	4564	(monitor\$3 or detect\$3 or determin\$3 or identify) near5 (condition or status or state or failure or fault\$2 or congestion or event) near5 (lan or ethernet)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2020/04/10 13:59
S252	127	S250 and S251	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2020/04/10 14:00
S253	81	S252 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2020/04/10 14:00
S254	4	(monitor\$3 or detect\$3 or determin\$3 or identify) near5 (condition or status or state or failure or fault\$2 or congestion or event) near5 (lan or ethernet) with layer with wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2020/04/10 14:31
S255	269	(monitor\$3 or detect\$3 or determin\$3 or identify) with (lan or ethernet) with layer with wan	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2020/04/10 15:10
S256	6	(monitor\$3 or detect\$3 or determin\$3 or identify) with (lan or ethernet) with (differen\$2 or separat\$3) with layer with (wan or dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2020/04/10 15:15
S257	31	(manag\$5 or provision\$3 or optimiz\$3 or monitor\$3 or gather\$3 or analyz\$3 or inspect\$3 or snoop\$3 or sniff\$3) with (lan or ethernet) with (differen\$2 or separat\$3) with layer with (wan or dsl or adsl)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2020/04/10 15:16
S258	26	S257 and (@ad<"20110112" or @rlad<"20110112")	US-PGPUB; USPAT; FPRS	OR	ON	2020/04/10 15:18

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S118	0	((lan adj2 interface) and (wan adj2 interface) and event and collect\$3 and condition).clm.	USPAT	OR	ON	2016/01/08 18:18
S119	0	((lan adj2 interface) and (wan adj2 interface) and event and collect\$3).clm.	USPAT	OR	ON	2016/01/08 18:19
S120	8	((lan adj2 interface) and (wan adj2 interface) and event).clm.	US-PGPUB; USPAT	OR	ON	2016/01/08 18:19
S204	25	((lan adj2 interface) and (wan adj2 interface) and condition).clm.	US-PGPUB; USPAT	OR	ON	2019/02/04 10:07
S205	7	((lan adj2 interface) and (wan adj2 interface) and condition and dsl).clm.	US-PGPUB; USPAT	OR	ON	2019/02/04 10:07
S259	14	((lan adj2 interface) and (wan adj2 interface) and condition and layer).clm.	US-PGPUB; USPAT	OR	ON	2020/04/10 14:32

4/10/2020 3:20:06 PM

C:\Users\dduong\Documents\EAST\Workspaces\16432364.wsp

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:

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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.

Document Description: Issue Fee Payment (PTO-85B)

Issue Fee Transmittal Form

Application Number	Filing Date	First Named Inventor	Atty. Docket No.	Confirmation No.
16432364	05-Jun-2019	Peter Chow	20145-049USC2	1021

TITLE OF INVENTION :

SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS

Entity Status	Application Type	Art Unit	Class - Subclass	EXAMINER
Regular Undiscounted	Utility under 35 USC 111(a)	2467	252000	DUC DUONG
Issue Fee Due	Publication Due	Total Fee(s) Due	Date Due	Prev. Paid Fee
\$1000	\$0	\$1000	16-Jul-2020	\$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~~	
☐ Change of correspondence address requested, system generated AIA/122-EFS form attached	☐ 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 & Baugh LLP

2.

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	07-16-2020
Name	Michael V. North	Registration Number	46963

Electronic Patent Application Fee Transmittal				
Application Number:		16432364		
Filing Date:		05-Jun-2019		
Title of Invention:		SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS		
First Named Inventor/Applicant Name:		Peter Chow		
Filer:		Michael V. North/Domarina Alkhas		
Attorney Docket Number:		20145-049USC2		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY APPL ISSUE FEE	1501	1	1000	1000
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 (\$)				1000

Electronic Acknowledgement Receipt	
EFS ID:	40016326
Application Number:	16432364
International Application Number:	
Confirmation Number:	1021
Title of Invention:	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS
First Named Inventor/Applicant Name:	Peter Chow
Customer Number:	146571
Filer:	Michael V. North/Domarina Alkhas
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-049USC2
Receipt Date:	16-JUL-2020
Filing Date:	05-JUN-2019
Time Stamp:	09:52:48
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$1000
RAM confirmation Number	E20207F052458736
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 1.20 (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	46175	no	2
			727f8f69cd084388cc1d923c0aena976b35efcf7		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32238	no	2
			9689eac637ade237133f8aff6d420dcf4ecad416		
Warnings:					
Information:					
Total Files Size (in bytes):			78413		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/432,364	08/25/2020	10757003	20145-049USC2	1021

146571 7590 08/05/2020

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 0 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):

Peter Chow, Los Altos, CA;
ASSIA SPE, LLC, Wilmington, DE
Wonjong Rhee, San Francisco, CA;
Ardavan Maleki Tehrani, Atherton, CA;
Marc Goldburg, Redwood City, CA;

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Electronically Filed 10/4/2020

PETITION FOR CERTIFICATE OF CORRECTION Address to: Mail Stop Certificate of Correction Branch Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450	Attorney Docket	20145-049USC2
	First Named Inventor	Peter Chow
	Patent Number	10,757,003 B2
	Issue Date	August 25, 2020
	Application Number	16/432,364
	Filing Date	2019-06-05
	Title:	"SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS"

Commissioner:

Transmitted herewith for filing is a Certificate of Correction for the above-identified patent. Please correct Claim 1 as indicated in the enclosed Certificate of Correction. Applicants respectfully request that the following corrections be made:

The following text should replace Claim 1 at column 28, lines 5 and 6:

-- In the Claims:

At Column 28 line 5 and 6, Claim 1, "one or more processors; and processors, configured to:" should read -- one or more processors; and

a memory storing machine-executable instructions, when executed by the one or more processors, configured to; --

It is believed that no fee is due since the error was made by the Patent and Trademark Office. However, the Commissioner is hereby authorized to charge any fees which may be due, and to credit any overpayment of fees, to Deposit Account No. 50-2776.

Respectfully submitted,

Date: October 4, 2020

By: / Michael North /
Michael North
Reg. No. 46,963

NORTH WEBER & BAUGH LLP
3260 Hillview Avenue
Palo Alto, CA 94304
Tel.: (650) 856-7564; Fax: (650) 856-0542
mnorth@northweber.com

UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

Page 1 of 1

PATENT NO. : 10,757,003 B
APPLICATION NO.: 16/432,364
ISSUE DATE : August 25, 2020
INVENTOR(S) : Peter Chow et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims:

At Column 28 line 5 and 6, Claim 1, "one or more processors; and processors, configured to:" should read --
one or more processors; and
a memory storing machine-executable instructions, when executed by the one or more
processors, configured to; --

MAILING ADDRESS OF SENDER (Please do not use customer number below):

NORTH WEBER & BAUGH LLP
3260 Hillview Ave.
Palo Alto, CA 94304

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. 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 1.0 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: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Electronic Acknowledgement Receipt	
EFS ID:	40753612
Application Number:	16432364
International Application Number:	
Confirmation Number:	1021
Title of Invention:	SYSTEMS AND METHODS FOR JOINTLY OPTIMIZING WAN AND LAN NETWORK COMMUNICATIONS
First Named Inventor/Applicant Name:	Peter Chow
Customer Number:	146571
Filer:	Michael V. North/Domarina Alkhas
Filer Authorized By:	Michael V. North
Attorney Docket Number:	20145-049USC2
Receipt Date:	04-OCT-2020
Filing Date:	05-JUN-2019
Time Stamp:	12:38:37
Application Type:	Utility under 35 USC 111(a)

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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	Request for Certificate of Correction	049USC2_PetCertofCorrc_Issue dPatent.pdf	41706 36312bbe5c9f6f8d226b8830f467b26376fe829d	no	1

Warnings:

Information:					
2	Request for Certificate of Correction	049USC2_CertificateOfCorrection_SB44.pdf	164761 ca76fab090cd6df2c20a05e6a212216beeb6cb9	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			206467		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 10,757,003 B2
APPLICATION NO. : 16/432364
DATED : August 25, 2020
INVENTOR(S) : Peter Chow et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

At Column 28 Line 5 and 6, Claim 1:

“one or more processors; and processors, configured to:”

Should read:

-- one or more processors; and

a memory storing machine-executable instructions, when executed by the one or more
processors, configured to; --

Signed and Sealed this
Third Day of November, 2020



Andrei Iancu
Director of the United States Patent and Trademark Office