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Application Number: 16600302

Document Date: 10/11/2019

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- Drawing

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Form Revision Date: March 1, 2019

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UTILITY PATENT APPLICATION TRANSMITTAL <i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>	Attorney Docket No.	190072
	First Named Inventor	Joseph L. Vilella
	Title	Mutually secure optical data ...
	Priority Mail Express® Label No.	Filed via EFS-Web

APPLICATION ELEMENTS <i>See MPEP chapter 600 concerning utility patent application contents.</i>	Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450
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1. ☐ Fee Transmittal Form (PTO/SB/17 or equivalent)	ACCOMPANYING APPLICATION PAPERS 10. ☐ Assignment Papers (cover sheet & document(s)) Name of Assignee _____ 11. ☐ 37 CFR 3.73(c) Statement (when there is an assignee) ☒ Power of Attorney 12. ☐ English Translation Document (if applicable) 13. ☐ Information Disclosure Statement (PTO/SB/08 or PTO-1449) ☐ Copies of citations attached 14. ☐ Preliminary Amendment 15. ☐ Return Receipt Postcard (MPEP § 503) (Should be specifically itemized) 16. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed) 17. ☐ Nonpublication Request Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent. 18. ☒ Other: Request for First Action Interview Certification and Request for Prioritized Examination _____ _____ _____
2. ☒ Applicant asserts small entity status. See 37 CFR 1.27	
3. ☐ Applicant certifies micro entity status. See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.	
4. ☒ Specification [Total Pages <u>16</u>] Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement)	
5. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets <u>6</u>]	
6. Inventor's Oath or Declaration [Total Pages <u>1</u>] (including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e)) a. ☒ Newly executed (original or copy) b. ☐ A copy from a prior application (37 CFR 1.63(d))	
7. ☒ Application Data Sheet * See note below. See 37 CFR 1.76 (PTO/AIA/14 or equivalent)	
8. CD-ROM or CD-R in duplicate, large table, or Computer Program (Appendix) ☐ Landscape Table on CD	
9. Nucleotide and/or Amino Acid Sequence Submission (if applicable, items a. – c. are required) a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on: i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ Paper c. ☐ Statements verifying identity of above copies	

*Note: (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 must be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS				
☒ The address associated with Customer Number: <u>24243</u> OR ☐ Correspondence address below				
Name				
Address				
City	State	Zip Code		
Country	Telephone	Email		
Signature	/John Buchaca/		Date	2019-10-11
Name (Print/Type)	John D. Buchaca		Registration No. (Attorney/Agent)	37289

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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

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	190072
		Application Number	
Title of Invention	Mutually secure optical data network and method		
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		
	Joseph	L.	Vilella			
Residence Information (Select One) • US Residency Non US Residency Active US Military Service						
City	San Diego	State/Province	CA	Country of Residence	US	
Mailing Address of Inventor:						
Address 1		Spada Innovations, Inc.				
Address 2		4660 La Jolla Village Dr., Suite 500				
City	San Diego	State/Province	CA			
Postal Code	92122	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	24243		
Email Address	john@charmason.com	Add Email	Remove Email

Application Information:

Title of the Invention	Mutually secure optical data network and method		
Attorney Docket Number	190072	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	6	Suggested Figure for Publication (if any)	

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	190072
		Application Number	
Title of Invention	Mutually secure optical data network and method		

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	24243		

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	16431602	2019-06-04

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	190072
		Application Number	
Title of Invention	Mutually secure optical data network and method		

Prior Application Status	Abandoned	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
16431602	Continuation in part of	15351315	2016-11-14
Prior Application Status	Abandoned	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15351315	Continuation in part of	14419092	2015-02-02
Prior Application Status	Expired	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
14419092	a 371 of international	PCT/US2013/053389	2013-08-02
Prior Application Status	Expired	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
PCT/US2013/053389	Claims benefit of provisional	61678977	2012-08-02
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)	Access Code ⁱ (if applicable)	Remove
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

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	190072
		Application Number	
Title of Invention	Mutually secure optical data network and method		

☐ 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	190072
		Application Number	
Title of Invention	Mutually secure optical data network and method		

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	190072
		Application Number	
Title of Invention	Mutually secure optical data network and method		

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		Joint Inventor
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. ☐				
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information For Applicant:				
Address 1				
Address 2				
City		State/Province		
Country			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	190072
		Application Number	
Title of Invention	Mutually secure optical data network and method		

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 ¹		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:

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	/John Buchaca/		Date (YYYY-MM-DD)	2019-10-11	
First Name	John	Last Name	Buchaca	Registration Number	37289
Additional Signature may be generated within this form by selecting the Add button. Add					

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	190072
		Application Number	
Title of Invention	Mutually secure optical data network and method		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

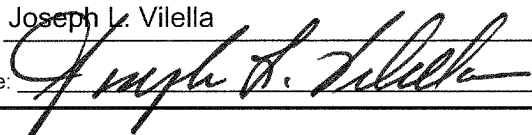
The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection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

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

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

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.

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

Title of Invention	Mutually secure optical data network and method
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 _____ filed on _____ 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 Inventor: Joseph L. Vilella Date (Optional): 10/11/2019 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.**

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

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/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	2019-10-11
First Named Inventor	Joseph L. Vilella
Title	Mutually secure optical data network and method
Art Unit	
Examiner Name	
Attorney Docket Number	190072

SIGNATURE of Applicant or Patent Practitioner

Signature	/John Buchaca/	Date (Optional)	2019-10-11
Name	John D. Buchaca	Registration Number	37289
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

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 _____ forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

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Signature

Joseph L. Vilella

Date (Optional)

10/11/2019

Name

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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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**CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION
UNDER 37 CFR 1.102(e) (Page 1 of 1)**

First Named Inventor:	Joseph L. Vilella	Nonprovisional Application Number (if known):	
Title of Invention:	Mutually secure optical data network and method		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently \$0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.
2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.
3. The applicable box is checked below:

I. ☒ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

- i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.
---OR---
(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.
- ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, or the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

- i. A request for continued examination has been filed with, or prior to, this form.
- ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
- iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
- iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
- v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature <u>/John Buchaca/</u>	Date <u>2019-10-11</u>
Name (Print/Typed) <u>John D. Buchaca</u>	Practitioner Registration Number <u>37289</u>
Note: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required.*	
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PTO/SB/413C (05-11)

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REQUEST FOR FIRST ACTION INTERVIEW (FULL PILOT PROGRAM)

Attorney Docket Number: 190072	Application Number (if known):	Filing date: 2019-10-11
First Named Inventor: Joseph L. Vilella	Title: Mutually secure optical data network and method	

APPLICANT HEREBY REQUESTS A FIRST ACTION INTERVIEW IN THE ABOVE-IDENTIFIED APPLICATION. See Instruction Sheet on page 2.

1. The application must contain three (3) or fewer independent claims and twenty (20) or fewer total claims.
2. The application must not contain any multiple dependent claims.
3. By filing this request:

Applicant is agreeing to make an election without traverse if the Office determines that the claims are not obviously directed to a single invention; and

Applicant is agreeing not to request for a refund of the search fee and any excess claims fee paid in the application after the mailing or notification of the pre-interview communication prepared by the examiner.

4. Other attachments: _____

Signature /John Buchaca/	Date 2019-10-11
Name (Print/Typed) John D. Buchaca	Registration Number 37289
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Mutually secure optical data network and method

Prior Application

This is a continuation of copending US Patent Application Serial No. 16431602, filed 2019-06-04, which is a continuation-in-part of US Patent Application Serial No. 15351315, filed 2016-11-14, which is a continuation-in-part of US Patent Application Serial No. 14419092, filed 2015-02-02, which is a 371 of International Application Serial No. PCT/US2013/053389, filed 2013-08-02, which claims the benefit of U.S. Provisional Patent Application Serial No. 61678977, filed 2012-08-02 all of which are incorporated herein by reference.

Field of the Invention

The instant invention relates to computer networks and more particularly to optical data network traffic routing to multiple users in a local area.

Background

Nowadays a wide variety of entities are moving towards the use of Passive Optical Networks (“PON”) and benefit from the interconnectivity provided by local and wide area networks, and connection to the Internet. Many entities depending on their purpose have many types of devices connected to the network including personal computers, wireless controllers, application servers, printers, scanners, ambient control systems, security cameras and sensors, phone systems, gaming consoles and television sets. The digital signals carried by the PON include converged voice, data and video signal content traffic.

Many individual and business users send and receive digital information which is intended to remain private and can be confidential to the individual users. Such users can be businesses located in the same office building as co-tenants, guests located in a hotel, users located in a commercial, local, state, federal or similar entity, subscribers in a residential entity such as owners or tenants. In the past, reasonable privacy and security can be accomplished by each user connecting directly to a secure service provider carrier using a dedicated headend located in the entity space including a modem, workgroup switches and routing equipment. This equipment typically requires its own cooling equipment. Often the connection throughout the local network and to the carrier is through copper wiring which, due to its electrical resistance, can generate additional heat requiring cooling. All this equipment and cooling

capability is often multiplied by the number of individual tenants in a building, leading to high power consumption.

A typical limiting factor using copper wiring for digital connection lines is bandwidth. Thus, a particular business tenant may elect to upgrade its individual local network and its connection to the carrier using high bandwidth equipment. Increasing the bandwidth often requires additional copper wiring, and more air conditioning.

With the development of optical fiber technology, photonic networks which are typically referred to as Passive Optical Networks can deliver significantly higher bandwidth and lower power consumption. This need for increased speed and sustainability by reduced power consumption has promoted the accelerated adoption of PON in most commercial and residential sectors.

The higher available bandwidth has led to network designs where one or more PON interface routers can distribute data streams to a multiplicity of users through an Optical Line Terminal ("OLT"). Further, this can eliminate the need for a dedicated router for each user. Unfortunately however, this creates an increased cyber-security risk for all those users connected to the PON interface routers since the global routing table can be surreptitiously accessed by a nefarious user, or some cyber-entity mimicking a user on the PON.

The instant invention results from efforts to provide an improved passive optical networking system that addresses one or more of the above problems.

Summary

The primary and secondary objects of the invention are to provide an improved optical networking system. These and other objects are achieved by providing an optical network interface router including at least one virtual routing table for each of a plurality of optical network units to which the interface router is connected.

In some embodiments there is provided a multi-user optical data network apparatus comprises: a plurality of network service carrier lines connected to a passive optical network interface router; at least one uplink connecting said interface router to an optical line terminal; said optical line terminal being connected to a number of passive optical network feeds for carrying a common data feed to a plurality of optical network units each supporting at least one of a plurality of private user devices; said interface router being configured to have at least one virtual routing table for each one of said plurality of optical network units; and, wherein each of

said optical network units is adapted to extract data packets intended for a supported one of said devices.

In some embodiments said interface router is a premise router.

In some embodiments said interface router is further configured to have a routing table routine generating said at least one virtual routing table for each one of said plurality of optical network units.

In some embodiments each of said optical network units provides service to a separate number of private users.

In some embodiments said uplink carries data including digitized voice and video data.

In some embodiments there is provided a multi-user optical data network apparatus comprises: a plurality of network service carrier lines connected to a plurality of passive optical network interface routers; a plurality of uplinks connecting said interface routers to an optical line terminal; said optical line terminal being connected to a number of passive optical network feeds for carrying a common data feed to a plurality of optical network units each supporting at least one of a plurality of private user devices; wherein each of said interface routers is configured to have at least one virtual routing table for each one of said plurality of optical network units to which said each of said interface routers is connected; and, wherein each of said optical network units is adapted to extract data packets intended for a supported one of said devices.

In some embodiments there is provided a digital data network communication method comprises: accepting a plurality of private data streams into a passive optical network interface router serving a plurality of private users through a plurality of optical network units; aggregating said private data streams into a combined data feed; routing said data feed to at least two of said plurality of optical network units; extracting from said data feed a first one of said private data streams; wherein said routing comprises: generating an independently unique virtual routing table for each of said plurality of optical network units; tagging ethernet frames intended for a first one of said plurality of optical network units according to entries in a first one of said virtual routing tables associated with a first one of said optical network units; distributing said tagged ethernet frames according to said first one of said virtual routing tables.

In some embodiments said distributing comprises associating destinations listed in said first one of said virtual routing tables with said first one of said optical network units.

In some embodiments each of said optical network units provides service to a separate number of private users.

In some embodiments said accepting comprises: interfacing a plurality of service provider data lines through a single headend.

In some embodiments said interfacing comprises: utilizing at least one premise router and a radio frequency video converter; and, feeding an output of said at least one premise router through an optical line terminal.

In some embodiments said interfacing further comprises: feeding an output of said converter through said optical line terminal.

In some embodiments said aggregating comprises using an enterprise aggregating switch.

The text of the original claims is incorporated herein by reference as describing features in some embodiments.

Brief Description of the Drawings

Fig. 1 is a functional block diagram of several data service providers supplying multi-tenant building through a single headend according to an exemplary embodiment of the invention.

Fig. 2 is a functional block diagram of main point of entry room for the data network servicing a multi-tenant building according to an exemplary embodiment of the invention.

Fig. 3 is a functional block diagram for a premise router according to an exemplary embodiment of the invention.

Fig. 4 is a functional block diagram of an optical line terminal servicing multiple tenant users with a common data feed according to an exemplary embodiment of the invention.

Fig. 5 is a functional block diagram of an optical line terminal aggregating data and video streams into a common optical data feed according to an exemplary embodiment of the invention.

Fig. 6 is a functional block diagram of an optical network unit interfacing a tenant private network with a common optical data feed according to an exemplary embodiment of the invention.

Description of the Exemplary Embodiments

Referring now to the drawing, there is illustrated in Figs. 1 - 6 the components of a system **1** used to provide a mutually secure, shared Local Area Network ("LAN") implementation which can supply a multi-tenant site such as an office building **100** with

converged voice, data and video signal content traffic at gigabit speeds to a plurality of mutually secure end point users such as building tenants having multiple end user devices such as computers, access points and wireless controllers, application servers and printers, and television sets.

As shown in Figure 1, a single building **100** can have multiple tenants **102, 104, 106** such as individual companies, each potentially having multiple digital network devices. The system offers each tenant the ability to specify and use their own private address space even if the data feed overlaps with neighboring tenant on the same network, and the transmission of converged content traffic over the shared infrastructure while maintaining the separation and security of the individual tenant content traffic.

The system relies upon a collection of standards-based technologies that are designed and implemented to provide a point-to-multipoint networking through a single aggregation switch that is capable of providing thousands of IP voice, data, and video connection ports.

In a basic configuration, the aggregate downstream rate can be 2.5 Gbps, while the upstream rate can be 1.25 Gbps. Each of the connections can be adapted to support high-bandwidth multimedia applications on a single optical fiber over a distance of 20km or more. Telecommunications service traffic that includes Internet, public switched telephone networks, and broadcast/cable television **108, 110, 112** for the building are provided by one or more commercial carriers **114, 116, 118**. The telecommunications services carrier lines **120,122,124** enter the building **100** at a Main Point Of Entry (MPOE) room **126** and terminate into headend equipment **128**. From the headend equipment, the voice, video and data content traffic can distributed to each of the tenants **102, 104, 106** over data feeds carried by fiber optic cabling **130, 132, 134**.

As shown in Figure 2, the secure, shared multi-tenant LAN architecture can include a Passive Optical Network (“PON”) interface router, which for clarity in this embodiment is a single premise router **140**, an aggregation switch referred to as an Optical Line Terminal (OLT) **146**, a plurality of end user terminal devices such as computers, telephones and televisions located within the physically separate tenant **102, 104, 106** spaces, and an optical distribution network that consists of splitters and fiber cabling infrastructure. It shall be understood that a plural number of interface routers such as premise routers can be used.

The headend equipment **128** receives the plurality of telecommunications service carrier lines **120,122,124** from the separate carrier providers **114, 116, 118**. An RF-based video signal can be supplied by one or more of the carriers to the headend equipment via a broadband coaxial

cable **130**. The interface to the carrier lines within the headend equipment is the premise router **140**.

The premise router **140** can be configured with Virtual Routing and Forwarding (VRF) as described in RFC 4381 and RFC 4382, and utilizes Virtual Local Area Network (VLAN) tagging to separate and manage the distribution of the voice, video and data content traffic to each of the users. The VLAN-tagged voice, video, and data content traffic is connected to the Optical Line Terminal (OLT) **146** through an uplink **142** that provides primary communication. Optionally, a secondary uplink **144** may be employed as a backup communication path.

The OLT **146** can be powered by dual 48 VDC power feeds **148, 150** from rectifier modules **152, 154** that are attached to separate AC Mains **156, 158** through an uninterruptible power supply **160**. The OLT has a minimum of eight optical ports, but can have well over fifty such ports. Each port delivers a beam of light that contains the aggregated data for a multiplicity of users. The aggregated data may or may not be encrypted based on the type of PON.

The OLT **146** takes the VLAN-tagged voice, video, and data content traffic **142, 144** and processes each of the ethernet frames by first optionally encrypting them, then converting them into light, and outputting them as a photonic broadcast stream to the appropriate initial passive optical network feeds **162, 164, 166, 168, 170** that connects to an optical distribution patch panel **172**. The optical distribution patch panel **172** is used to provide the ability for cross-connecting the initial feeds **162, 164, 166, 168, 170** to the distribution feeds **174, 176, 178, 180** that traverse the distance to the remotely located tenants **102, 104, 106**. A tenant **106** requiring larger bandwidth can accept multiple distribution feeds **178, 180**.

In the case where a carrier provider **114** supplies an RF-based video signal **130**, the headend equipment **128** receives the RF-based video signal and converts it into light by processing the electrical analog signal and using it to modulate a laser which outputs the equivalent video photonic stream. This new video photonic stream is then combined with an initial feed **162** which results in a modified initial feed **164** that contains a photonic broadcast stream that contains the voice, video and data content traffic that is then fed into the optical distribution patch panel **172**. Of course in some instances the initial feed can contain digitized voice, video and data in which case no bypass of the OLT is necessary.

As shown in Figure 3, the premise router **140** can be the interface to each of the commercial carrier providers **114, 116, 118** through either a packet-switched or a leased-line Wide Area Network (WAN) interface in order to utilize the telecommunications services

provided over carrier lines **120,122,124**. Logical circuits can make connections between the premise router **140** and carrier providers **114, 116, 118**, utilizing a shared-bandwidth connection that may be shared with other carrier customers and could potentially affect quality of service and bandwidth availability. The leased-line connection provides a direct interface access to the carrier and eliminates the possibility of being affected by other carrier customers. The premise router **140** can be configured to run a routing table routine **412** that accesses the virtual routing table instantiations to create virtual routing tables **420, 422, 424, 426** for each Optical Network Unit (ONU) serving a tenant. This configuration provides for creation of multiple routing tables, one for each ONU, within the single premise router **140**. This capability supports the overlapping of IP addresses for any of the tenants because the routing instances are independent. In this way, data traffic intended for one tenant is automatically isolated from traffic intended for other tenants. Furthermore, queries emanating from one tenant are identified so that one tenant cannot mimic the identity of another. In other words, unique routing for each tenant effectively isolates its traffic from other tenants, vastly improving the networks defense against cyber-attack.

Thus, the premise router processor **410** gets and puts the tenant-specific routing information through the routing table routine **412** into the appropriate virtual routing tables **420, 422, 424, 426**. The updated virtual routing tables are used to uniquely VLAN-tag the voice, video, and data content traffic that is sent and received through the uplinks **142**, to the OLT **146**.

In this way, the overlapping IP address on a single PON infrastructure allows each tenant connected to the infrastructure to transmit and receive information to any of the carriers. Thus all the tenants in a building can simply connect to the PON infrastructure without the need for their own dedicated headend.

A configuration file loaded into the premise router contains the commands to implement the virtual routing tables for each of the ONUs providing service to the tenant users. By way of example, the following pseudo-code implements independent virtual routing tables for two ONUs serving two users, namely "Tenant A" and "Tenant B". Comment lines begin with an exclamation point ("!"):

!-- Begin gateway configuration and programming

!-- Configure gateway identity

!-- Establish express forwarding to optimize network performance and scalability

```
!--- For each tenant (1..n) Do
!--- Instantiate virtual route table for the Tenant
!--- Enable VPN (Virtual Private Network) for the Tenant
!--- Establish routing and forwarding for the virtual routing table
!--- Creates lists of import and export route-target extended communities
!--- End Do

!--- Set IP (Internet Protocol) address, netmask and enable IS-IS routing

!--- For each tenant (1..n) Do
!--- Establish loopback identifier for the Tenant
!--- Enable VRF (Virtual Routing and Forwarding) for the Tenant
!--- Associate the VRF instance with an interface or sub-interface.
!--- Loopbacks use the same IP address because they belong to different
    Tenant VRF's
!--- Broadcast to all hosts on the subnet
!--- End Do

!--- Define and configure the gateway ingress interface
!--- Set bandwidth
!--- Config IP address and netmask
!--- Enable MPLS (MultiProtocol Label Switching)

!--- Enables logging of BGP (Border Gateway Protocol) neighbor resets.
!--- Adds an entry to the BGP or multiprotocol BGP neighbor table
!--- Enables BGP sessions to use a specific operational interface for TCP
    (Transmission Control Protocol) connections

!--- Enter address family configuration mode

!--- Sends the community attribute to a BGP neighbor

!--- For each tenant (1..n) Do
!--- Set the address family for the tenant
!--- End Do

!--- Use longest prefix matching or default route

!--- end gateway configuration and programming
```

The above example shows that the premise router **140** can be programmed to create an independent virtual routing table for each user ONU. Thus, each user is effectively encased within its own separate routing environment, vastly restricting access by cyber attackers to the PON.

Figure 4 represents the Passive Optical Network infrastructure which is an optical distribution network used to convey the photonic broadcast stream feeds that contain the

encrypted data packets such as VLAN-tagged ethernet frames **300, 302, 304, 306** that are distributed back and forth between the various tenant spaces **102, 104, 106** and the OLT **146**. Essentially, the OLT can broadcast the combined encrypted VLAN-tagged ethernet frames **300, 302, 304, 306** over the distribution feeds **174, 176, 178, 180** to a number of splitters **308, 310, 312, 314**.

Each splitter **308** can replicate the incoming photonic broadcast stream equally over each of its drop lines **320, 322, 324**. The splitter **308** can attach to the simplex, single-mode fiber from the OLT **146** and can passively redistribute the incoming light stream up to 64 times. The splitter is a Planar Lightwave Circuit (PLC) that is constructed using silica glass waveguide circuits and aligned fiber optic pigtails that are all integrated inside of a single package. The attenuation of the light signal through the PLC of the splitter **308** is symmetrical in both directions. The signal loss from a 1x8 PLC splitter is expected to be less than one dB greater than what would be expected from a perfect splitter, approximately 10 dB. A typical 1x32 PLC splitter shall have approximately 17 dB or less.

Each of the outputs from the optical splitter can be an individual simplex, single-mode fiber called a drop line **320, 322, 324**. The drop lines can be routed and fed into the appropriate tenant physical space **102, 104, 106** and terminated into the tenant's dedicated Optical Network Unit (ONU) **330, 332, 334**.

Each ONU **330, 332, 334** is operated so that it utilizes the VLAN-tagging to select those of the incoming ethernet frames assigned to the particular tenant, and then removes the encryption from the selected ethernet frames. Thus, each ONU strips out or extracts only those incoming frames that are intended for the particular tenant. The decrypted ethernet frames **301, 303, 305** are then made available **340, 342, 344** for the tenant's IP/ethernet end-user equipment. Those frames not assigned to the particular tenant are ignored and cannot be decrypted by the particular tenant. In other words, a first subset of the frames can be associated with a first piece of end-user equipment and a second subset of the frames is associated with a second piece of end-user equipment. The first and second pieces of equipment can be common to a single tenant or can be split among separate tenants.

In other words, for example, tenant A **102** gets supplied to its ONU **330** all incoming encrypted frames **300, 302, 304, 306** via its drop line **320** including those frames that are intended for it **300, 306** and those frames that are unintended for it **302, 304**. The ONU strips out its intended encrypted frames **300, 306** and decrypts them to form its intended decrypted

frames **301** which it makes available to Tenant A's dedicated, private data line **340**. The ONU also encrypts outgoing frames.

As shown in Figure 5, the OLT **146** that typically resides in the MPOE room **126** can be a key component of the headend equipment **128**. The OLT **146** can perform as the Layer-2 workgroup switching mechanism for voice, video and data content traffic that is sent and received from the individual tenants.

The OLT **146** equipment can be a chassis having multiple slots used to host circuit boards that perform various functions. Operations of the OLT are managed and controlled by a processor **500**. A backplane **502** of the OLT can provide the communication path for all of the control, management, and data signals between the circuit boards installed within the OLT. A network interface **504** provides the interface to/from the primary uplink **142** and backup uplink **144** connections to the premise router **140**. A switching fabric component **506** can be used to encrypts the VLAN-tagged ethernet frames using the appropriate symmetric key for a specific tenant and sends the result to an optical conversion component **508** for transmission to the tenant. The content traffic on the switching fabric component **506** is encrypted for each tenant location before being transmitted over the shared optical distribution network. Encryption of the layer-2 ethernet frames is used to provide the confidentiality of each tenant's signal traffic.

A symmetric-key algorithm can be used for the encryption of the ethernet frame data packets. This particular implementation utilizes a fixed block size of 128-bits and a key size of 128-bits that operate on a 4x4 column-major order matrix of bytes. It performs 10 cycles of transformation rounds that convert the input plaintext into the final output of ciphertext. Each round can consists of:

- a. First, a byte substitution function is performed where each byte in the state matrix is replaced using an 8-bit substitution.
- b. Next, each of the rows of the state are shifted by a certain number of steps. The first row is left unchanged. Each byte of the second row is shifted one to the left. Similarly, the third and fourth rows are shifted by offsets of two and three respectively. Row n is shifted left circular by n-1 bytes.
- c. Finally, the columns of the state are mixed by combining the four bytes in each column. The four bytes of each column of the state are combined using linear transformation. Encryption is used to specifically prevent man-in-the-middle attacks. Additionally, the PON configuration also supports IEEE 802.1x authentication in order to provide provide port based

Network Access Control to limit network access, with features like IP//MAC address limiting to secure the network from unauthorized/malicious users.

The optical conversion component **508** of the OLT **146** can convert the electrical signals of the encrypted VLAN-tagged ethernet frames and output them over the initial feeds **162**, **166**, **168**, **170** as modulated optical signals.

In the case where a carrier provider **114** supplies an RF-based video signal **130** to the headend equipment **128**, the signal is connected to a laser transmitter **520** where the input broadband signal is used to modulate a laser. The modulated output of the laser is a low-level photonic light stream. The photonic light stream is sent to an erbium-doped fiber amplifier **522**, where the signal is increased to approximately 30 dBmV. The resulting amplified video signal is then overlayed on an initial feed **162** through the use of a wave division multiplexor combiner **524**. The output from the wave division multiplexor combiner **524** is a feed line **164** that contains encrypted VLAN-tagged ethernet frames and a laser-modulated, RF-based video signal.

As shown in Figure 6, each tenant can have one or more of an ONU **330** that accepts drop line **320** connections. The ONU **330** terminates optical fibers from a splitter **308** and sends/receives decrypted ethernet frames **340** to the tenant's IP/ethernet equipment, and RF video signals **656** to the tenant's television. The ONU has a processor **600** which controls and manages all activity of the ONU by directly communicating all of the control and management signals **602**, **604**, **606** to/from its internal components **610**, **612**, **640**. The ONU receives the photonic light stream transmitted over the drop line **320**. The optical converter **610** examines the encrypted photonic light stream that enters the component. If the VLAN-tagged ethernet frame has been encrypted with the same symmetric key, it indicates that the VLAN-tagged frame belongs to the tenant of that ONU. After the optical converter **610** performs the decryption, the VLAN-tagged ethernet frame is sent to the network interface **612** of the ONU via the direct communication path **608**. The network interface **612** demultiplexes the electrical signal to divide out baseband telephony/data signals from broadband video channels. The network interface sends/receives the VLAN-tagged ethernet frames to the appropriate physical connection interface **622**, **632**, **652**. The ONU can supply a basic 802.3 ethernet interface **622**, or an 802.3 ethernet interface that include power-over-ethernet (PoE) capability **632**, or an RF-based video F-Type interface **652** to transmit the RF-based video signal **656**. The PoE port injector **640** implements the Power-Over-Ethernet and Power-Over-Ethernet Plus based upon the IEEE 802.3af-2003 and IEEE 802.3at-2009 standards respectively.

In this way, the above described system empowers a multi-tenant building **100** with an environment to securely host individual tenant data traffic with overall network flexibility. This ability of the system allows it to leverage the high bandwidth and energy efficiency of passive optical network equipment for the entire building. Because optical bandwidth is comparatively unlimited, existing systems often do not utilize this capacity. Thus, the high bandwidth capability of optical fiber can be leveraged to route all traffic optically and uniformly throughout the building on an aggregated feed. Each tenant can extract its share of the traffic from the feed. In this way, a single headend having reduced air conditioning requirements can be located at the building's main point of entry, and no additional air conditioning is needed at the individual tenant spaces for what would have been headend-type network equipment.

While the preferred embodiment of the invention has been described, modifications can be made and other embodiments may be devised without departing from the spirit of the invention and the scope of the appended claims.

What is claimed is:

CLAIMS

1. A multi-user optical data network apparatus comprises:
 - at least one network service carrier line connected to a passive optical network interface router;
 - at least one uplink connecting said interface router to an optical line terminal;
 - said optical line terminal being connected to a number of passive optical network feeds for carrying a common data feed to a plurality of optical network units each supporting at least one of a plurality of private user devices;
 - said interface router being configured to have at least one virtual routing table for each one of said plurality of optical network units; and,
 - wherein each of said optical network units is adapted to extract data packets intended for a supported one of said devices.
2. The apparatus of Claim 1, which further comprises each of said optical network units being prevented from extracting data packets intended for alternate ones of said devices supported by others of said optical network units.
3. The apparatus of Claim 2, wherein said interface router is further configured to have a routing table routine generating said at least one virtual routing table for each one of said plurality of optical network units.
4. The apparatus of Claim 3, wherein said at least one virtual routing table supports generation of uniquely tagged ethernet frames for each one of said plurality of optical network units .
5. The apparatus of Claim 4, wherein each of said optical network units provides service to a separate number of private users.
6. The apparatus of Claim 5, wherein said uplink carries data including digitized voice and video data.
7. The apparatus of Claim 6, wherein said optical line terminal comprises an enterprise aggregating switch.

8. A multi-user optical data network apparatus comprises:

- at least one network service carrier line connected to a plurality of passive optical network interface routers;

- a plurality of uplinks connecting said interface routers to at least one optical line terminal;

- said at least one optical line terminal being connected to a number of passive optical network feeds for carrying a common data feed to a plurality of optical network units each supporting at least one of a plurality of private user devices;

- wherein at least one of said interface routers is configured to have at least one virtual routing table for each one of said plurality of optical network units connected to said at least one optical line terminal; and,

- wherein each of said optical network units extracts data packets intended for a supported one of said devices, and does not extract data packets intended for others of said devices supported by others of said optical network units.

9. A digital data network communication method comprises:

- accepting a plurality of private data streams into at least one passive optical network interface router serving a plurality of private users through a plurality of optical network units;

- aggregating said private data streams into a combined data feed;

- routing said data feed to at least two of said plurality of optical network units;

- wherein said routing comprises:

- generating an independently unique virtual routing table for each of said plurality of optical network units; and,

- uniquely tagging ethernet frames intended for a first one of said plurality of optical network units according to entries in a first one of said virtual routing tables associated with a first one of said optical network units; and,

- wherein said method further comprises:

- distributing said tagged ethernet frames according to said first one of said virtual routing tables; and,

- extracting from said data feed a first one of said private data streams.

10. The method of Claim 9, wherein said distributing comprises associating destinations listed in said first one of said virtual routing tables with said first one of said optical network units.

11. The method of Claim 9, wherein each of said optical network units provides service to a separate number of private users.

12. The method of Claim 9, wherein said accepting further comprises:
interfacing a plurality of service provider data lines through a single headend.

13. The method of Claim 9, wherein said aggregating further comprises using an enterprise aggregating switch.

Mutually secure optical data network and method

ABSTRACT

A digital optical data network system for improving information security in Passive Optical Networks ("PON") by providing virtual information separation in the router, such as a premise router, or routers interfacing the entire PON, such as by utilizing virtual routing and forwarding, thus allowing safe data traffic between multiple carriers, service providers accessing the PON and multiple end users on the PON such as tenants in a building, employees of a business entity, or subscribers in a residential community.

190072

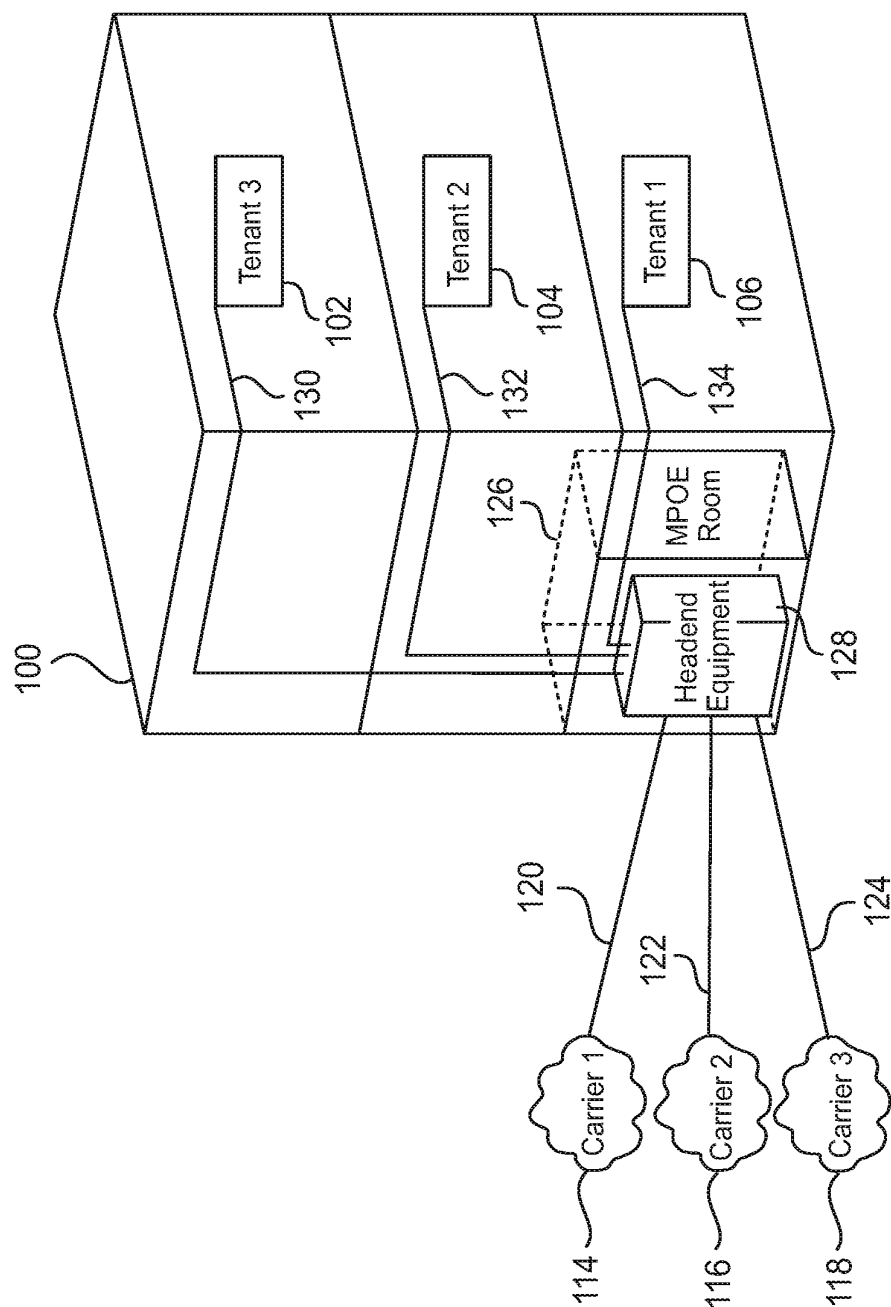


FIG. 1

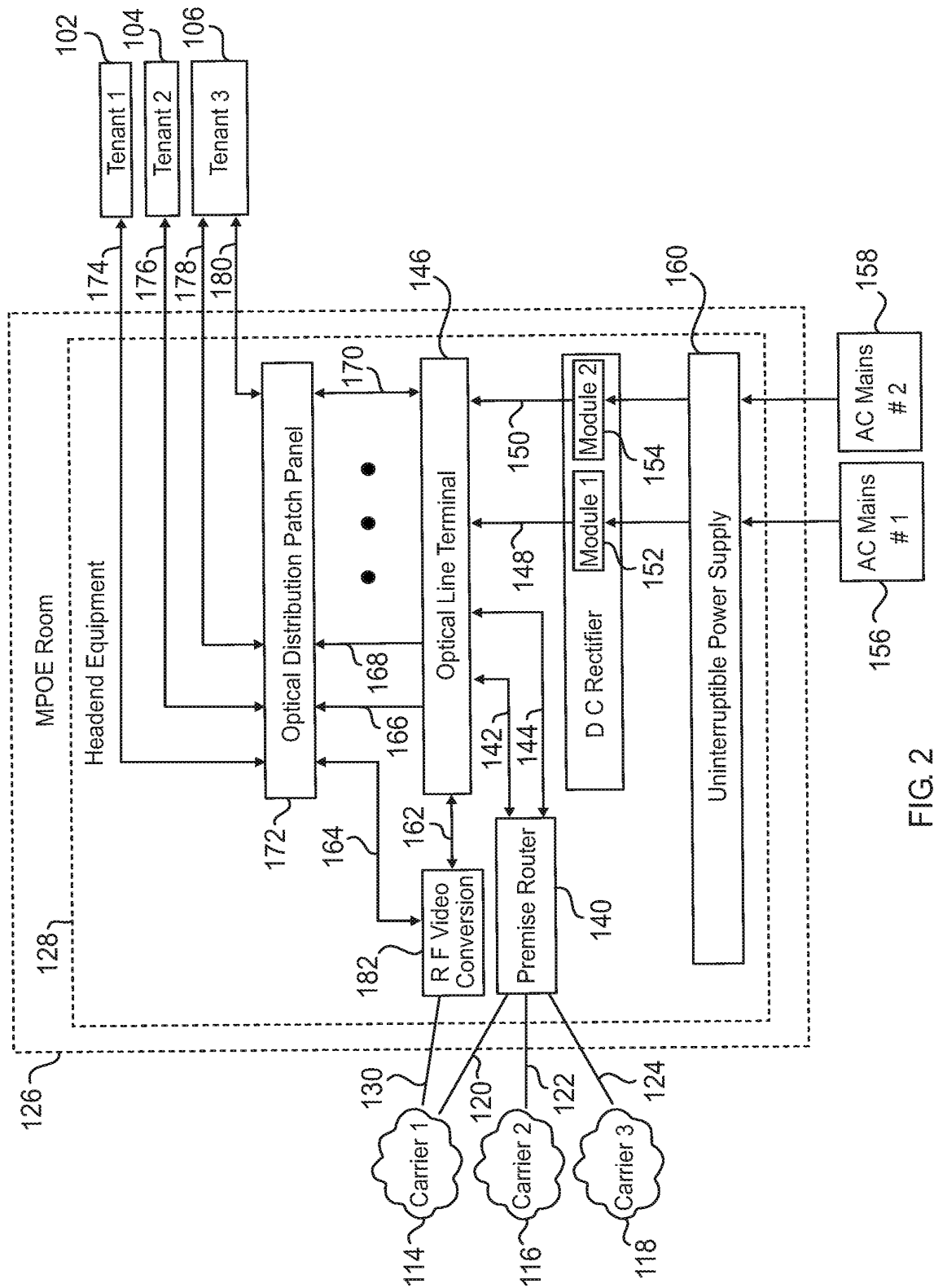


FIG. 2

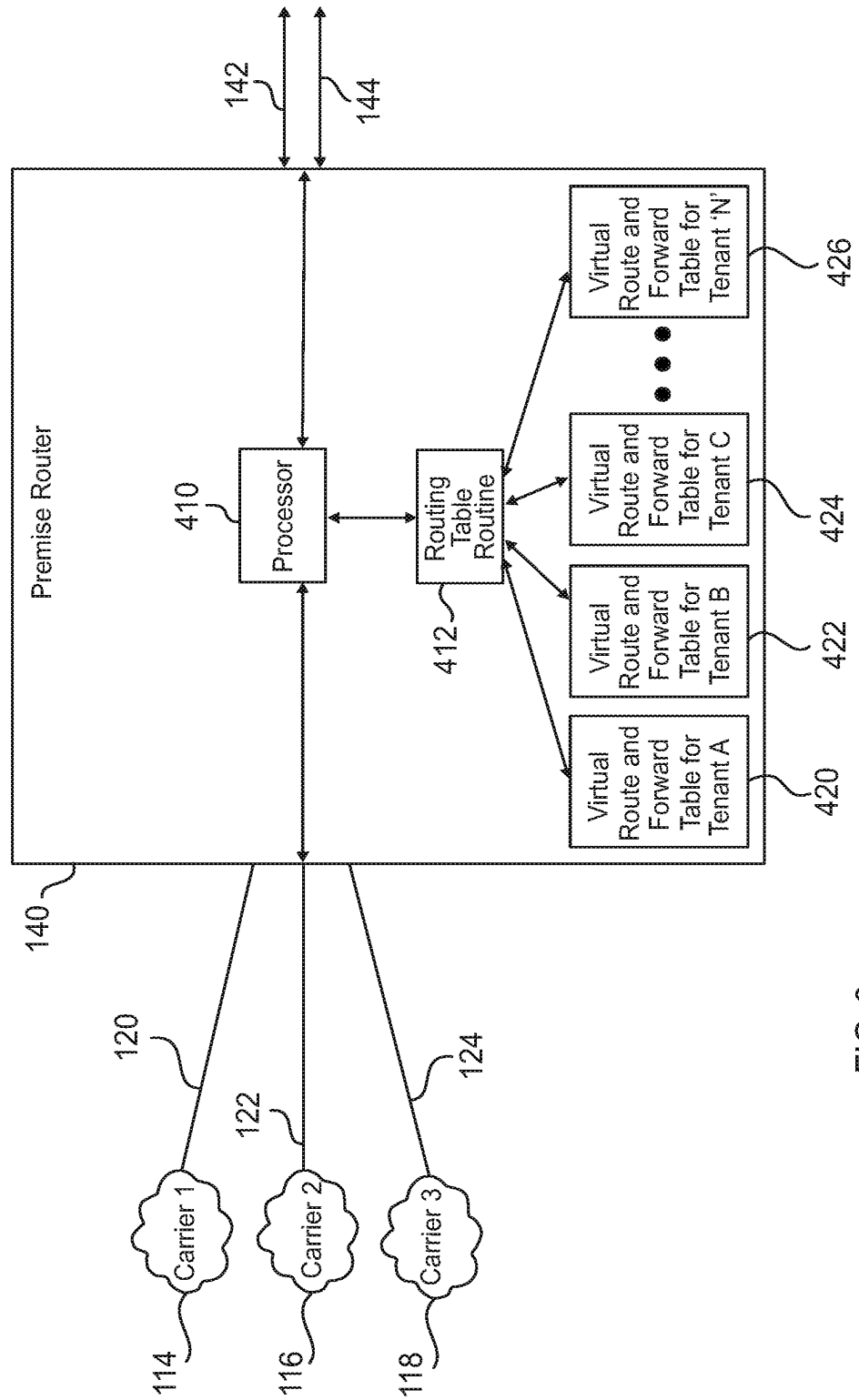


FIG. 3

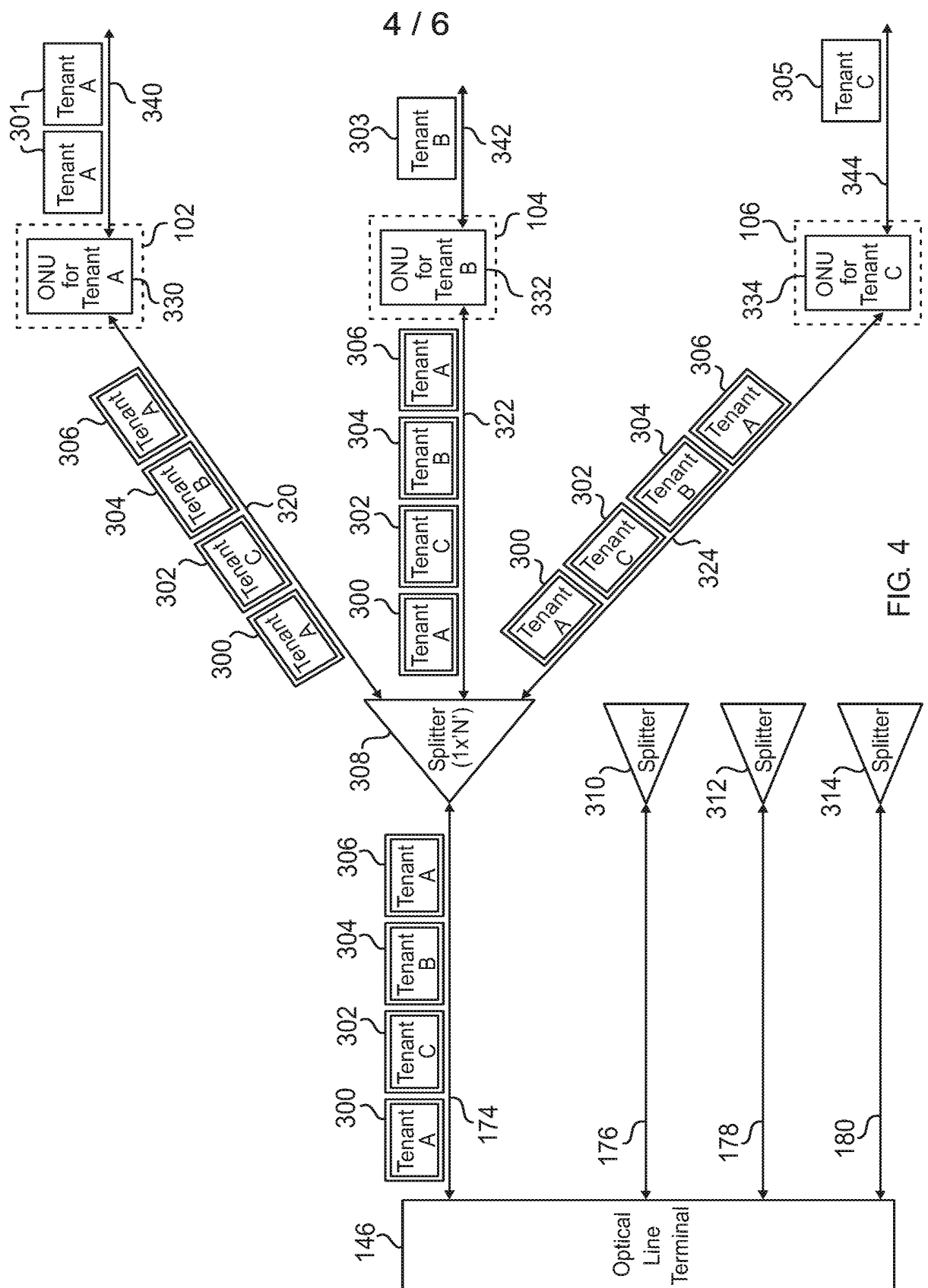


FIG. 4

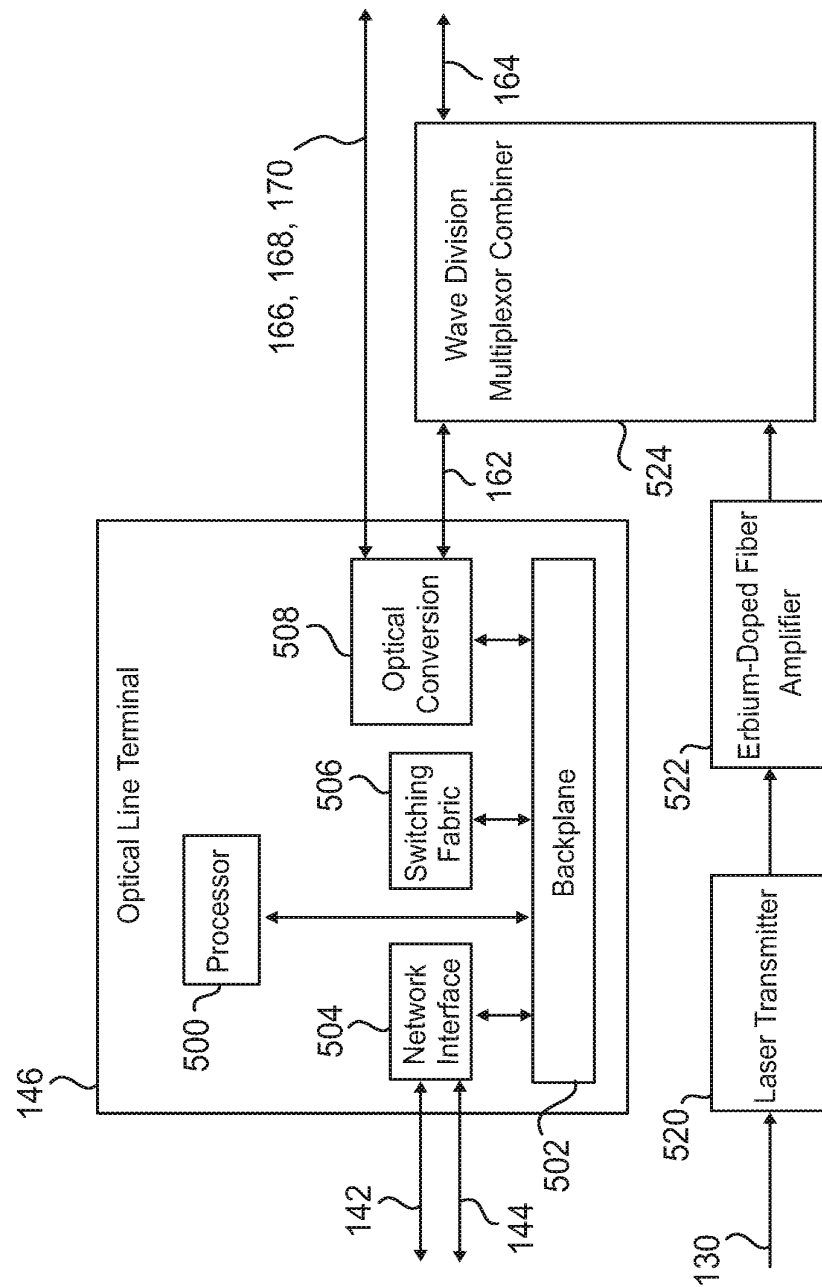


FIG. 5

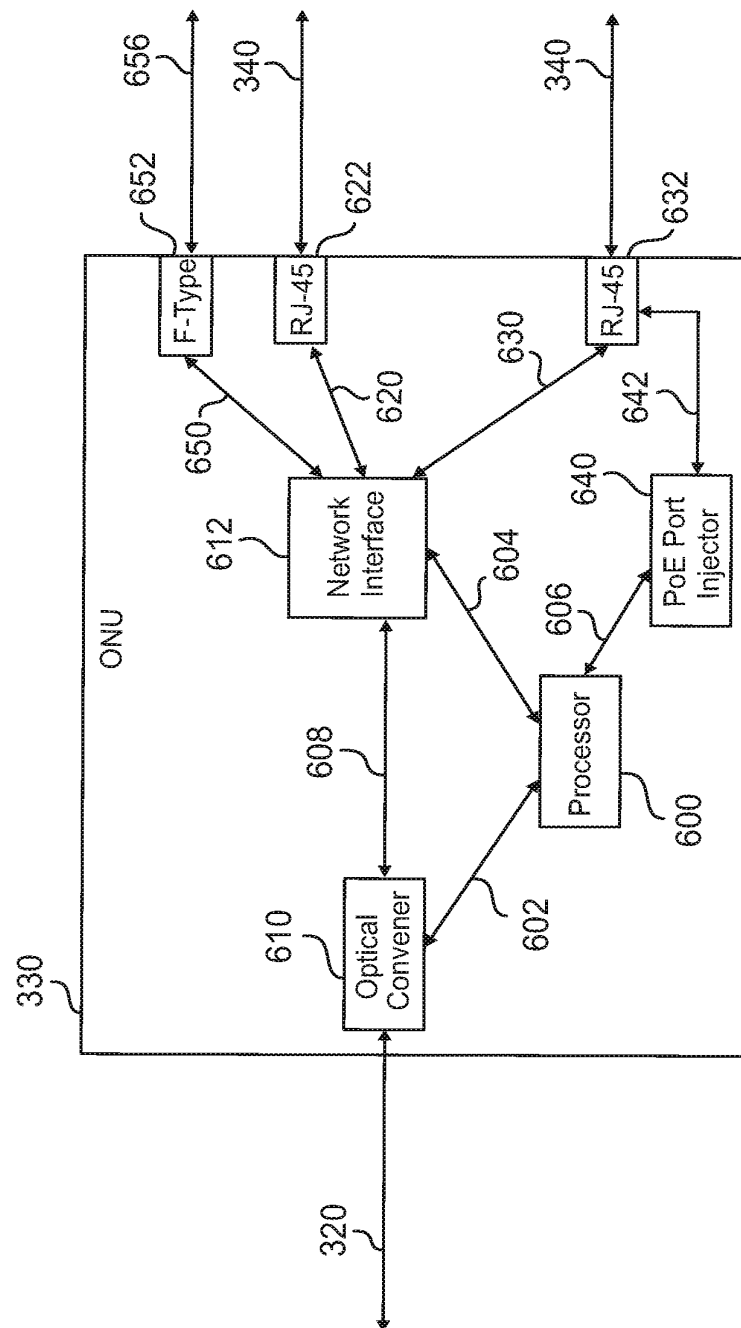


FIG. 6

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		Mutually secure optical data network and method		
First Named Inventor/Applicant Name:		Joseph L. Vilella		
Filer:		John David Buchaca		
Attorney Docket Number:		190072		
Filed as Small Entity				
Filing Fees for Track I Prioritized Examination - Nonprovisional Application under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	75	75
UTILITY SEARCH FEE	2111	1	330	330
UTILITY EXAMINATION FEE	2311	1	380	380
REQUEST FOR PRIORITIZED EXAMINATION	2817	1	2000	2000
Pages:				
Claims:				
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
PROCESSING FEE, EXCEPT PROV. APPLS.	2830	1	70	70
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2855

Electronic Acknowledgement Receipt	
EFS ID:	37440816
Application Number:	16600302
International Application Number:	
Confirmation Number:	7123
Title of Invention:	Mutually secure optical data network and method
First Named Inventor/Applicant Name:	Joseph L. Vilella
Customer Number:	24243
Filer:	John David Buchaca
Filer Authorized By:	
Attorney Docket Number:	190072
Receipt Date:	11-OCT-2019
Filing Date:	
Time Stamp:	18:48:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$2855
RAM confirmation Number	E20190AI51170266
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	2019-10-11_190072_Transmittal.pdf	155068	no	1
			42153b177935087166866b83762f99183021801f		
Warnings:					
Information:					
2	Application Data Sheet	2019-10-11_190072_ADS.pdf	1256037	no	9
			c72a6e6fb7342f44bdfda3d2f43d13b057150813		
Warnings:					
Information:					
3	Oath or Declaration filed	2019-10-11_190072_Declaration.pdf	151154	no	1
			0279580b9860378a93db8d3346423f9b30aed50		
Warnings:					
Information:					
4	Power of Attorney	2019-10-11_190072_POA.pdf	371182	no	2
			7ad869f8e6cd9d9c205e2e2ea9c7256f507a0d24		
Warnings:					
Information:					
5	TrackOne Request	2019-10-11_190072_CertReqForPrioritizedExam.pdf	155406	no	1
			c46730d2ec945d1e02625d0f3339cccd098310171		
Warnings:					
Information:					
6	First Action Interview - Enrollment Request	2019-10-11_190072_ReqForFirstActionInterview.pdf	140488	no	1
			5f4e7231c19576c3aa9274a19bd2d26e7ba0bb616		
Warnings:					
Information:					

7		2019-10-11_190072_DescriptionClaimsAbstract.pdf	197803	yes	16
			71243b11ebef8abafec7d441b93f662fd7c2b0bd		
	Multipart Description/PDF files in .zip description				
	Document Description	Start	End		
	Specification	1	12		
	Claims	13	15		
	Abstract	16	16		
Warnings:					
Information:					
8	Drawings-other than black and white line drawings	2019-10-11_190072_Drawing.pdf	213286	no	6
			34124fb7a4fb4cc46e3941e71d474f29ee0712ac		
Warnings:					
Information:					
9	Fee Worksheet (SB06)	fee-info.pdf	40338	no	2
			ba9b47f70a96bba5613798be294b6f0cf4e254dc7		
Warnings:					
Information:					
Total Files Size (in bytes):			2680762		
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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
16/600,302	10/11/2019	2636	785	190072	13	3

CONFIRMATION NO. 7123

FILING RECEIPT



24243
CHARMASSON, BUCHACA & LEACH, LLP
2635 Camino Del Rio South
Suite 102
SAN DIEGO, CA 92108

Date Mailed: 10/30/2019

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.

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Inventor(s)

Joseph L. Vilella, San Diego, CA;

Applicant(s)

Joseph L. Vilella, San Diego, CA;

Power of Attorney: The patent practitioners associated with Customer Number 24243

Domestic Priority data as claimed by applicant

This application is a CON of 16/431,602 06/04/2019
which is a CIP of 15/351,315 11/14/2016 ABN
which is a CIP of 14/419,092 02/02/2015 ABN
which is a 371 of PCT/US2013/053389 08/02/2013
which claims benefit of 61/678,977 08/02/2012

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: 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: 10/28/2019

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/600,302**

Projected Publication Date: 02/06/2020

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Mutually secure optical data network and method

Preliminary Class

398

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

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

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page 2 of 4

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 16/600,302				
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	75	N/A				
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	330	N/A				
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	380	N/A				
TOTAL CLAIMS (37 CFR 1.16(ii))	13	minus 20 =	*	x 50 =	0.00	OR				
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 =	*	x 230 =	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					
				TOTAL	785	TOTAL				
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED - PART II										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY		
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE(\$)	ADDITIONAL FEE(\$)	RATE(\$)	ADDITIONAL FEE(\$)		
	Total (37 CFR 1.16(ii))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		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(ii))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		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 NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/600,302	10/11/2019	Joseph L. Vilella	190072	7123
24243	7590	10/31/2019	EXAMINER	
CHARMASSON, BUCHACA & LEACH, LLP 2635 Camino Del Rio South Suite 102 SAN DIEGO, CA 92108			ART UNIT	PAPER NUMBER
			2491	
			NOTIFICATION DATE	DELIVERY MODE
			10/31/2019	ELECTRONIC

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

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

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

john@charmason.com

<i>Decision Granting Request for Prioritized Examination (Track I)</i>	Application No. 16/600,302	Applicant(s) Vilella, Joseph L.	
	Examiner BRIAN W BROWN	Art Unit OPET	AIA (FITF) Status No
1. THE REQUEST FILED <u>11 October 2019</u> IS GRANTED . The above-identified application has met the requirements for prioritized examination A. ☒ for an original nonprovisional application (Track I). B. ☐ for an application undergoing continued examination (RCE). 2. The above-identified application will undergo prioritized examination. The application will be accorded special status throughout its entire course of prosecution until one of the following occurs: A. filing a <u>petition for extension of time</u> to extend the time period for filing a reply; B. filing an <u>amendment to amend the application to contain more than four independent claims, more than thirty total claims</u>, or a multiple dependent claim; C. filing a <u>request for continued examination</u> ; D. filing a notice of appeal; E. filing a request for suspension of action; F. mailing of a notice of allowance; G. mailing of a final Office action; H. completion of examination as defined in 37 CFR 41.102; or I. abandonment of the application. Telephone inquiries with regard to this decision should be directed to BRIAN BROWN at (571)272-5338. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.			
/BRIAN W BROWN/ Petitions Examiner, OPET			



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/600,302	10/11/2019	Joseph L. Vilella	190072	7123
24243	7590	12/19/2019		
CHARMASSON, BUCHACA & LEACH, LLP 2635 Camino Del Rio South Suite 102 SAN DIEGO, CA 92108			EXAMINER COHEN, HARVEY I	
			ART UNIT	PAPER NUMBER
			2439	
			NOTIFICATION DATE	DELIVERY MODE
			12/19/2019	ELECTRONIC

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

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

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

john@charmason.com

First Action Interview Pilot Program Pre-Interview Communication	Application No. 16/600,302	Applicant(s) Vilella, Joseph L.	
	Examiner HARVEY I COHEN	Art Unit 2439	AIA (FITF) Status No

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

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

This time period for reply is extendable under 37 CFR 1.136(a) for only ONE additional MONTH.

This communication constitutes notice under 37 CFR 1.136(a)(1)(i).

Applicant must, within the time period for reply, file: (1) A letter requesting not to have a first action interview; (2) A reply under 37 CFR 1.111 waiving the first action interview and First Action Interview Office Action; or (3) An Applicant Initiated Interview Request Form (PTOL-413A) electronically via EFS-Web, accompanied by a proposed amendment or arguments, and schedule the interview within 2 months from the filing of the request. A failure to respond to this communication will be treated as a request not to have an interview. If applicant waives the First Action Interview Office Action, the instant Pre-Interview Communication is deemed the first Office Action on the Merits. The next subsequent Office action may be made final if appropriate. See MPEP 706.07(a).

Status

1) ☒ Responsive to communication(s) filed on 10/11/2019 .

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____ .

Disposition of Claims

2) ☒ Claim(s) 1-13 is/are pending in the application.

2a) Of the above claim(s) ____ is/are withdrawn from consideration.

3) ☐ Claim(s) ____ is/are allowed.

4) ☒ Claim(s) 1-13 is/are rejected.

5) ☐ Claim(s) ____ is/are objected to.

6) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

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

8) ☒ The drawing(s) filed on 10/11/2019 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

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

Priority under 35 U.S.C. § 119

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

a) ☐ All b) ☐ Some * c) ☐ None of:

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

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

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

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

Contact Information

Examiner's Telephone Number: (571)270-0526

Examiner's Typical Work Schedule: 7:30-5:00 pm, Alt Fri off

Supervisor's Name: Luu Pham

Supervisor's Telephone Number:
571-270-5002

Attachment(s) 1) ☒ Notice of References Cited (PTO-892) 2) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ____ .	3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ . 4) ☐ Other: ____ .
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<i>First Action Interview Pilot Program Pre-Interview Communication</i>	Application No. 16/600,302		Applicant(s) Vilella, Joseph L.	
	Examiner HARVEY I COHEN		Art Unit 2439	AIA (FITF) Status No

Notification of Rejection(s) and/or Objection(s)

#	Claim(s)	Reference(s) (if applicable)	Rejection Statutory Basis	Brief Explanation of Rejection
1	1-4 and 9-10	A B	103	Dupont(A) teaches (abstract, par. 9) (Dupont: par. 66; multiple customers are provided with a customer port ("CP") 68 at the customer's physical location through the use of Ethernet equipment 70; Ethernet Equipment 70 includes multiple customer physical to CPs 68)
2	1-4 and 9-10	A B	103	Dupont (A): par. 10; high speed communication system such as a fiber optic network or SONET/SDH network to transmit data between the user equipment and the WAN access device.
3	1-4 and 9-10	A B	103	Kolli teaches virtual routing tables
4	5-7 and 11-13	A B C	103	Dupont(A) and Koli(B) as above; Sanderson(C) teaches voice and video; private user communication; plurality of service providers / customers / corporate entities

Expanded Discussion/Commentary

5		Claim 1: multi-user optical data; service provider (Dupont: par. 29; internet access device such as an internet backbone router 5 ("BR") [e.g., service carrier]. The BR 5 has a number of ports (not shown) with internet protocol ("IP") addresses assigned thereto. Internet access is achieved through accessing the ports on the BR 5; par. 10; high speed communication system such as a fiber optic network or SONET/SDH network to transmit data between the user equipment and the WAN access device)	
6		Claim 1: uplink to optical terminal; plurality of user devices (Dupont: par. 66; multiple customers are provided with a customer port ("CP") 68 at the customer's physical location through the use of Ethernet equipment 70; Ethernet Equipment 70 includes multiple customer physical to CPs 68; : par. 53; the Ethernet input stream [e.g., feeds] and sends them to the appropriate agents within protocol engine; par. 10; high speed communication system such as a fiber optic network or SONET/SDH network to transmit data between the user equipment [user devices] and the WAN access device)	
7		Claim 1: virtual routing table for each one of said plurality of optical network units (Kolli: par. 53; one or more virtual routing tables maintained by the transparent virtual router 510; par. 49; transparent virtual router is also in communication with one or more IP router (s) 452 of one or more ISP(s) through a high-speed connection 448 (e.g., a fiber optical gigabit Ethernet connection)	
8		Claim 1: extract packets for supported devices (Dupont: par. 11; operable to frame the received downstream data packet into a format compatible [e.g., supported] for receipt by the user network; par. 48; MAC filter 47 filters Ethernet messages passing over the user LAN based on the destination MAC address in each Ethernet packet. The MAC filter 47 only accepts packets destined to the MAC address associated with the protocol engine 30 and broadcast/multicast packets; par. 53; protocol demux demultiplexes [e.g., extracts] packets from the Ethernet input stream and sends them to the appropriate agents within protocol engine)	
9		Claim 2: Extract for intended recipient only (Dupont: par. 41; accept all Ethernet encapsulation types from the user LAN 3 and only provide one encapsulation type to the user LAN 3)	
10		Claim 3: generate virtual routing tables (Kolli: par. 53; one or more virtual routing tables maintained by the transparent virtual router 510; par. 49; transparent virtual router is also in communication with one or more IP router (s) 452 of one or more ISP(s) through a high-speed connection 448 (e.g., a fiber optical gigabit Ethernet connection)	
DATE: 12 December 2019		/HARVEY I COHEN/ Examiner, Art Unit 2439	/LUU T PHAM/ Supervisory Patent Examiner, Art Unit 2439

U.S. Patent and Trademark Office

PTOL-413FP (Rev. 08-13)

First Action Interview Pilot Program - Pre-Interview Communication Part of Paper No./Mail Date 20191209

First Action Interview Pilot Program Pre-Interview Communication	Application No. 16/600,302		Applicant(s) Vilella, Joseph L.	
	Examiner HARVEY I COHEN		Art Unit 2439	AIA (FITF) Status No

Notification of Rejection(s) and/or Objection(s)

#	Claim(s)	Reference(s) (if applicable)	Rejection Statutory Basis	Brief Explanation of Rejection

Expanded Discussion/Commentary

11		Claim 4: generation of uniquely tagged frames (Dupont: par. 67; a VLAN to the router port extension; each customer [user] has its own VLAN Id and is provided with a CP [customer port]; each CP is mapped to a VP [virtual port] and a RPE [router port extension]. Standard "VLAN tagging," as defined by IEEE802.1 Q, and virtual channels are preferably used to map each particular customer traffic flow; each VP is addressable by a unique Ethernet MAC address for reaching the RPE service)	
12		Claim 5: Each opt network unit to a separate number of users (Sanderson: par. 84; interfaces in the CE router may be configured as a member of a local VRF [VPN-specific routing and forwarding table]. Members of the same VRF can exchange packets with each other. A separate routing table is created with each new VRF. Traffic is not exchanged between two local VRFs unless specifically configured to do so: this naturally separates the traffic into secure domains)	
13		Claim 6: digitized voice and video (Sanderson: par. 86; customer edge interface; bi-directionally and provides traffic in both directions; transport of each subscribed service voice, video and Internet/private data network; par. 180; VOIP [e.g., digitized voice] devices from different customer organizations into one voice VPN)	
14		Claim 7: enterprise aggregating switch (Sanderson: par. 48; figs. 4, 5; customers A, B, C, and D may be different corporate entities [e.g., enterprises]. Customer A has three sites at different physical locations, A1, A2 and A3. Customer B has one site, B1. Customer C has two sites C1 and C2; refer to fig. 4, which schematically shows physical connectivity in one particular embodiment of a converged network; par. 62; customer is defined as an entity, for example a corporate entity, that uses the network. A user is an individual who uses services on the network; par. 49; par. 52; different customer sites are connected to the network through the PE routers [e.g., enterprise aggregating switch])	
15		Claim 8: plurality of routers (Dupont: par. 0009; high speed network multiple users or LANs with a high speed data communication path to a WAN access device via a high speed access medium, such as a fiber optic network; par. 29; fiber optic system 4 provides a connection between the user LAN 3 and an internet access device such as an internet backbone router 5 ("BR"). The BR 5 has a number of ports with internet protocol ("IP") addresses assigned thereto. Internet access is achieved through accessing the ports on the BR 5; par. 66; multiple customers are provided with a customer port ("CP") 68 at the customer's physical location)	
16		Claim 8: plurality of uplinks (Sanderson: par. 48; figs. 4, 5; customers A, B, C, and D may be different corporate entities. Customer B has one site, B1. Customer C has two sites, C1 and C2; refer to fig. 4, which schematically shows physical connectivity in one particular embodiment of a converged network; par. 62; customer is defined as an entity, for example a corporate entity, that uses the network. A user is an individual who uses services on the network; par. 49; par. 52; different customer sites are connected to the network through the PE routers [e.g., enterprise aggregating switch])	
DATE: 12 December 2019		/HARVEY I COHEN/ Examiner, Art Unit 2439	/LUU T PHAM/ Supervisory Patent Examiner, Art Unit 2439

U.S. Patent and Trademark Office

PTOL-413FP (Rev. 08-13)

First Action Interview Pilot Program - Pre-Interview Communication

Part of Paper No./Mail Date 20191209

<i>First Action Interview Pilot Program Pre-Interview Communication</i>	Application No. 16/600,302		Applicant(s) Vilella, Joseph L.	
	Examiner HARVEY I COHEN		Art Unit 2439	AIA (FITF) Status No

Notification of Rejection(s) and/or Objection(s)

#	Claim(s)	Reference(s) (if applicable)	Rejection Statutory Basis	Brief Explanation of Rejection

Expanded Discussion/Commentary

17		Claim 8: common data supporting user devices (Dupont: par. 66; multiple customers are provided with a customer port ("CP") 68 at the customer's physical location through the use of Ethernet equipment 70; Ethernet Equipment 70 includes multiple customer physical to CPs 68)	
18		Claim 8: virtual routing tables (Kolli: par. 53; one or more virtual routing tables maintained by the transparent virtual router 510; par. 49; transparent virtual router is also in communication with one or more IP router (s) 452 of one or more ISP(s) through a high-speed connection 448 (e.g., a fiber optical gigabit Ethernet connection)	
19		Claim 8: does not extract data intended for other devices (Dupont: par. 11; operable to frame the received downstream data packet into a format compatible [e.g., supported] for receipt by the user network; par. 48; MAC filter 47 filters Ethernet messages passing over the user LAN based on the destination MAC address in each Ethernet packet. The MAC filter 47 only accepts [e.g., does not extract others] packets destined to the MAC address associated with the protocol engine 30 and broadcast/multicast packets; par. 53; protocol demux demultiplexes [e.g., extracts] packets from the Ethernet input stream and sends them to the appropriate agents within protocol engine)	
20		Claim 9: plurality of private data streams serving plurality of users (Dupont: par. 0009; high speed network ... multiple users or LANs with a high speed data communication path to a WAN access device via ... a fiber optic network; par. 29; fiber optic system 4 provides a connection between the user LAN 3 and an internet access device such as an internet backbone router 5 ("BR"). The BR 5 has a number of ports [e.g., plurality of streams] (not shown) with internet protocol ("IP") addresses assigned thereto; par. 66; multiple customers provided with a customer port at the customer's physical location through the use of Ethernet equipment 70; includes multiple customer physical connections.	
21		Claim 9: aggregating (Dupont: par. 66; Ethernet Equipment 70 multiplexes multiple customers)	
22		Claim 9: routing to at least two (Dupont: par. 48; MAC filter 47 filters Ethernet messages passing over the user LAN based on the destination MAC address in each Ethernet packet. The MAC filter 47 only accepts packets destined to the MAC address associated with the protocol engine 30 and broadcast/multicast packets [e.g., broadcast to more than one destination]; par. 53; protocol demux demultiplexes [e.g., extracts] packets from the Ethernet input stream and sends them to the appropriate agents within protocol engine	
DATE: 12 December 2019		/HARVEY I COHEN/ Examiner, Art Unit 2439	/LUU T PHAM/ Supervisory Patent Examiner, Art Unit 2439

U.S. Patent and Trademark Office

PTOL-413FP (Rev. 08-13)

First Action Interview Pilot Program - Pre-Interview Communication

Part of Paper No./Mail Date 20191209

<i>First Action Interview Pilot Program Pre-Interview Communication</i>	Application No. 16/600,302		Applicant(s) Vilella, Joseph L.	
	Examiner HARVEY I COHEN		Art Unit 2439	AIA (FITF) Status No

Notification of Rejection(s) and/or Objection(s)

#	Claim(s)	Reference(s) (if applicable)	Rejection Statutory Basis	Brief Explanation of Rejection

Expanded Discussion/Commentary

23		Claim 9: virtual routing table (Kolli: par. 53; one or more virtual routing tables maintained by the transparent virtual router 510; par. 49; transparent virtual router is also in communication with one or more IP router (s) 452 of one or more ISP(s) through a high-speed connection 448 (e.g., a fiber optical gigabit Ethernet connection)	
24		Claim 9: uniquely tagging frames (Dupont: par. 67; a VLAN to the router port extension; each customer [user] has its own VLAN Id and is provided with a CP [customer port]; each CP is mapped to a VP [virtual port] and a RPE [router port extension]. Standard "VLAN tagging," as defined by IEEE802.1 Q, and virtual channels are preferably used to map each particular customer traffic flow; each VP is addressable by a unique Ethernet MAC address for reaching the RPE service)	
25		Claim 9: distributing tagged frames per routing table (Dupont: par. 44; source MAC address is fixed to the one associated with the protocol engine 30. The destination MAC address is dynamically resolved; par. 48; accepts packets destined to the MAC address associated with the protocol engine 30 and broadcast/multicast packets; par. 65; each RPE [router port extension] has an associated Virtual Port ("VP"))	
26		Claim 9: extracting (Dupont: par. 11; operable to frame the received downstream data packet into a format compatible [e.g., supported] for receipt by the user network; par. 48; MAC filter 47 filters Ethernet messages passing over the user LAN based on the destination MAC address in each Ethernet packet. The MAC filter 47 only accepts packets destined to the MAC address associated with the protocol engine 30 and broadcast/multicast packets; par. 53; protocol demux demultiplexes [e.g., extracts] packets from the Ethernet input stream and sends them to the appropriate agents within protocol engine)	
27		Claim 10: associating destination in vrt (Dupont: par. 44; source MAC address is fixed to the one associated with the protocol engine 30. The destination MAC address is dynamically resolved; par. 48; accepts packets destined to the MAC address associated with the protocol engine 30 and broadcast/multicast packets; par. 65; each RPE [router port extension] has an associated Virtual Port ("VP"))	
28		Claim 11: ONU support a separate number of users (Sanderson: par. 84; interfaces in the CE router may be configured as a member of a local VRF [VPN-specific routing and forwarding table]. Members of the same VRF can exchange packets with each other. A separate routing table is created with each new VRF. Traffic is not exchanged between two local VRFs unless specifically configured to do so: this naturally separates the traffic into secure domains)	
DATE: 12 December 2019		/HARVEY I COHEN/ Examiner, Art Unit 2439	/LUU T PHAM/ Supervisory Patent Examiner, Art Unit 2439

U.S. Patent and Trademark Office

PTOL-413FP (Rev. 08-13)

First Action Interview Pilot Program - Pre-Interview Communication

Part of Paper No./Mail Date 20191209

First Action Interview Pilot Program Pre-Interview Communication	Application No. 16/600,302		Applicant(s) Vilella, Joseph L.	
	Examiner HARVEY I COHEN		Art Unit 2439	AIA (FITF) Status No

Notification of Rejection(s) and/or Objection(s)

#	Claim(s)	Reference(s) (if applicable)	Rejection Statutory Basis	Brief Explanation of Rejection

Expanded Discussion/Commentary

29		Claim 12: plurality of service providers (Sanderson: par. 48; figs. 4, 5; customers A, B, C, and D may be different corporate entities. Customer A has three sites at different physical locations, A1, A2 and A3. Customer B has one site, B1. Customer C has two sites, C1 and C2; refer to fig. 4, which schematically shows physical connectivity in one particular embodiment of a converged network; par. 62; customer is defined as an entity, for example a corporate entity, that uses the network. A user is an individual who uses services on the network; par. 49; par. 52; different customer sites are connected to the network through the PE routers)(Dupont: par. 26; BR 5 a number of ports)
30		Claim 13: enterprise aggregating switch (Sanderson: par. 48; figs. 4, 5; customers A, B, C, and D may be different corporate entities. Customer A has three sites at different physical locations, A1, A2 and A3. Customer B has one site, B1. Customer C has two sites, C1 and C2; refer to fig. 4, which schematically shows physical connectivity in one particular embodiment of a converged network; par. 62; customer is defined as an entity, for example a corporate entity, that uses the network. A user is an individual who uses services on the network; par. 49; par. 52; different customer sites are connected to the network through the PE routers [e.g., enterprise aggregating switch])
DATE: 12 December 2019		/HARVEY I COHEN/ Examiner, Art Unit 2439
		/LUU T PHAM/ Supervisory Patent Examiner, Art Unit 2439

U.S. Patent and Trademark Office
PTOL-413FP (Rev. 08-13)

First Action Interview Pilot Program - Pre-Interview Communication Part of Paper No./Mail Date 20191209

<i>Notice of References Cited</i>	Application/Control No. 16/600,302		Applicant(s)/Patent Under Reexamination Vilella, Joseph L.	
	Examiner HARVEY I COHEN		Art Unit 2439	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-20020141421-A1	10-2002	Dupont, Jean-Lou	H04Q11/0478	370/403
*	B	US-20080212598-A1	09-2008	Kolli; Raja	H04L29/12207	370/409
*	C	US-20040223500-A1	11-2004	Sanderson, David M.	H04L12/4641	370/395.53
	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

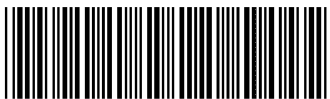
*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*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.

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

Notice of References Cited

Part of Paper No. 20191209

<i>Search Notes</i> 	Application/Control No. 16/600,302	Applicant(s)/Patent Under Reexamination Vilella, Joseph L.
	Examiner HARVEY I COHEN	Art Unit 2439

CPC - Searched*		
Symbol	Date	Examiner
H04Q11/0067 H04B10/27 H04L63/0414	12/09/2019	HC
H04Q2011/0073 H04Q2011/0086	12/09/2019	HC

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
Performed inventor search in PALM	12/09/2019	HC
Performed inventor search in EAST	12/09/2019	HC
Performed inventive search terms in EAST	12/09/2019	HC

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

/HARVEY I COHEN/ Examiner, Art Unit 2439	
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	14	(Joseph NEAR3 Vilella).in.	US-PGPUB; USPAT	OR	ON	2019/12/09 07:48
S2	6541	(H04Q11/0067 H04B10/27 H04L63/0414 H04Q2011/0073 H04Q2011/0086).cpc.	US-PGPUB; USPAT	OR	ON	2019/12/09 07:48
S4	0	(H04Q11/0067 H04B10/27 H04L63/0414 H04Q2011/0073 H04Q2011/0086).cpc. AND ((optic\$4) WITH router) AND ((virtual NEAR routing) (virtual NEAR routing NEAR table)) AND ((extract\$3 (pull\$3 ADJ out) remov\$3 obtain\$4 pars\$3) NEAR5 (data)) AND (@AD < "20120802")	US-PGPUB; USPAT	OR	ON	2019/12/09 08:46
S5	1	"20060269285".pn.	US-PGPUB; USPAT	OR	ON	2019/12/09 09:21
S6	1	"20100232608".pn.	US-PGPUB; USPAT	OR	ON	2019/12/09 09:22
S7	1	"7509144".pn.	US-PGPUB; USPAT	OR	ON	2019/12/09 09:22
S8	1	"8315387".pn.	US-PGPUB; USPAT	OR	ON	2019/12/09 09:22
S9	1	"9900224".pn.	US-PGPUB; USPAT	OR	ON	2019/12/09 09:24
S10	1	"20140195666".pn.	US-PGPUB; USPAT	OR	ON	2019/12/09 09:24
S11	1	"6460095".pn.	US-PGPUB; USPAT	OR	ON	2019/12/09 09:25
S12	1	"20100232608".pn.	US-PGPUB; USPAT	OR	ON	2019/12/09 09:27
S13	7	(US-20060269285-\$ or US-20100232608-\$ or US-20140195666-\$).did. or (US-7509144-\$ or US-8315387-\$ or US-9900224-\$ or US-6460095-\$).did.	US-PGPUB; USPAT	OR	ON	2019/12/09 09:28
S14	3	S13 AND (virtual NEAR3 table)	US-PGPUB; USPAT	OR	ON	2019/12/09 09:29
S15	20	((optic\$4) WITH router) AND ((virtual NEAR routing) (virtual NEAR routing NEAR table)) AND ((extract\$3 (pull\$3 ADJ out) remov\$3 obtain\$4 pars\$3) NEAR5 (data)) AND (@AD <	US-PGPUB; USPAT	OR	ON	2019/12/09 09:30

		"20120802")				
S16	20	((optic\$4 photonic (passive NEAR2 optical)) WITH router) AND ((virtual NEAR routing) (virtual NEAR routing NEAR table)) AND ((extract\$3 (pull\$3 ADJ out) remov\$3 obtain\$4 pars\$3) NEAR5 (data)) AND (@AD < "20120802")	US-PGPUB; USPAT	OR	ON	2019/12/09 09:52
S17	97	("20040165600" "20040196827" "20040218539" "20040223500" "20050044262" "20050213513" "20080044181" "20110286452" "7095738" "7184437" "7221675" "7286479" "7359989" "7856509" "8151000").PN. OR ("8953590").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2019/12/09 11:03
S18	10	(US-20060269285-\$ or US-20100232608-\$ or US-20140195666-\$ or US-20020141421-\$ or US-20040223500-\$ or US-20040165600-\$).did. or (US-7509144-\$ or US-8315387-\$ or US-9900224-\$ or US-6460095-\$).did.	US-PGPUB; USPAT	OR	ON	2019/12/10 08:22
S19	4	S18 AND ((voip voice) AND video)	US-PGPUB; USPAT	OR	ON	2019/12/10 08:22
S20	3	S18 AND enterprise	US-PGPUB; USPAT	OR	ON	2019/12/10 08:37
S21	1	"20050152301".pn.	US-PGPUB; USPAT	OR	ON	2019/12/10 08:38
S22	43	((optic\$4 photonic (passive NEAR2 optical)) WITH router) AND ((virtual NEAR routing) (virtual NEAR routing NEAR table)) AND (aggregat\$3 multiplex\$3 (common NEAR channel)) AND (@AD < "20120802")	US-PGPUB; USPAT	OR	ON	2019/12/10 12:11
S23	11	(US-20060269285-\$ or US-20100232608-\$ or US-20140195666-\$ or US-20020141421-\$ or US-20040223500-\$ or US-20040165600-\$ or US-20050152301-\$ or US-20080212598-\$).did. or (US-7509144-\$ or US-8315387-\$ or US-9900224-\$).did.	US-PGPUB; USPAT	OR	ON	2019/12/11 08:01
S24	43	((optic\$4 photonic (passive NEAR2 optical)) WITH router) AND ((virtual NEAR routing) (virtual NEAR routing NEAR table)) AND (aggregat\$3 multiplex\$3 (common NEAR channel)) AND (@AD < "20120802")	US-PGPUB; USPAT	OR	ON	2019/12/11 08:02
S25	0	S24 AND (data NEAR feed)	US-PGPUB; USPAT	OR	ON	2019/12/11 08:02
S26	3	S24 AND (feed)	US-PGPUB; USPAT	OR	ON	2019/12/11 08:02
S27	2	S23 and passive	US-PGPUB; USPAT	OR	ON	2019/12/11 08:03
S28	9	S23 and stream	US-PGPUB; USPAT	OR	ON	2019/12/11 08:05
S29	7	S23 AND (enterprise organization corporate corporation)	US-PGPUB; USPAT	OR	ON	2019/12/11 09:20

12/ 12/ 2019 9:17:45 AM

C:\Users\hcohen\Documents\EAST\Workspaces\16-600302-Vilella-MutuallySecureOpticalDataNetwork.wsp

Bibliographic Data

Application No: 16/600,302

Foreign Priority claimed: ☐ Yes ☒ No

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

Verified and Acknowledged: /HARVEY I COHEN/

Examiner's Signature

Initials

Title:

Mutually secure optical data network and method

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/11/2019	726	2439	190072
RULE			

APPLICANTS

INVENTORS

Joseph L. Vilella San Diego, CA, UNITED STATES

CONTINUING DATA

This application is a CON of 16431602 06/04/2019

16431602 is a CIP of 15351315 11/14/2016ABN

15351315 is a CIP of 14419092 02/02/2015ABN

14419092 is a 371 of PCT/US2013/053389 08/02/2013

PCT/US2013/053389 has PRO of 61678977 08/02/2012

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

10/28/2019

** SMALL ENTITY **

STATE OR COUNTRY

UNITED STATES

ADDRESS

CHARMASSON, BUCHACA & LEACH, LLP

2635 Camino Del Rio South

Suite 102

SAN DIEGO, CA 92108

UNITED STATES

FILING FEE RECEIVED

\$2,855

Applicant Initiated Interview Request Form

Application No.: 16600302

First Named Applicant: Joseph L. Vilella

Examiner: Cohen, Harvey I

Art Unit: 2439

Status of Application: Pending

Tentative Participants:

(1) Cohen, Harvey I

(2) Joseph L. Vilella (personally)

(3) John D. Buchaca (telephonically 619-294-2922)

(4)

Proposed Date of Interview: 02 March 2020

Proposed Time: 11:00 (☉AM☉PM)

Type of Interview Requested:(1) ☒ Telephonic(2) ☒ Personal(3) ☐ Video ConferenceExhibit To Be Shown or Demonstrated: ☐ YES☒ NO

If yes, provide brief description:

Issues To Be Discussed

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) 103 Rej.	Claims 1-13	Dupont(A), Koli(B), Sanderson(C)	☐	☐	☐
(2)			☐	☐	☐
(3)			☐	☐	☐
(4)			☐	☐	☐

☐ Continuation Sheet Attached☐ Proposed Amendment or Arguments Attached

Brief Description of Arguments to be Presented: Non-obviousness of claims in light of Declarations of Joseph L. Vilella and Michael Zegarski, as they relate to the relevant skill in the art, and secondary non-obviousness considerations

An interview was conducted on the above-identified application on

NOTE: This form should be completed and filed by applicant in advance of the interview (see MPEP § 713.01). If this form is signed by a registered practitioner not of record, the Office will accept this as an indication that he or she is authorized to conduct an interview on behalf of the principal (37 CFR 1.32(a)(3)) pursuant to 37 CFR 1.34. This is not a power of attorney to any above named practitioner. See the Instruction Sheet for this form, which is incorporated by reference. By signing this form, applicant or practitioner is certifying that he or she has read the Instruction Sheet. After the interview is conducted, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible. This application will not be delayed from issue because of applicant's failure to submit a written record of this interview.

/John Buchaca/

Applicant/Applicant's Representative Signature

Examiner/SPE Signature

John D. Buchaca

Typed/Printed Name of Applicant or Representative

619-294-2922

Applicant's/Applicant's Representative's Telephone Number

37289

Registration Number, if applicable

This collection of information is required by 37 CFR 1.133. 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 24 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.

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

WASHINGTON, D.C.

In re application of:	)	
	)	Examiner: Cohen, Harvey I
Joseph L. Vilella	)	
	)	
Serial No: 16600302	)	Art Unit: 2439
	)	
Filed: 2019-10-11	)	
	)	
For: Mutually secure optical data	)	
network and method	)	
	)	

DECLARATION OF JOSEPH L. VILELLA

I, JOSEPH L. VILELLA, declare that:

I am the sole inventor in the above referenced instant application.

I am the Chief Executive Officer of SPADA INNOVATIONS, INC. of San Diego, California (hereinafter "SPADA") specializing in information technology and the development of optical data network systems. Part of my duties included the evaluation of various systems used to communicate data on computer networks.

From 2008 to 2010 I was Director of Engineering and Operations of the Intelligence and Information Security Business Unit of Science Applications International Corporation (hereinafter "SAIC") of San Diego, CA. I was a high technology technical advisor to government and commercial entities in the information technology industry. My current curriculum vitae is attached as Exhibit A.

Background

The following is my understanding of the state of knowledge in the Information Technology (hereinafter "IT") community in the United States (hereinafter "US") up to

2012 as it relates to my development and implementation of virtual information separation through or across a Passive Optical Network (hereinafter “PON” or plural “PONs”) which is the subject of the present application.

Some time before 2008, SAIC had successfully deployed Motorola's PON technology in a local network operated by the Federal Government in Maryland. The network did not include users who needed separated information.

Some time before 2008, Motorola Mobility had successfully deployed its version of a PON into a multi-story, single tenant corporate building in Seattle, Washington. The network did not include users who needed separated information such as separate companies occupying the same building.

In 2008, a concerted effort was launched by SAIC to introduce PONs into the commercial sector of the US. Heretofore, the commercial sector had been totally dominated by copper networks and Cisco-based networking products.

On or about 2008, as part of my duties with SAIC, I requested and was given the task to introduce PONs in the commercial sector in the western United States. After two years of hard work with very little progress, it became clear to me and the company that SAIC was not properly set up to adequately support the PON commercialization initiative. Specifically, SAIC could not adequately respond to the accelerated bidding process and the rapid decision making required by the commercial sector. Further, in my opinion, it lacked the will to engage the strong opposition to PONs by the copper networking, Cisco-based IT establishment.

It is important to note that the Cisco dominated IT establishment in the US at the time clearly understood the threat PONs presented to the Cisco-biased status quo. A PON drastically simplified IT networking and did not require any Cisco certified personnel to deploy, operate, and manage it. In particular, many Cisco certified technicians had a

reasonable fear for their job security. Many had little interest in PONs, arguing strongly against its adoption and, to my knowledge, even blocking some PON deployment efforts. In essence, there was a US-wide IT industry bias against the adoption of PON technology and absolutely no interest to learn about it.

In or about 2010, due to the above-described circumstances, I left SAIC to establish SPADA which would seek to establish PON in the commercial sector with help from SAIC. As a new venture, SPADA would be free from any reluctance to implement PONs because of the powerful Cisco-based status quo. Further, SPADA would be nimble enough to rapidly address any problems that might be encountered during initial development, and overcome any encountered resistance. And, SPADA would have the fundamental expertise in both PONs and Cisco-based IT.

For the next several years, SPADA was considered the only outfit in the Western US with PON technical expertise. We at SPADA strived to secure PON projects for commercial entities such as corporations, hospitals and universities, along with government facilities.

Although SPADA achieved modest progress in implementing PON commercially, it remained difficult to market PON to the target entities and overcome the strong commitment of their IT departments to continue to use Cisco products and protect their Cisco-based status quo.

In or about late 2011, SPADA's sales and marketing team then decided to approach the developers and owners of commercial buildings, assuming that a PON would work well for them. In this way, the developers/owners could act as partners by introducing the PON technology to the commercial tenant entities, many of which were small corporations that did not have any IT bias or even care about Cisco products. SPADA would discuss the specific technical features with the tenant entities and thus excite them to embrace and use the PON technology.

While establishing this new marketing strategy, we at SPADA came to the technical realization that the PON technology, as it was currently designed and used, was not purposefully meant to provide legal information separation within the PON. Such information separation would be demanded by corporate tenants who had no relationship with one another other than renting space within the same building. This created a serious technical problem because all of those tenants would ostensibly be served by a single PON head-end called an Optical Line Terminal (hereinafter "OLT") which was not intended to provide such information separation. That was something that conventional copper networks easily solved by physically separating entities/users by using a dedicated router located within the private space of each entity/user. PONs, on the other hand, by their very nature were not intended to support the use of entity/user located routers to physically separate information. With a PON, every user on the network was expected to have optical end point devices called Optical Network Units (hereinafter "ONUs") that would provide the necessary voice, video and data communication. In essence, the accidental sharing of information across legally separated entities presented a huge risk with PON.

I struggled to find a solution this problem. Out of desperation and thinking totally out of the box, I investigated using a process that was available but rarely used in copper networks, namely Virtual Routing and Forwarding (hereinafter "VRF") as a way of somehow creating discrete, separated virtual routers on the PON. Because of its rare, limiting and infrequent use, few people in the IT community clearly understood the VRF process. At that time, neither I nor my SPADA partner James Reynante, who was a Cisco certified IT professional that had worked for me at SAIC, had enough knowledge about the VRF mechanisms to know whether the process held any potential for success.

In addition, upon contacting Motorola Mobility, who was our PON equipment provider, we found that they had not intended to use VRF operationally with their OLT and thus had not tested it for that purpose. Specifically, it was unknown whether their OLT would properly process the VRF tagged information packets being distributed to and from the

destinations on the PON. Thus, Motorola Mobility could give no assurances that VRF tagged information packets would work within their PON system.

Therefore, SPADA faced two huge challenges, namely, an apparent lack of general knowledge in the IT community of virtual information separation via the PON router, and the even less known capability of an OLT to accept and distribute the virtually separated information to and from the PON router. This was not a trivial matter because in order to virtually separate the information, the standard way of addressing the source and destination of each Ethernet frame had to be changed to a unique labeling scheme that had to be accepted by the OLT of the PON. I was not aware of any experts in the PON community that had any confidence that the change of addressing would work. Furthermore, the virtual separation of information was also counter-intuitive to the precious few IT experts who understood VRF because such processing completely eliminated direct information sharing between entities/users within the network they shared. This would prevent such commonly used functions such as calendar sharing, virtual meetings, and sharing financial data among users on the PON. Such a restriction was likely to be dismissed outright by those attempting to implement PON in the commercial setting.

In or about the second quarter of 2012, SPADA enlisted the help of SAIC to program a router to virtually separate information using VRF and to send the specially tagged Ethernet frames through the PON OLT. Representing SAIC, Mr. Jay McGuerty brought an SAIC owned router to SPADA, and configured it to properly perform the virtual information separation using VRF. James R. Reynante prepared our PON OLT to receive the virtually separated information generated by the router and pass it via an optical splitter to two ONUs. If the information was received successfully in its entirety, the capability of PON to accept and maintain legally separated information would have been proven. If the information would have been partially received (frames were missed), or not received at all, the process would have failed. In that case, SPADA

would have had to request that Motorola Mobility undertake the daunting task of adapting their OLT operational programming to try to accommodate the process.

The results were positive and the process of virtually separating information and accepting it in its entirety across the PON was a proven and replicable reality. Such a positive initial result was not generally expected.

SPADA then requested that SAIC provide a written summary of the test activities (See Exhibit B).

Thereafter, our initial patent application was filed from which the present application derives its priority.

Satisfying a Long Felt Need

It has been known since at least 2006 when PONs were being developed that they held out great promise for significantly increasing bandwidth over copper-based networks and generally requiring less power. Therefore, the desirability of PON had been foreseen by visionary high technology innovators many years ago. However, implementation of PON, especially in the commercial sector where individual users on a network needed protection from other users was not considered as a priority.

Some PON manufacturers added encryption to their PON equipment capabilities in order to enhance information protection to the end users through the PON. However, that still did not prevent the accidental provisioning of information by the router to the wrong end user. If the information was accidentally comingled at the router and thus shared between legally separate entities, encrypting it at the OLT was useless since it would become decrypted and accidentally shared by the end users.

Configuring a router to generate virtual routing tables for the legally separated users on the PON in such a way that the OLT can properly direct frames tagged according to those

virtual routing table, fulfilled the need for sharing a PON between legally separated users in the commercial sector.

Failure of Others to Find a Solution

As stated above in the Background, in 2008 SAIC realized that implementing a PON in the commercial sector was valid endeavor. However, two years were spent trying to implement PON as designed for single, non-legally separated entities, which was too expensive for many smaller businesses.

Copying by Others

As of the date of this Declaration, I am aware of several companies who have implemented PON in the commercial sector in which one or more routers are configured to run VRF so that a separate, unique virtual routing table is generated for each ONU on their PON. Those companies include internet service providers such as AT&T, Cox Communications, and many others. Further, I believe many hotels and other hospitality-based entities have implemented my invention in their buildings to provide virtual information separation to selected ONUs on their PON.

Skepticism of Experts

I believe I would be considered to be an expert in the field of information technology as it relates to the installation of data networks and particularly optical data network systems. As I have explained within this document, the prevailing acceptance of Cisco-based IT equipment and processes, the novelty of PON technology, my lack of knowledge of the details of VRF, would have led me to be skeptical that a PON router could be configured to tag Ethernet frames according to virtual routing tables, and that an OLT would be able to properly direct those frame to and from destinations on the PON. Indeed, up until the success of the test the VRF enabled PON system, I was skeptical that the system would work.

Counter-intuitiveness

I am familiar with IT engineers and professionals. Any idea which tends to hinder shared information efficiency, increases complexity, utilizes unfamiliar functions in new ways, utilizes unfamiliar functions developed for copper networks in an optical network, and disrupts the status quo would be seen as counter-intuitive.

My claimed apparatus and method can prevent direct information sharing within a network and thus creates added complexity and networking inefficiency.

My claimed apparatus and method increases the complexity of installing a PON since the router interfacing the PON, often implemented as a so-called premise router using 2012 technology, must be configured to provide independent virtual routing tables for some or all of ONUs on the PON.

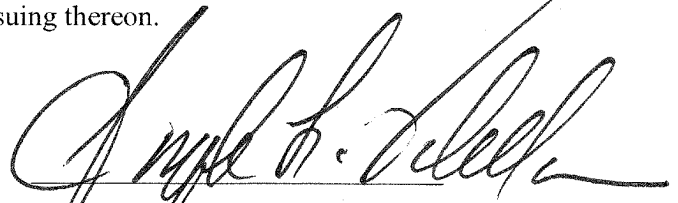
My claimed apparatus and method uses VRF which is a function unfamiliar to the typical IT technician. Further, VRF was developed for copper-based network routers that interacted with access layer switches, not for copper-based network routers that interacted with passive optical switches such as OLTs.

My claimed apparatus and method allows PON to be implemented in, for example, multi-tenant buildings which heretofore had been disfavored due to the potential for hacking. It can also be implemented by internet service providers that provide connectivity to tenants within apartment and condominium buildings as well as houses within residential neighborhoods. It can also be implemented by corporations using PON that want to virtually separate and secure critical information, with or without encryption, for greater security. This disrupts the status quo which is generally a counter-intuitive notion.

I further 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 issuing thereon.

Date: Oct 10, 2019

A handwritten signature in black ink, appearing to read "Joseph L. Yilella", written over a horizontal line.

Joseph L. Yilella, Inventor

CEO, SPADA INNOVATIONS, INC.

JOSEPH L. VILELLASan Diego, CA | (619) 884-8360 | joevilella@gmail.com**HIGH TECHNOLOGY EXECUTIVE PROFESSIONAL**

High technology executive with a proven track record in leading initiatives, founding and managing companies, developing new technologies, managing, consolidating and migrating projects, designing and configuring environments and the automation of high-performance systems. Have extensive experience the development and management of sustainability programs and initiatives. Have performed critical function as program level Design Requirements Architect and Final Approval Authority. Overarching management experience in functionality, usability, reliability, performance and regression testing. Detail oriented with the ability to rapidly learn and take advantage of new concepts, business models, and technologies. Have worked collaboratively to isolate problems and implement simple and repeatable solutions.

CAREER HIGHLIGHTS

- Pioneer in the field of Passive Optical Networks (PON) with emphasis in encrypted GPON systems.
- Identified and corrected critical design requirements problems, thus preventing the cancellation of a major US Navy Foreign Military Sales, Geographic Wide Network Centric Warfare System Program.
- Successfully developed and implemented the "first of its kind" PC based, sub-sonic real-time data acquisition and graphics display system. It was developed and implemented for the Air Force Stealth Cruise Missile flight simulator.
- Successfully developed the "first of its kind" biometric laser based fingerprint scanner "proof of concept" for the Central Intelligence Agency (CIA).
- Successfully developed and implemented the "first of its kind" Parametric, High Resolution-Digital Colour, Automated Optical Inspection System for printed circuit boards Inspection. Applied and received Patent for it.
- Developed the "first of its kind" SMT Cost of Quality Model to provide accurate analysis of the cost of manufacturing quality of the Surface Mount Technology process.
- Developed and assisted in the implement a California Title 24 energy reduction initiative related to the use of Gigabit Passive Optical Networks. This was done for the California Energy Commission under the auspices of Sempra Energy. This effort included the development of the analytics required for entities to achieve energy reduction credits.

PROFESSIONAL EXPERIENCE**Full Time Care Taker****2017 -2018**

I became the primary and sole caretaker of my dear wife Betty as she underwent the final stages of her battle with ALS. Betty passed away in July 1, 2017 and following her passing, I dedicated the appropriate period of time to bereavement, re-locating and getting back to Engineering Management. I currently do systems engineering and management consulting and I'm actively seeking an executive of position in the workforce.

SPADA Innovations, Inc. | San Diego, CA**2010 – 2017****CEO and Gigabit Passive Optical Networks System Architect**

- Pioneer in the field of Passive Optical Networks with emphasis the encrypted PON Systems (GPON). Was a fundamental contributor to the technical enhancements of the Motorola GPON system, which was the most advanced GPON technology of its time. With a strong tactical and strategic mind, ideally suited to plan and direct corporate wide moves towards the adoption of this essential next step in high bandwidth fiber optics IT infrastructure.
- Corporate President and CEO: Successfully led SPADA to the development of a fundamental Patent Pending IP in the field of Passive Optical Networks. The company is currently
- Program Manager for SPADA GPON Initiatives: Responsible for developing detailed technical studies and proposals. Negotiating, finalizing and managing contracts with customers and subs. Identifying and detailing design, deployment, integration and sell-off activities. Establishing and managing customer required

EXHIBIT A

Joseph L. Vilella

(619) 884-8360 | joevilella@gmail.com

schedules and budgets. Sub-contractors management and oversight. Developing customer reports. Supporting sub-contractors and customer meetings. Supporting final integration and sell off activities at the job sites. Developing and managing long-term GPON service and support contracts.

- Lead and managed the negotiations of a potential SPADA acquisition of the Motorola GPON Fiber to the Desk technology.
- Leading Gigabit Passive Optical Networks (GPON) technology Subject Matter Expert in the Western United States.
- Chief designer of GPON networks topology for SPADA Projects
- Lead the implementation, verification and patent application of a fundamental information separation process in the field of Gigabit Passive Optical Networks. Managed all levels of the Patent Pending process. Pending Patent US20170063542A1 – Mutually Secure Optical Data Network and Method
- Provided GPON Implementation Advisory to Semptra Energy, Time Warner Cable, Qualcomm, LEIDOS, the City of San Diego and the other high-profile companies.
- Supported Semptra Energy to implement GPON as a mandatory technology within the Title 24 Construction Code across the State of California.

Science Applications International Corp. (SAIC) | San Diego, CA

2005 - 2010

Engineering Director & Senior Technical Advisor (2007-2010)

- Managing Director of Engineering & Operations for advanced sustainability efforts related to the Greening of new and existing data center and critical infrastructure of Federal and commercial clients. Responsible for the successful development of key initiatives in this area and the overarching management of efforts related to this critical endeavor.
- Senior Technical Advisor to a Green power generation entity with a fundamental breakthrough in the area of geothermal and reclaimed power production. Responsible for in-depth technology validation and the development of the entity's overall tactical and strategic business model required to position the company for its most critical round of financing.
- Senior Technical Advisor reporting to the CIO and the Vice President of IT Operations of the Zenith Insurance Corporation in support of critical software migration of their core enterprise/multistate Oracle-based application. Responsible for providing technical advisory related the overall management activities, integration, and test processes related to this high-priority effort.

Senior Technical Advisor and Chief USG Design Requirements Architect (2005-2007)

- Senior Technical Advisor to US Government (USG) and its Prime Contractor in the areas of System Design, Integration, and Test. In that capacity performed high priority third-party evaluation of the subsystem/system design, integration, and test processes. Provided the recommendations required to prevent program cancellation and achieve successful completion of the Early Operational Capabilities (EOC) Phase of the geographic scale Network Centric Warfare System for the island of Taiwan.
- Upon providing such recommendations, was appointed Chief USG Design Requirements Architect responsible for the restructuring, management and control of the design requirements process throughout its EOC Integration and Test activities. Also managed the restructuring of design requirements developed for the follow-on phase of the project and established a solid path toward their successful operational validation.
- Final Approval Authority for the acceptance of validated design requirements and determination of qualification methods and Chief Advocate for requirements addition, modification, or deletion. Interfaced and negotiated issues involving design requirements with the military representatives of the Taiwan Government.
- Senior Technical Advisor to the US Government Program Manager responsible for the coordination of technical and management activities related to the deployment of highly specialized Tactical Command and Control systems to the surface fleet of the US Navy. Advisory role specifically related to the technical and management processes optimization in support of that critical effort.

EXHIBIT A

Joseph L. Vilella

(619) 884-8360 | joevilella@gmail.com

- Held a Secret Clearance.

Vectron Inc. | San Diego, CA

1994 - 2005

Chief Executive Officer/Chief Technology Officer

- As founder and CEO, operated Vectron through all its years of technology development, implementation and go to market efforts. Led it through the .Com crash, while successfully fending a hostile takeover as well as other challenges. Was also successful in raising 14 million dollars in capital through its years of operation. Ultimately, the wholesale move of the US SMT manufacturing industry to China and the lack interest of our main investors and VCs to follow that move by funding the pursuit of a China venture, lead to the closure of the company.
- Conceptual developer and sole patent holder of the original Parametric PC Boards Automated Optical Inspection (AOI) System (International Patent EP1032912B1 – Electronic Assembly Video Inspection System).
- Led the design, development, integration, and test of the Parametric PC Board AOI System.
- The Parametric AOI process provided a quantum technology leap for the global electronics industry in detection and analysis. It utilized a 4megapixel aerial photography color camera in conjunction with a numerical database defining the inspection parameters. Under his technical leadership, artificially intelligent software was developed in-house to perform the detection, measurement and pass or fail decision related to the type and placement of all the components within a printed circuit board. This inspection technology became a highly publicized industrial breakthrough and the gold standard worldwide for the automated inspection of printed circuit boards. It essentially rendered all previous Automated Optical Inspection processes obsolete.
- Managed the process of application, defense, and successful adjudication of the Parametric AOI Patent that today has had massive global usage implications.

Developer, SMT Cost Quality Model & Global AOI Standard

- Developed the first SMT Cost of Quality Model that provided accurate analysis of the cost of manufacturing quality of the SMT process as it relates to the deployment of automated inspection technologies - over 150 companies worldwide use the Cost of Quality Model
- Chairman of Automated Inspection Technologies of the Institute of Printed Circuits responsible for leading the development of the Automated Optical Inspection Standard.
- Technical Advisor on automated inspection technologies to the Governments of Puerto Rico and the Peoples Republic of China.

JV&A Design Group | San Diego, CA

1992 - 1993

Owner – Projects Manager

- Led the design of specialized equipment required to support complex manufacturing processes.
- Designed equipment for Qualcomm, Inc., Hewlett Packard, Inc., Nelcor-Puritan Bennet, Inc., Encad, Inc., Medtronic Interventional Vascular, Inc., Kaigai Seiyaku Pharmaceuticals, Disease Detection International, Inc., and Trinity Biotech, PLC.

General Dynamics, Convair Division | San Diego, CA

1983 - 1991

SIL Department Manager, Principal Integration & Test Engineer – Advanced Cruise Missile Program

- Led the avionics design verification, systems integration, and testing of the Advanced Cruise Missile (ACM) program. The ACM was the US's stealth cruise missile, a strategic nuclear weapon system.
- Designed, integrated and coordinated test efforts of the B-52 component of the Missile in the Loop Flight Simulator, the SIL Systems Test Set (SSTS).
- Managed the Systems Integration Laboratory (SIL, a 15 million dollars facility) and was responsible for the operations of the Missile in the Loop Simulator.
- Developed and implemented the first ever PC based real-time data acquisition and graphics display system for the Missile in the Loop Flight simulator. It was known as the Advanced Data Display System (ADDS).
- Directed the box level design verification tests, sub-system and system level tests, hardware and software integration tests, and flight events demonstrations.
- Responsible for performing the W-80 Nuclear Warhead Integration tests.

EXHIBIT A

Joseph L. Vilella

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- Project Manager for the integration of the Aerodynamics Loads Simulation System to the Missile in the Loop Simulator.
- Held a Secret Clearance.

EDUCATION AND OTHER PERTINENT FACTS

Education

B.S. Management | University of Phoenix

Minors (145 credit units) in Electrical Engineering and Chemistry | University of Puerto Rico, College of Engineering

Languages (Full Fluency)

English & Spanish

Extracurricular Interests

Pedaling Mechanics Cycling Coach, Indoor Cycling Instructor, Chess.com

Marital Status

Widowed

PUBLICATIONS

Technical Manual of the MM11L - 8k Memory System – Digital Equipment Corporation

Principles and Concepts of Modern Chemistry – School Textbook and Lab Manual in Spanish, Published by Editoriales de Armas in and used in the Junior High Schools of Puerto Rico

A Breakthrough in 0201 Components Inspection – SMT Magazine

Revolutionizing the Industry with High Resolution Digital Color AOI – Co Authored with Robert Kane – SMT Magazine

SMT Council Interview on Automated Optical Inspection – SMT Magazine

Closing the Digital Color AOI Loop – SMT Magazine

Advances in the Digital Color Camera Technology – SMT Magazine

Developed the Surface Mount Technology Cost of Quality Model – February of 2003

The High Cost of Quality in Global SMT Manufacturing- Electronics Business

The Inherent Lack of Quality in SMT Products – SMT Magazine

Can You Credibly Assess Your First Pass Yields? – SMT China

First Draft of the Global AOI Standard - Co Authored with Martin Kane - Institute of Printed Circuits

The Fundamental Reality of an AOI Seal – SMT Magazine

AOI and AXI: One Powerful Combination – SMT Magazine

Vectron and the Government of Puerto Rico (Spanish) – EMS Editors

Friday, November 1, 2013 10:50:54 AM Pacific Daylight Time

Subject: Re: SPADA Multi-Tenant Solution Summary

Date: Friday, November 1, 2013 10:39:20 AM Pacific Daylight Time

From: Joseph Vilella

To: Jay McGuerty

From: Jay McGuerty <JAY.S.MCGUERTY@saic.com>

Date: Monday, October 22, 2012 4:55 PM

To: Joseph Vilella <joseph.vilella@spadainnovations.com>, James Reynante <james.reynante@spadainnovations.com>

Subject: SPADA Multi-Tenant Solution Summary

Mr Vilella,

This is a summary of the multi-tenant testing SAIC performed at SPADA's lab in La Jolla.

SPADA was seeking a multi-tenant solution that provided secure isolation at layer-2 (VLAN) and Layer-3 (virtualized routing tables) up to and including an ISP cloud.

Cisco routers support Multi-Protocol Label Switching (MPLS)/Virtual Routing Forwarding (VRF) integrated with Border Gateway Protocol (BGP). These features used together can provide a secure multi-tenant network isolation solution.

The question was would these components work with the Motorola's GPON technology. When Dr. Reynante contacted Motorola regarding interoperability with Cisco MPLS/VRF their response was that they believed it would but that Motorola had never tested this configuration.

SPADA contracted with SAIC to create a multi-tenant technology demonstrator solution consisting of two Cisco 2800's configured as an ISP cloud peering with BGP and four Cisco 2600's acting as tenant routers i.e. tenant "A" and tenant "B" at two physical sites.

A multi-tenant site-1 was created by connecting one of each tenant's routers to separate Motorola ONT terminal in turn connected to a Motorola AXS1800. Each tenant router was configured with basic dynamic routing i.e. no special support for/knowledge of VRF, MPLS or BGP was required for customer premise equipment (CPE).

The Motorola ONT terminals were configured to place each tenants traffic in different VLANs which were trunked transparently through the Motorola AXS1800 to one side of the MPLS/VRF/BGP cloud (Cisco 2800). The traffic was demonstrated to be isolated and not able to interact or have any knowledge of the other (note: this requires that only SPADA have administrative rights to the onsite ISP/cloud router). Traffic from each tenant was observed to travel successfully to the other end of the cloud (site-2 for tenant "A")

EXHIBIT B

and "B").

This demonstrates that the Motorola AXS1800 successfully and transparently worked with the Cisco MPLS/VRF/BGP multi-tenant features. This was a small technology demonstrator but could be scaled up support much larger sites.

Additional development is required to provide a full suite of enterprise class services such as a high security caching DNS server, IDS/Firewall and Security Operations Center. Such an architecture could also support a multi-tenant VoIP solution as well.

v/r

--

Jay McGuerty
Principal Security Engineer
Science Application International Corporation
10260 Campus Point Drive
San Diego, CA 92121
858.826.7309 w
858.663.5209 c

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

WASHINGTON, D.C.

In re application of:	)	
	)	Examiner: Cohen, Harvey I
Joseph L. Vilella	)	
	)	
Serial No: 16600302	)	Art Unit: 2439
	)	
Filed: 2019-10-11	)	
	)	
For: Mutually secure optical data	)	
network and method	)	
	)	

DECLARATION OF MICHAEL ZEGARSKI

I, Michael Zegarski, declare that:

I was familiar with many aspects of Passive Optical Networks and Information Technology as they existed in 2012. As of 2005, and through 2013, I worked for Motorola Mobility in support of its Gigabit Passive Optical Network (hereinafter “GPON”) technology in the position of Senior Systems Engineer. I was a Subject Matter Expert on Passive Optical Networks (hereinafter “PON”). My position also required me to be extremely familiar and conversant with the most current IP Routing and Switching processes. This was the case because the Optical Line Terminal (hereinafter “OLT”) offered by us at Motorola Mobility, which was a layer-2 optical switch, had to be properly interfaced with any of the existing brands of routers in the US marketplace and replaced all existing brands of access layer switches within the US marketplace.

In 2012, Mr. James Reynante, an employee of SPADA Innovations, Inc. (hereinafter “SPADA”), reached out to me to ask if it was possible for our OLT to accept virtually separated information via the use of the Virtual Routing and Forwarding (hereinafter “VRF”) process. The reason he was interested in finding out about this was because

SPADA wanted to be able to use our OLT to provide information to legally separated entities, users or tenants within a building managed by a single OLT.

Skepticism

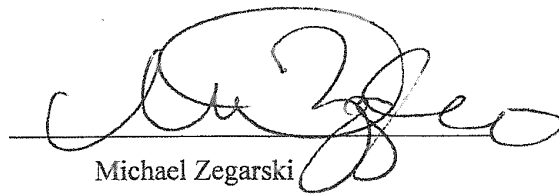
I was very skeptical about this different way of using our OLT for two reasons:

Reason 1: Our OLT had been specifically designed to provide shared information to end users existing under the umbrella of a single entity such as a corporation, a government agency or similar organization. At the time of its development, it was not anticipated that our OLT was going to be used to provide virtually and thus absolutely separated information to its end users within any entity. In view of this, I had to advise Mr. Reynante that I was skeptical that this could be accomplished because to my knowledge, this specific application was not an operational consideration of our OLT and as such, it had not been tested and verified to be possible by our organization.

Reason 2: The existence of a method by which information could be virtually and absolutely separated within a router was, to my knowledge, definitively not a mainstream routing set up process. Through my previous years supporting IT experts programming routers to interface with our OLTs, I had never heard or experienced the use of VRF-labeled Ethernet frames going through a layer-2 OLT. In my mind, VRF was a hardly used, very specialized and little known information routing configuration and as such, and without understanding how it was accomplished and tested, I was very skeptical that it would work with our OLT or any PON OLT for that matter.

I further 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 issuing thereon.

Date: September 27, 2015


Michael Zegarski

Electronic Acknowledgement Receipt	
EFS ID:	38335187
Application Number:	16600302
International Application Number:	
Confirmation Number:	7123
Title of Invention:	Mutually secure optical data network and method
First Named Inventor/Applicant Name:	Joseph L. Vilella
Customer Number:	24243
Filer:	John David Buchaca
Filer Authorized By:	
Attorney Docket Number:	190072
Receipt Date:	17-JAN-2020
Filing Date:	11-OCT-2019
Time Stamp:	18:53:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	2020-01-17_190072_Transmittal.pdf	157074 6f0885ae128c05a8ff34e0819485337d3111f b6a	no	1
Warnings:					

Information:					
2	Amendment/Req. Reconsideration-After Non-Final Reject	2020-01-17_190072_Response.pdf	98579	no	3
			aaef72fc14aa2ccd28721a2e133f466b3d3c7669		
Warnings:					
Information:					
3	Letter Requesting Interview with Examiner	2020-01-17_190072_ApplicantInitiatedInterviewRequest.pdf	137452	no	1
			d0aba28934cfa95cc260d17fe40ea963609c4416		
Warnings:					
Information:					
4	Affidavit-traversing rejectns or objectns rule 132	2020-01-17_190072_DeclarationOfJosephVilella_withExhibitsAandB.pdf	1704837	no	15
			dd10c80930cf72aab9c2eedaf433b41ad1c45e9		
Warnings:					
Information:					
5	Affidavit-traversing rejectns or objectns rule 132	2020-01-17_190072_DeclarationOfMichaelZegarski.pdf	128675	no	3
			3321c45d0c53bcf81fc9d18ddea3b38e3a9a74e		
Warnings:					
Information:					
Total Files Size (in bytes):			2226617		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)

Approved for use through 11/30/2020. OMB 0651-0031
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TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	16600302	
	Filing Date	2019-10-11	
	First Named Inventor	Joseph L. Vilella	
	Art Unit	2439	
	Examiner Name	Cohen, Harvey I	
Total Number of Pages in This Submission	23	Attorney Docket Number	190072

ENCLOSURES (Check all that apply)		
☐ Fee Transmittal Form ☐ Fee Attached ☒ Amendment/Reply ☐ After Final ☒ Affidavits/declaration(s) ☐ Extension of Time Request ☐ Express Abandonment Request ☐ Information Disclosure Statement ☐ Certified Copy of Priority Document(s) ☐ Reply to Missing Parts/ Incomplete Application ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53	☐ Drawing(s) ☐ Licensing-related Papers ☐ Petition ☐ Petition to Convert to a Provisional Application ☐ Power of Attorney, Revocation ☐ Change of Correspondence Address ☐ Terminal Disclaimer ☐ Request for Refund ☐ CD, Number of CD(s) _____ ☐ Landscape Table on CD	☐ After Allowance Communication to TC ☐ Appeal Communication to Board of Appeals and Interferences ☐ Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) ☐ Proprietary Information ☐ Status Letter ☒ Other Enclosure(s) (please identify below): Applicant Initiated Interview Request Form
Remarks Response - 3 Sheets Declaration of Joseph L. Vilella with Exhibits - 15 sheets Declaration of Michael Zegarski - 3 sheets Applicant Initiated Interview Request Form - 1 sheet This Transmittal - 1 Sheet		
SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT		
Firm Name	Charmasson, Buchaca & Leach, LLP	
Signature	/John Buchaca/	
Printed name	John D. Buchaca	
Date	2020-01-17	Reg. No. 37289

CERTIFICATE OF TRANSMISSION/MAILING		
I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:		
Signature	/John Buchaca/	
Typed or printed name	John D. Buchaca	Date 2020-01-17

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

WASHINGTON, D.C.

In re application of:	)	
	)	Examiner: Cohen, Harvey I
Joseph L. Vilella	)	
	)	Art Unit: 2439
Serial No: 16600302	)	
	)	
Filed: 2019-10-11	)	
	)	
For: Mutually secure optical data	)	
network and method	)	
	)	

RESPONSE

Commissioner for Patents
Mail Stop Amendment
via EFS-Web

In response to the First Action Interview Pilot Program Pre-Interview Communication mailed 2019-12-19, please find the attached Applicant Initiated Interview Request Form (PTOL-413A), the Declaration of Joseph L. Vilella including attached Exhibits A and B, the Declaration of Michael Zegarski, and the following REMARKS comprising a summary of the proposed arguments for the interview.

REMARKS

Claims 1-13 remain pending in this application. Claims 1, 8, and 9 are independent.

The claims have been rejected for obviousness in light of: Dupont, US Pub. No. 20020141421; Kolli, US Pub. No. 20080212598; and, Sanderson, US Pub. No. 20040223500.

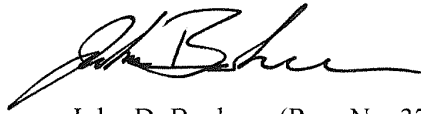
Applicant contends that the cited references do not render the pending claims obvious because the combination of the cited references do not result in the invention as claimed, and because of the secondary non-obviousness considerations raised by the Declarations of Joseph L. Vilella and Michael Zegarski. These include ample evidence of the apparent satisfaction of a long-felt need in the optical data networking industry, the failure of others to find a solution, subsequent copying by others, skepticism of experts, and the counter-intuitiveness of the claimed invention in light of the relevant skill in the art.

The Declarations of Joseph L. Vilella and Michael Zegarski show that at the time of the claimed invention, configuring a passive optical network interface router to have at least one virtual routing table with the understanding that data processed through such a configuration would be accepted by an optical line terminal was not obvious. Indeed, it appears that a person of expertise in the industry, namely Mr. Zegarski, had serious misgivings about whether it would even work. Those of ordinary skill in the art would therefore likely have even less confidence. Mr. Vilella's Declaration shows that there were very good reasons for those of ordinary skill in the art to NOT pursue any implementation of a virtual routing table on a passive optical network interface router feeding data to an optical line terminal, and to dismiss a suggestion of such implementation outright. This is strong evidence of non-obviousness.

Applicant is unaware of any teaching in the cited references that would suggest the effectiveness of configuring a passive optical network interface router to use a virtual routing table to process data passing through an optical line terminal.

2020-01-17

Respectfully submitted,



John D. Buchaca (Reg. No. 37, 289)
2635 Camino Del Rio South, Suite 102
San Diego, California 92108
Telephone: (619) 294-2922

190072

I hereby certify that this correspondence is being transmitted electronically via the United States Patent and Trademark Office EFS-Web system to: Mail Stop Amendment, Commissioner for Patents, on 2020-01-17, by John D. Buchaca, Reg. No. 37,289.

Signature:  Date: 2020.01.17



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/600,302	10/11/2019	Joseph L. Vilella	190072

CONFIRMATION NO. 7123

PUBLICATION NOTICE



24243
CHARMASSON, BUCHACA & LEACH, LLP
2635 Camino Del Rio South
Suite 102
SAN DIEGO, CA 92108

Title:Mutually secure optical data network and method

Publication No.US-2020-0045390-A1

Publication Date:02/06/2020

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.

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

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 16/600,302		Filing Date 10/11/2019		☐ 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 \$50 =				
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 = *				x \$230 =				
☐ 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		03/09/2020		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		
								RATE (\$)		
								ADDITIONAL FEE (\$)		
		Total (37 CFR 1.16(i))		* 9	Minus	** 20	= 0	x \$50 =		0
		Independent (37 CFR 1.16(h))		* 3	Minus	*** 3	= 0	x \$230 =		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
		(Column 1)		(Column 2)		(Column 3)				
AMENDMENT				CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		
								RATE (\$)		
								ADDITIONAL FEE (\$)		
		Total (37 CFR 1.16(i))		*	Minus	**	=	x \$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.								SLIE		
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".								/TIMOTHY COLE/		
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".										
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.										

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Electronic Acknowledgement Receipt	
EFS ID:	38806359
Application Number:	16600302
International Application Number:	
Confirmation Number:	7123
Title of Invention:	Mutually secure optical data network and method
First Named Inventor/Applicant Name:	Joseph L. Vilella
Customer Number:	24243
Filer:	John David Buchaca
Filer Authorized By:	
Attorney Docket Number:	190072
Receipt Date:	09-MAR-2020
Filing Date:	11-OCT-2019
Time Stamp:	14:09:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	2020-03-09_190072_Amendme nt.pdf	205093	no	7
			b61a16e014719f5dbad896ed637ebe2f27491758		
Warnings:					

Information:	
Total Files Size (in bytes):	205093
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

WASHINGTON, D.C.

In re application of:	)	
	)	Examiner: Cohen, Harvey I
Joseph L. Vilella	)	
	)	Art Unit: 2439
Serial No: 16600302	)	
	)	
Filed: 2019-10-11	)	
	)	
For: Mutually secure optical data	)	
network and method	)	
_____	)	

AMENDMENT

Commissioner for Patents
Mail Stop Amendment
via EFS-Web

In response to the First Action Interview conducted **2020-03-02**, please amend that application as indicated below.

In the Specification

On page 5, lines 14-23, please amend the paragraph as indicated below.

In a basic configuration, the aggregate downstream rate can be 2.5 Gbps, while the upstream rate can be 1.25 Gbps. Each of the connections can be adapted to support high-bandwidth multimedia applications on a single optical fiber over a distance of 20km or more. Telecommunications service traffic that includes Internet, public switched telephone networks, and broadcast/cable television ~~108, 110, 112~~ for the building are provided by one or more commercial carriers **114, 116, 118**. The telecommunications services carrier lines **120, 122, 124** enter the building **100** at a Main Point Of Entry (MPOE) room **126** and terminate into headend equipment **128**. From the headend equipment, the voice, video and data content traffic can distributed to each of the tenants **102, 104, 106** over data feeds carried by fiber optic cabling **130, 132, 134**.

On page 9, lines 6-14, please amend the paragraph as indicated below.

Each splitter **308, 310, 312, 314** can replicate the incoming photonic broadcast stream equally over each of its drop lines **320, 322, 324**. The splitter **308** can attach to the simplex, single-mode fiber from the OLT **146** and can passively redistribute the incoming light stream up to 64 times. The splitter is a Planar Lightwave Circuit (PLC) that is constructed using silica glass waveguide circuits and aligned fiber optic pigtails that are all integrated inside of a single package. The attenuation of the light signal through the PLC of the splitter **308** is symmetrical in both directions. The signal loss from a 1x8 PLC splitter is expected to be less than one dB greater than what would be expected from a perfect splitter, approximately 10 dB. A typical 1x32 PLC splitter shall have approximately 17 dB or less.

In the Claims

1. (Currently Amended) A multi-user optical data network apparatus comprises:
 - at least one network service carrier line connected to a passive optical network interface router;
 - at least one uplink connecting said interface router to an optical line terminal;
 - said optical line terminal being connected to a number of passive optical network feeds for carrying a common data feed to a plurality of optical network units each supporting at least one of a plurality of private user devices;
 - said interface router being configured to have at least one virtual routing table for each one of said plurality of ~~optical network units~~ private user devices, whereby said common data feed comprises data packets uniquely tagged for each one of said plurality of private user devices; and,
 - wherein each of said optical network units is adapted to extract those of said data packets intended for a supported one of said private user devices, and ignore those of said data packets not intended for said supported one of said private user devices, thereby virtually isolating said private user devices from one another.
2. Cancelled.
3. Cancelled.
4. (Currently Amended) ~~The apparatus of Claim 3, wherein said at least one virtual routing table supports generation of uniquely tagged ethernet frames for each one of said plurality of optical network units~~ The apparatus of Claim 1, wherein said data packets comprise ethernet frames.
5. (Currently Amended) The apparatus of Claim 4, wherein each of said plurality of optical network units provides service to a separate number of private users.
6. (Original) The apparatus of Claim 5, wherein said uplink carries data including digitized voice and video data.

7. Cancelled.

8. (Currently Amended) A digital data network communication method comprises:

accepting a plurality of private data streams into at least one passive optical network interface router serving a plurality of private ~~[[users]]~~ user devices through a plurality of optical network units;

aggregating said private data streams into a combined data feed;

routing said data feed to ~~at least two of~~ said plurality of optical network units;

extracting from said data feed a first one of said private data streams intended for a first one of said plurality of private user devices;

wherein said routing comprises:

generating an independently unique virtual routing table for each of said plurality of ~~optical network units~~ private user devices;

uniquely tagging ethernet frames intended for ~~[[a]]~~ said first one of said plurality of ~~optical network units~~ private user devices according to entries in a first one of said virtual routing tables associated with ~~[[a]]~~ said first one of said ~~optical network units~~ private user devices;

~~—distributing said tagged ethernet frames according to said first one of said virtual routing tables.~~

9. Cancelled.

10. (Original) The method of Claim 8, wherein each of said optical network units provides service to a separate number of private users.

11. (Original) The method of Claim 8, wherein said accepting further comprises:

interfacing a plurality of service provider data lines through a single headend.

12. (Original) The method of Claim 8, wherein said aggregating further comprises using an enterprise aggregating switch.

13. (New) A digital data network communication method comprises:

- creating a common data feed between an optical line terminal and a plurality of optical network units;
- connecting a plurality of private user devices to said plurality of optical network units;
- virtually isolating said plurality of private user devices from one another;
- wherein said isolating comprises:
 - uniquely tagging data packets intended for each one of said plurality of private user devices connected to said plurality of optical network units;
 - wherein said uniquely tagging comprises providing a unique virtual routing table for said each one of said plurality of private user devices.

REMARKS

Claims 1, 4-6, 8, and 10-13 remain pending in this application. Claims 2,3, 7, and 9 have been cancelled. Claims 1, 8, and 13 are independent.

The specification has been amended to correct some typographical errors. Specifically, reference characters 108, 110, and 112 have been removed since they do not appear in the drawing. Reference characters 310, 312, 314 have been added to the specification to refer to the splitters so identified in the drawing.

The claims have been rejected for obviousness in light of: Dupont, US Pub. No. 20020141421; Kolli, US Pub. No. 20080212598; and, Sanderson, US Pub. No. 20040223500.

It is believed the amendments made to the claims support their allowance over the teachings of the cited references.

Therefore, reconsideration of the pending claims is earnestly solicited.

Applicant hereby reserves the right to further prosecute the original claims or any other broad claims supported by the disclosure in one or more continuing applications.

Respectfully submitted,

2020-03-09



John D. Buchaca (Reg. No. 37, 289)
2635 Camino Del Rio South, Suite 102
San Diego, California 92108
Telephone: (619) 294-2922

190072

I hereby certify that this correspondence is being transmitted electronically via the United States Patent and Trademark Office EFS-Web system to: Mail Stop Amendment, Commissioner for Patents, on 2020-03-09, by John D. Buchaca, Reg. No. 37,289.

Signature:  Date: 2020-03-09

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

WASHINGTON, D.C.

In re application of:	)	
	)	Examiner: Tolentino, Roderick
Joseph L. Vilella	)	
	)	Art Unit: 2439
Serial No: 16600302	)	
	)	
Filed: 2019-10-11	)	
	)	
For: Mutually secure optical data	)	
network and method	)	
	)	

RESPONSE TO INTERVIEW

Commissioner for Patents
Mail Stop Amendment
via EFS-Web

In response to the Interview conducted 2020-07-13, please find the attached
Second Declaration of Joseph L. Vilella.

REMARKS

Claims 1-13 remain pending in this application. Claims 1, 8, and 9 are independent.

Based on the exchange of information during the Interview conducted 2020-07-13 it is believed the attached Second Declaration of Joseph L. Vilella will help the examiner in his analysis of the pending claims.

2020-07-23

Respectfully submitted,

/John Buchaca/

John D. Buchaca (Reg. No. 37, 289)
2635 Camino Del Rio South, Suite 102
San Diego, California 92108
Telephone: (619) 294-2922

190072

I hereby certify that this correspondence is being transmitted electronically via the United States Patent and Trademark Office EFS-Web system to: Mail Stop Amendment, Commissioner for Patents, on 2020-07-23, by John D. Buchaca, Reg. No. 37,289.

Signature: _____/John Buchaca/_____ Date: _____2020-07-23_____

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

WASHINGTON, D.C.

In re application of:	)	
	)	Examiner: Tolentino, Roderick
Joseph L. Vilella	)	
	)	
Serial No: 16600302	)	Art Unit: 2439
	)	
Filed: 2019-10-11	)	
	)	
For: Mutually secure optical data	)	
network and method	)	
_____	)	

SECOND DECLARATION OF JOSEPH L. VILELLA

I, JOSEPH L. VILELLA, declare that:

Maintaining critical/legal information separation at all networking levels is of paramount importance in a world so dominated by online services and so susceptible to highly sophisticated hacking attacks. As of the turn of the century, this became especially critical in the Internet Service Providers (ISP) arena, where voice, video and data services were provided to multiple subscribers across a unified ISP network system (e.g. AT&T, Verizon, Cox, Time Warner, Comcast and others). ISPs were then and still are today providing those services to commercial and residential clients.

Virtual separation of the voice, video and data communications for each client, often referred to as virtual circuits or virtual private networks (VPNs), was accomplished within the converged services network. This was achieved via the use of X.25, Frame Relay and Asynchronous Transfer Mode (ATM) processes. Though extremely capital intensive and limited in scalability, these processes were highly relied upon by the ISPs to legally segregate their clients.

However, with the eventual and increased utilization of the highly scalable and cost effective Internet Protocol (IP), a new method of creating VPNs via IP packet

encapsulation arose. This method was disclosed by Sanderson et al. in US Patent Publication No. 2004/0223500 A1 (hereinafter “Sanderson”). As is the case with most new processes, the Sanderson VPN method, though more efficient, took many years to be widely utilized by the large ISPs. The main reason was that they were heavily invested in the capital equipment required to put in place and maintain the previous information separation methods.

The Sanderson method created virtual and effective legally separated information VPNs within a converged IP-based communications signal environment. At its core, this separation is created and maintained within the routers transporting the data across the length of the ISP services provisioning network. Typically, after the final ISP router, referred to by Sanderson as the Customer Edge (CE) router, the information is delivered via access layer switches to its intended subscribers. This is a point-to-point distribution scheme originated and managed at the access layer switch level. From there the point-to-point distribution was additionally supported at each subscriber premise via the use of a subscriberowned router which would distribute the voice, video, and data signals as required. Through all that path, each VPN maintained its virtual information characteristics via the use of a then novel way of tagging the IP packets called Multi Protocol Label Switching (MPLS) which is at the core of the Virtual Routing and Forwarding process described by Sanderson.

The Sanderson method of virtual information separation, though not fully utilized at the time, could support all existing copper-based point-to-point distribution networks. However, in 2010, when my company SPADA INNOVATIONS, INC. (hereinafter “SPADA”) brought the Passive Optical Network (PON) technology to California, PON did *not* support the point-to-point distribution scheme that could be virtually segregated using the Sanderson method. Instead, it required and maintained the converged information of the CE router via the use of its Optical Line Terminal all the way to the subscriber’s premises, where it would be properly segregated and disseminated to its intended IP devices (computers, VoIP phones, digital TVs, etc.). This also applies to any

end user of the PON that requires virtual information separation. Therefore, beyond this point, we will use the term "end user" instead of "subscriber".

Therefore, when SPADA was challenged with providing virtual private communication to end users, none of the router experts of SAIC or the PON experts of the equipment manufacturer could warrant that the PON Optical Line Terminal would successfully accept and convey to the end users such information virtually separated according to the Sanderson method. Please refer to my earlier Declaration and the Declaration of Michael Zegarski. Thus, SPADA needed to determine whether the instantiation and validation of the use of the Sanderson method to transport information successfully through the PON Optical Line Terminal to its intended end users was even possible. This is the basis of the present Application. It is important to note again that the success of that determination could not be warranted by any of the IT providers, PON manufacturer, or Information Security Experts that were involved at that time.

I further 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 issuing thereon.

Date: 7/23/20



Joseph L. Vilella, Inventor
CEO, SPADA INNOVATIONS, INC.

Electronic Acknowledgement Receipt	
EFS ID:	40090381
Application Number:	16600302
International Application Number:	
Confirmation Number:	7123
Title of Invention:	Mutually secure optical data network and method
First Named Inventor/Applicant Name:	Joseph L. Vilella
Customer Number:	24243
Filer:	John David Buchaca
Filer Authorized By:	
Attorney Docket Number:	190072
Receipt Date:	23-JUL-2020
Filing Date:	11-OCT-2019
Time Stamp:	17:04:25
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	Miscellaneous Incoming Letter	2020-07-23_190072_Response.pdf	35886 b5f4263db6bb92915132416e9353824ab6113fc8	no	2

Warnings:

Information:					
2	Affidavit-not covered under specific rule	2020-07-23_190072_2dDeclarationJosephVilella.pdf	750970	no	3
			11b15bd7dee7e9b5da2d43d2986a30adc3a0b288		
Warnings:					
Information:					
Total Files Size (in bytes):			786856		
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.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/600,302	10/11/2019	Joseph L. Vilella	190072	7123
24243	7590	08/06/2020	EXAMINER	
CHARMASSON, BUCHACA & LEACH, LLP			TOLENTINO, RODERICK	
2635 Camino Del Rio South				
Suite 102				
SAN DIEGO, CA 92108				
			ART UNIT	PAPER NUMBER
			2439	
			NOTIFICATION DATE	DELIVERY MODE
			08/06/2020	ELECTRONIC

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

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

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

john@charmason.com

<i>First Action Interview Office Action Summary</i>	Application No. 16/600,302	Applicant(s) Vilella, Joseph L.	
	Examiner RODERICK TOLENTINO	Art Unit 2439	AIA (FITF) Status No

The MAILING OR NOTIFICATION DATE of this communication appears on the cover sheet with the correspondence address.

THE SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE **TWO MONTHS** FROM THE MAILING OR NOTIFICATION DATE OF THIS COMMUNICATION.

This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

☒ Applicant's request to not have a first-action interview is acknowledged (or the time period for reply set forth in the Pre-Interview Communication has expired and the Office did not receive any reply).

Status

1) ☒ Responsive to communication(s) filed on 3/9/2020 and interview conducted on ____.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

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

Disposition of Claims

3) ☒ Claim(s) 1,4-6,8 and 10-13 is/are pending in the application.

3a) Of the above claim(s) ____ is/are withdrawn from consideration.

4) ☐ Claim(s) ____ is/are allowed.

5) ☒ Claim(s) 1,4-6,8 and 10-13 is/are rejected.

6) ☐ Claim(s) ____ is/are objected to.

7) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

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

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

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

Priority under 35 U.S.C. § 119

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

a) ☐ All b) ☐ Some * c) ☐ None of:

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

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

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

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

Contact Information

Examiner's Telephone Number: (571)272-2661

Examiner's Typical Work Schedule: Mon- Fri 8am-4pm

Supervisor's Name: Luu Pham

Supervisor's Telephone Number:
571-270-5002

Attachment(s) 1) ☒ Notice of References Cited (PTO-892) 2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.	3) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date: <u>7/13/2020</u> . 4) ☐ Other: _____.
---	--

First Action Interview Office Action Summary		Application No. 16/600,302		Applicant(s) Vilella, Joseph L.	
		Examiner RODERICK TOLENTINO		Art Unit 2439	AIA (FITF) Status No
Notification of Rejection(s) and/or Objection(s)					
#	Claim(s)	Reference(s) (if applicable)	Rejection Statutory Basis	Brief Explanation of Rejection	
	1,4-6,8 and 10-13	Kolli, Suvakovic, Homer	103	Kolli teaches plurality of virtual route tables. Suvakovic addresses plurality of PONs and Homer teaches the use of Ethernet and tagging packets	

Expanded Discussion/Commentary		
		Claim 1: virtual routing table for each one of said plurality of optical network units (Kolli: par. 53; one or more virtual routing tables maintained by the transparent virtual router 510; par. 49; transparent virtual router is also in communication with one or more IP router (s) 452 of one or more ISP(s) through a high-speed connection 448 (e.g., a fiber optical gigabit Ethernet connection)
		Claim 1: at least one network service carrier line connected to a passive optical network interface router; at least one uplink connecting said interface router to an optical line terminal; said optical line terminal being connected to a number of passive optical network feeds for carrying a common data feed to a plurality of optical network units each supporting at least one of a plurality of private user device (Suvakovic, Para 0037, teaches plurality of PONs network architecture and Para 0041 teaches the use of routing tables.) Would be obvious to combine with Kolli by implementing a more secure virtual routing table
		Claim 1: said interface router being configured to have at least one virtual routing table for each one of said plurality of optical-network units private user devices, whereby said common data feed comprises data packets uniquely tagged for each one of said plurality of private user devices; wherein each of said optical network units is adapted to extract those of said data packets intended for a supported one of said private user devices, and ignore those of said data packets not intended for said supported one of said private user devices, thereby
DATE: 14 July 2020		/RODERICK TOLENTINO/ Primary Examiner, Art Unit 243

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiners responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicants correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,-
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicants record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiners version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, Interview Record OK on the paper recording the substance of the interview along with the date and the examiners initials.

<i>Notice of References Cited</i>	Application/Control No. 16/600,302		Applicant(s)/Patent Under Reexamination Vilella, Joseph L.	
	Examiner RODERICK TOLENTINO		Art Unit 2439	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-20020141421-A1	10-2002	Dupont, Jean-Lou	H04Q11/0478	370/403
*	B	US-20080212598-A1	09-2008	Kolli; Raja	H04L61/20	370/409
*	C	US-20040223500-A1	11-2004	Sanderson, David M.	H04L63/0272	370/395.53
*	D	US-20110206370-A1	08-2011	Suvakovic; Dusan	H04Q11/0067	398/25
*	E	US-20130010640-A1	01-2013	HIGUCHI; Hidemitsu	H04L12/4641	370/254
	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

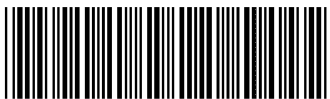
*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*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. 20200714

<i>Search Notes</i> 	Application/Control No. 16/600,302	Applicant(s)/Patent Under Reexamination Vilella, Joseph L.
	Examiner RODERICK TOLENTINO	Art Unit 2439

CPC - Searched*		
Symbol	Date	Examiner
H04Q11/0067 H04B10/27 H04L63/0414	12/09/2019	HC
H04Q2011/0073 H04Q2011/0086	12/09/2019	HC

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
Performed inventor search in PALM	12/09/2019	HC
Performed inventor search in EAST	12/09/2019	HC
Performed inventive search terms in EAST	12/09/2019	HC
Updated EAST Keyword Search	07/13/2020	RT

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

/RODERICK TOLENTINO/ Primary Examiner, Art Unit 2439	
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EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	13,029,289	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:46
L2	100	L1 and ("virtual routing table")	US-PGPUB; USPAT; EPO	OR	ON	2020/07/14 10:46
L3	49	L1 and ("virtual routing tables")	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:47
L4	10	L1 and ("virtual routing tables") and "mac address"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:50
L5	0	L1 and ("virtual routing tables" same (PON optical))	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:51
L6	0	L1 and ("virtual routing tables") and PON	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:51
L7	0	L1 and ("virtual routing tables") and (passive near3 optical)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:51
L8	0	L1 and ("virtual routing tables") and PON	US-PGPUB; USPAT; EPO	OR	ON	2020/07/14 10:52
L9	16	L1 and ("virtual routing tables" with router)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:53
S1	13,029,234	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/09 16:11
S2	974	(virtual near2 "routing table")	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:11
S3	14	(virtual near2 "routing table" with packets with (tag tagged Id identifier))	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:12
S4	8	(virtual near2 "routing table" with packets with (tag tagged Id identifier) with destination)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:16

S5	9	(virtual near2 "routing table" with packets with extract\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:22
S6	3	(virtual near2 "routing table" with packets with common near4 feed)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:23
S7	0	(virtual near2 "routing table" with packets near3 ignor\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:24
S8	3	(virtual near2 "routing table" with packets near3 intended)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:24
S9	1,478	S1 and (ethernet with frame with MAC same packet)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/09 16:39
S10	2,351	S1 and (ethernet with frame with MAC same packet)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:39
S11	1,016	S1 and (ethernet with frame with "MAC address" same packet)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:39
S12	8	S1 and (ethernet with ignor\$3 with "MAC address" same packet)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:40
S13	0	("80115221").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/13 11:44
S14	1	("8011522").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/13 11:44
S15	974	(virtual near2 "routing table")	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 13:21
S16	3	(virtual near2 "routing table" with optical)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 13:22
S17	11	(virtual near2 "routing table" same optical)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 13:22
S18	254	(virtual near2 "routing table" with routers)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 13:22
S19	41	(virtual near2 "routing table" with routers)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 13:23

S20	13,029,234	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:33
S21	0	S20 and ("Passive optical network") with "virtual routers"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:33
S22	0	S20 and ("Passive optical network") same "virtual routers"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:36
S23	5	S20 and ("Passive optical network") and "virtual routers"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:36
S24	0	S20 and ("Passive optical network PON) same "virtual routers"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:38
S25	0	S20 and ("Passive optical network PON) same (virtual near3 routing near3 table)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 14:41
S26	263	S20 and ("Passive optical network PON) same "MAC address"	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 14:56
S27	58	S20 and ("Passive optical network PON) same "MAC address" with table	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 14:57
S28	0	S20 and ("Passive optical network PON) same "MAC address" with routing near2 table	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 15:16
S29	12	S20 and ("Passive optical network PON) with routing near2 table	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 15:21
S30	2	S20 and ("Passive optical network PON) with routing near2 tables	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:22
S31	0	S20 and ("Passive optical network PON) same packets near4 routing near2 tables	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:32
S32	2	S20 and ("Passive optical network PON) and packets near4 routing near2 tables	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:33
S33	5	S20 and (virtual near2 "routing tables" same ethernet)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:34
S34	3	S20 and (virtual near2 "routing tables" same MAC)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:36

S35	5	S20 and (virtual near2 "routing tables" near4 devices)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:44
S36	0	S20 and ("Passive optical network") same routing near3 tables same virtual	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:49
S37	0	S20 and ("Passive optical network" PON) same routing near3 tables same virtual	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:50
S38	3	S20 and ("Passive optical network" PON) same tables same virtual	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:51

EAST Search History (Interference)

<This search history is empty>

7/14/2020 11:19:33 AM

C:\Users\rtolentino\Documents\EAST\Workspaces\Case16600302.wsp

Electronic Acknowledgement Receipt	
EFS ID:	40771350
Application Number:	16600302
International Application Number:	
Confirmation Number:	7123
Title of Invention:	Mutually secure optical data network and method
First Named Inventor/Applicant Name:	Joseph L. Vilella
Customer Number:	24243
Filer:	John David Buchaca
Filer Authorized By:	
Attorney Docket Number:	190072
Receipt Date:	06-OCT-2020
Filing Date:	11-OCT-2019
Time Stamp:	14:53:22
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	Amendment/Req. Reconsideration-After Non-Final Reject	2020-10-06_190072_Amendme nt2.pdf	1916171 ee0776daaddf6ff0d34f00c13b8e79e302a1 b8a8	no	10

Warnings:

Information:	
Total Files Size (in bytes):	1916171
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.	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

WASHINGTON, D.C.

In re application of:	)	
	)	Examiner: Tolentino, Roderick
Joseph L. Vilella	)	
	)	Art Unit: 2439
Serial No: 16600302	)	
	)	
Filed: 2019-10-11	)	
	)	
For: Mutually secure optical data	)	
network and method	)	
	)	

AMENDMENT

Commissioner for Patents
Mail Stop Amendment
via EFS-Web

In response to the Office Action dated **2020-08-06**, please amend that application as indicated below.

In the Claims

1. (Currently Amended) A multi-user optical data network apparatus comprises:
 - at least one network service carrier line connected to a passive optical network interface router;
 - at least one uplink connecting said interface router to an optical line terminal;
 - said optical line terminal being connected to a number of passive optical network feeds for carrying a common data feed to a plurality of optical network units each supporting at least one of a plurality of private user devices;
 - said interface router being configured using Virtual Routing and Forwarding (VRF) commands to have at least one virtual routing table for each one of said plurality of private user devices, whereby said common data feed comprises data packets uniquely tagged using Multi Protocol Label Switching (MPLS) for each one of said plurality of private user devices; and,
 - wherein each of said optical network units is adapted to extract those of said data packets intended for a supported one of said private user devices, and ignore those of said data packets not intended for said supported one of said private user devices, thereby virtually isolating said private user devices from one another.
2. Cancelled.
3. Cancelled.
4. (Previously presented) The apparatus of Claim 1, wherein said data packets comprise ethernet frames.
5. (Previously presented) The apparatus of Claim 4, wherein each of said plurality of optical network units provides service to a separate number of private users.
6. (Original) The apparatus of Claim 5, wherein said uplink carries data including digitized voice and video data.

7. Cancelled.

8. (Currently Amended) A digital data network communication method comprises:

~~— accepting a plurality of private data streams into at least one passive optical network interface router serving a plurality of private user devices through a plurality of optical network units;~~

~~— aggregating said private data streams into a combined data feed;~~

~~— routing said data feed to said plurality of optical network units;~~

~~— extracting from said data feed a first one of said private data streams intended for a first one of said plurality of private user devices;~~

~~— wherein said routing comprises:~~

~~— generating an independently unique virtual routing table for each of said plurality of private user devices;~~

~~— uniquely tagging ethernet frames intended for said first one of said plurality of private user devices according to entries in a first one of said virtual routing tables associated with said first one of said private user devices~~

A digital data network communication method comprises:

— accepting a plurality of private data streams into at least one passive optical network interface router serving a plurality of private user devices through a plurality of optical network units (ONUs);

— configuring said at least one passive optical network interface router to virtually separate information intended for each of said plurality of private user devices, wherein said configuring comprises:

— generating an independently unique virtual routing table for each of said plurality of private user devices using Virtual Routing and Forwarding (VRF);

— uniquely tagging ethernet frames contained in said plurality of private data streams and intended for said first one of said plurality of private user devices according to entries in a first one of said virtual routing tables associated with said first one of said private user devices using Multi Protocol Label Switching (MPLS) to form MPLS tagged data packages;

_____ sending said MPLS tagged data packages to a passive optical networks optical line terminal (OLT);

_____ aggregating within said OLT said MPLS tagged data packages into a common data feed;

_____ distributing said common data feed to said plurality of ONUs;

_____ wherein said distributing comprises:

_____ replicating said common data feed using at least one optical splitter connected to said plurality of ONUs;

_____ extracting, at each of said plurality of ONUs, from said common data feed those MPLS tagged data packages intended for a specific one of said plurality of private user devices.

9. Cancelled.

10. (Original) The method of Claim 8, wherein each of said optical network units provides service to a separate number of private users.

11. (Original) The method of Claim 8, wherein said accepting further comprises:
interfacing a plurality of service provider data lines through a single headend.

12. (Original) The method of Claim 8, wherein said aggregating further comprises using an enterprise aggregating switch.

13. (Previously presented) A digital data network communication method comprises:
creating a common data feed between an optical line terminal and a plurality of optical network units;
connecting a plurality of private user devices to said plurality of optical network units;
virtually isolating said plurality of private user devices from one another;
wherein said isolating comprises:

uniquely tagging data packets intended for each one of said plurality of private user devices connected to said plurality of optical network units using Multi Protocol Label Switching (MPLS) to form MPLS tagged data packets;

wherein said uniquely tagging comprises [[providing]] configuring a premise router using Virtual Routing and Forwarding commands to provide a unique virtual routing table for said each one of said plurality of private user devices;

distributing, via a common data feed through at least one optical splitter, those MPLS tagged data packets intended for each one of a said plurality of private user devices connected to said plurality of optical network units.

REMARKS

Claims 1, 4-6, 8, and 10-13 remain pending in this application. Claims 2, 3, 7, and 9 are cancelled. Claims 1, 8, and 13 are independent.

The changes to the language of the claims are supported by the specification as originally filed. Attention has been made to avoid the introduction of any new matter. Specifically, in Claim 1 support for the use of Virtual Routing and Forwarding (VRF) commands can be found at page 6, lines 3-4 and page 8, lines 12-15. The language involving using Multi Protocol Label Switching (MPLS) is supported at page 8, line 22.

As for Claim 8, the entirety of the claim has been replaced in order to maintain clarity, however, much of the language is supported by the earlier construction of the claim. Support for newer language involving VRF and MPLS is the same as for Claim 1. As for other newer language, it is supported as follows. Support for “configuring” can be found at page 7, line 24. Support for “sending” can be found in the drawing at figures 3-6 and at page 6, lines 6-8. Support for “aggregating” can be found in the original claim language, in the drawing at figures 4-5. Support for “distributing” can be found in the drawing at figure 4 and at page 8, line 46 to page 9, line 5. Support for “replicating” can be found at page 9, line 6.

The above listed support also applies to the language now used in Claim 13.

Summary of actions to date

This amendment is being made in response to the Office Action dated 2020-08-06. In that Action in the First Action Interview Summary section it is noted that the check box for “Applicant’s request to not have a first-action interview is acknowledged (or the time period for reply set for the in the Pre-Interview Communication has expired and the Office did not receive any reply)” has been checked. This is at best misleading. What follows is a recounting of the actions taken in the present Application so far.

The present Application was filed on 2019-10-11 including a First-Action Interview Enrollment Request and the TrackOne Request. The TrackOne Request was Granted on 2019-10-31. The Application was assigned to Examiner Harvey I. Cohen

who conducted a search and prepared a Pre-Interview Communication mailed 2019-12-19 detailing his initial determination that the claims were obvious. Applicant replied on 2020-01-17 including the Interview Request Form and the Declarations of Mr. Vilella and Mr. Zegarski in support of non-obviousness, with no changes to the claims being made. An in-person interview was conducted on 2020-03-02 between Examiner Cohen, Mr. Vilella, Mr. Bernet of Spada Innovations, Inc., an entity closely involved in the development of the invention, and Mr. Buchaca, the attorney of record, attending telephonically. During the interview it was agreed that Applicant would submit an amendment to place the claims in better condition for allowance. An Amendment was filed a week after the interview on 2020-03-09 where the limitations of original Claim 4 involving the unique tagging of Ethernet frames according to a unique virtual routing table for each of the private user devices on a passive optical network was incorporated into Claim 1, and a new independent Claim 13 was added to more broadly claim this feature. On 2020-06-09 it was learned that the Application was being transferred to another examiner, Mr. Roderick Tolentino. A telephonic interview attended by Mr. Tolentino, Mr. Vilella, Mr. Bernet, and Mr. Buchaca was conducted 2020-07-13 in the hope that the status of the Application could be quickly addressed and an allowance would be forthcoming. That telephonic interview resulted in Mr. Tolentino advising that he would review the Application further and prepare an action. On 2020-07-23 Applicant submitted a Second Declaration of Mr. Vilella in further support of non-obviousness. Examiner Tolentino then generated the most recent Office Action dated 2020-08-06 rejecting the claims in light of some new prior art.

The claims have been rejected for obviousness in light of:

Kolli et al. – System and Method for Transparent Virtual Routing – US 2008/0212598 A1 – Sep. 4, 2008 (hereinafter “Kolli”);

Suvakovic et al. – Low-Energy Optical Network Architecture – US 2011/0206370 A1 – Aug. 25, 2011 (hereinafter “Suvakovic”); and,

Homer – System for Tracking Files Transmitted Over the Internet – US 7,500,004 B1 – Mar. 3, 2009 (hereinafter “Homer”).

I. The combined references do not result in the invention as now claimed.

None of these references alone or in combination are concerned with configuring a Passive Optical Network (hereinafter “PON”) premise router to use Virtual Routing and Forwarding (hereinafter “VRF”) to uniquely tag data packets using Multi Protocol Label Switching (hereinafter “MPLS”) so that those packets can successfully pass through an optical line terminal (hereinafter “OLT”) in a PON without begin corrupted or otherwise misdirected. None of the cited references discuss the passage of MPLS tagged data through an OLT. Thus the combined references do not teach the invention as now claimed.

II. The combination of the references is not suggested by the references themselves

The examiner suggests that because Kolli teaches the use of virtual routing tables, which applicant admits is known in the copper networking world, and Suvakovic teaches the use of routing tables by a PON, which applicant admits is well-known since that’s what routers use, that somehow the combination of those two things is obvious. Applicant disagrees.

First, there would be no motivation for Suvakovic to utilize VRF in its network. Suvakovic describes a classic unified, monolithic-type PON in a secure setting where all the end user devices are intended to receive all the information available on the network and every user is published within the router. Ultimately, there would be no reason for a Suvakovic-type optical network to provide information separation as accomplished by VRF. Further, the energy saving method that Suvakovic teaches deals with selectively shutting down OLTs that are not being actively addressed to save energy, and relies on published routing information. A virtual routing table carries the private information of a user and is not published or visible within the router. Thus, when the OLT shuts off communication to unpublished routes due to inactivity, those routes would be lost when activity starts up again. In other words, the use of VRF in a Suvakovic-type optical network would result in some of the routes being unpublished and potentially lost, defeating the operation of the network.

Similarly, there would be no motivation for Kolli to send its data concerning digital communication across phone lines (DSL) through an OLT with the inherent unpredictability such an act would entail. The Declarations of Mr. Vilella and Mr. Zegarski make clear that the intermingling of PON and copper networking strategies would not have been undertaken, especially by those exhibiting ordinary skill.

Homer addresses the tagging of data packets in the TCP/IP context to include additional information regarding their source. This essentially provides expanded header-type information, becoming part of the data being routed, and is not involved in routing or separating information between end users. Thus the teachings of Homer would be of little use to someone attempting to route data in a PON.

III. Those of ordinary skill in the networking arts would not have made the combination

The Declarations of Mr. Vilella and Mr. Zegarski strongly suggest that the combination of the cited references would be beyond the level of expert skill, and thus well beyond ordinary skill, in the digital networking industry at the time the invention occurred. Indeed, the Declarations suggest the combination would have been avoided.

MPEP section 2141 details the requirements for supporting a determination of obviousness where a combination of prior art references is being made. When considering obviousness of a combination of known elements, the operative question is thus "whether the improvement is more than the predictable use of prior art elements according to their established functions." citing *KSR International Co. v. Teleflex Inc.* (*KSR*), 550 U.S. 398, 82 USPQ2d 1385 (2007).

Here the unpredictability and lack of any expectation of success of the result as supported by the Declarations strongly indicates that the improvement in this case is non-obvious.

IV. The examiner must acknowledge the pertinence of secondary non-obviousness considerations in this case

MPEP section 2141 also makes clear that the examiner must take secondary non-obviousness considerations into account in the present obviousness inquiry. "While each

case is different and must be decided on its own facts, these factual inquiries, including secondary considerations when present, are the *controlling* inquiries in any obviousness analysis.” MPEP 2141 part II (*italics emphasis added*).

Since such an inquiry into the considerations raised by the Declarations of Mr. Vilella and Mr. Zegarski are controlling, the Examiner must recognize their probative value. The Declarations of Mr. Vilella and Mr. Zegarski provide ample support for the proposition that the claimed invention is non-obvious due to considerations such as satisfying a long felt need in the industry, failure by others, copying by others, and unexpected results in the form of skepticism by experts and counter-intuitiveness, any one of which could overcome an obviousness determination given the circumstances of this case.

It is believed the amendments made to the claims support their allowance over the teachings of the cited references.

Therefore, reconsideration of the pending claims is earnestly solicited.

Applicant hereby reserves the right to further prosecute the original claims or any other broad claims supported by the disclosure in one or more continuing applications.

Respectfully submitted,

2020-10-06

/John Buchaca/

John D. Buchaca (Reg. No. 37, 289)
2635 Camino Del Rio South, Suite 102
San Diego, California 92108
Telephone: (619) 294-2922

190072

I hereby certify that this correspondence is being transmitted electronically via the United States Patent and Trademark Office EFS-Web system to: Mail Stop Amendment, Commissioner for Patents, on 2020-10-06, by John D. Buchaca, Reg. No. 37,289.

Signature: _____/John Buchaca/_____ Date: ___2020-10-06___

Doc Code: PET.POA.WDRW

Document Description: Petition to withdraw attorney or agent (SB83)

PTO/AIA/83 (04-13)

Approved for use through 03/31/2021. OMB 0651-0035

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

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**REQUEST FOR WITHDRAWAL
AS ATTORNEY OR AGENT AND
CHANGE OF
CORRESPONDENCE ADDRESS**

Application Number	16600302
Filing Date	2019-10-11
First Named Inventor	Joseph L. Vilella
Art Unit	2439
Examiner Name	Tolentino, Roderick
Practitioner Docket Number	190072

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

Please withdraw me as attorney or agent for the above-identified patent application, and

- ☐ all the practitioners of record;
- ☐ the practitioners (with registration numbers) of record listed on the attached paper(s); or
- ☒ the practitioners of record associated with Customer Number: 24243

NOTE: The immediately preceding box should only be marked when the practitioners were appointed using the listed Customer Number.

The reason(s) for this request are those described in 37 CFR:

- | | | |
|--|---------------------------------------|---------------------------------------|
| ☐ 11.116(a)(1) | ☐ 11.116(a)(2) | ☐ 11.116(a)(3) |
| ☐ 11.116(b)(1) | ☐ 11.116(b)(2) | ☐ 11.116(b)(3) |
| ☐ 11.116(b)(4) | ☐ 11.116(b)(5) | ☐ 11.116(b)(6) |
| ☒ 11.116(b)(7) Please explain below: | | |

Because of the Covid-19 pandemic and the associated burdens it places on my family, I am unable to devote the time necessary to further represent the Applicant in this case.

Certifications

Check each box below that is factually correct. WARNING: If a box is left unchecked, the request will likely not be approved.

- ☒ I/We have given reasonable notice to the client, prior to the expiration of the response period, that the practitioner(s) intend to withdraw from employment.
- ☒ I/We have delivered to the client or a duly authorized representative of the client all papers and property (including funds) to which the client is entitled.
- ☒ I/We have notified the client of any responses that may be due and the time frame within which the client must respond.

Please provide an explanation, if necessary:

I have spoken with the client, and the client approves of my withdrawal.

[Page 1 of 2]

This collection of information is required by 37 CFR 1.36. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 15 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

REQUEST FOR WITHDRAWAL AS ATTORNEY OR AGENT AND CHANGE OF CORRESPONDENCE ADDRESS

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Change the correspondence address and direct all future correspondence to:

A. ☐ The address of the applicant associated with Customer Number: _____

OR

B. ☒ Applicant

Address 2031 Second Avenue

City **San Diego**

State **CA**

Zip **92101**

Country **US**

Telephone **619-884-8360**

Email **joevilella@gmail.com**

I am authorized to sign on behalf of myself and all withdrawing practitioners.

Signature **/John Buchaca/**

Name **John D. Buchaca**

Registration No. **37289**

Address 2635 Camino Del Rio South, Suite 102

City **San Diego**

State **CA**

Zip **92108**

Country **US**

Date **2020-10-08**

Telephone No. **619-294-2922**

NOTE: Withdrawal is effective when approved rather than when received.

[Page 2 of 2]

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Electronic Acknowledgement Receipt	
EFS ID:	40817659
Application Number:	16600302
International Application Number:	
Confirmation Number:	7123
Title of Invention:	Mutually secure optical data network and method
First Named Inventor/Applicant Name:	Joseph L. Vilella
Customer Number:	24243
Filer:	John David Buchaca
Filer Authorized By:	
Attorney Docket Number:	190072
Receipt Date:	12-OCT-2020
Filing Date:	11-OCT-2019
Time Stamp:	14:42:10
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	Petition to withdraw attorney or agent (SB83)	2020-10-12_190072_RequestForWithdrawal.pdf	436400 8d8b97cf05315f0b6305070d967d2addb129a7cd	no	2

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Total Files Size (in bytes):	436400
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/600,302	10/11/2019	Joseph L. Vilella	190072

24243
CHARMASSON, BUCHACA & LEACH, LLP
2635 Camino Del Rio South
Suite 102
SAN DIEGO, CA 92108

CONFIRMATION NO. 7123
POWER OF ATTORNEY NOTICE



Date Mailed: 10/23/2020

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/12/2020.

- The withdrawal as attorney in this application has been accepted. Future correspondence will be mailed to the new address of record. 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/ckhlok/



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Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/600,302	10/11/2019	Joseph L. Vilella	190072

Spada Innovations, Inc.
Joseph L. Vilella
2031 Second Avenue
San Diego, CA 92101

CONFIRMATION NO. 7123
POA ACCEPTANCE LETTER



Date Mailed: 10/23/2020

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/12/2020.

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

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/ckhlok/



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/600,302	10/11/2019	Joseph L. Vilella	190072	7123
7590		10/28/2020		
Spada Innovations, Inc. Joseph L. Vilella 2031 Second Avenue San Diego, CA 92101			EXAMINER TOLENTINO, RODERICK	
			ART UNIT	PAPER NUMBER
			2439	
			MAIL DATE	DELIVERY MODE
			10/28/2020	PAPER

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

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

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.
2. Office Action is in response to the reply by Applicant filed on 10/6/2020. Claims 1, 4-6, 8 and 10-13 are pending. This Office Action is Final.

Claim Rejections - 35 USC § 103

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

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

4. **Claims 1, 4-6 and 13 is/are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Mitsunaga et al. (US 2012/0128349) in view of Daruwalla et al. (US 6,693,878).**

As per claim 1, Mitsunaga teaches a multi-user optical data network apparatus comprises: at least one network service carrier line connected to a passive optical network interface router (*Mitsunaga, Paragraph 0053 recites "The PON system has an OLT 4 that is a station side apparatus installed in a station house of a carrier, for example, and plural ONUs 2 installed in subscriber's homes, for example, which are connected via an optical fiber and an optical splitter 3."*);

at least one uplink connecting said interface router to an optical line terminal
(Mitsunaga, Paragraph 0053 recites "The ONU 2 has a UNI interface, to which a terminal or communication apparatus such as a personal computer, a router or a terminal adaptor within the user home is connected. In FIG. 1, terminals 1 are shown. On the upper-level side of the OLT 4, there is a Network Node Interface (NNI), in which the PON system is connected through this interface via a core network of the carrier to an upper-level network such as internet.");

said optical line terminal being connected to a number of passive optical network feeds for carrying a common data feed to a plurality of optical network units each supporting at least one of a plurality of private user devices *(Mitsunaga, Paragraph 0053 recites "In FIG. 1, terminals 1 are shown. On the upper-level side of the OLT 4, there is a Network Node Interface (NNI), in which the PON system is connected through this interface via a core network of the carrier to an upper-level network such as internet. As shown in FIG. 1, the OLT 4 and the ONUs 2 are connected at 1 to N in the PON system. Between the OLT 4 and the ONUs 2, plural logical links are set on one physical link, and a path to each ONU 2 is set by this logical link.")*.

But fails to teach said interface router being configured using Virtual Routing and Forwarding (VRF) commands to have at least one virtual routing table for each one of said plurality of private user devices, whereby said common data feed comprises data packets uniquely tagged using Multi Protocol Label Switching (MPLS) for each one of said plurality of private user devices; and, wherein each of said optical network units is adapted to extract those of said data packets intended for a supported one of said private user devices, and ignore those of said data packets not intended for said

supported one of said private user devices, thereby virtually isolating said private user devices from one another.

However, in an analogous art Daruwalla teaches said interface router being configured using Virtual Routing and Forwarding (VRF) commands to have at least one virtual routing table for each one of said plurality of private user devices, whereby said common data feed comprises data packets uniquely tagged using Multi Protocol Label Switching (MPLS) for each one of said plurality of private user devices; and, wherein each of said optical network units is adapted to extract those of said data packets intended for a supported one of said private user devices, and ignore those of said data packets not intended for said supported one of said private user devices, thereby virtually isolating said private user devices from one another (*Daruwalla, Col. 15 Lines 17-34 recites "Next, the CMTS examines the packet's routing information in order to determine the destination IP address of the packet. Once the destination IP is obtained, the CMTS then consults the VRF Table associated with VPN1 (e.g. Table 800 of FIG. 8), in order to determine whether the packet's destination IP address falls within any of the recognized destination IP address ranges specified by the VPN1 VRF Table 800. Presumably, in the example of FIG. 3A, the packet's destination IP address will fall within one of the recognized destination IP address ranges specified in the VPN1 VRF Table (e.g. IP address range [Range1]), and the CMTS will route the packet, using an MPLS protocol, to the specified next hop (e.g. Next Hop1). The packet will eventually travel from the CMTS 324 to the VPN1 CE device 352 along a MPLS VPN communication path 311. Once the packet is received at CE device 352, it will be processed and routed to the appropriate destination node at Enterprise A."*).

It would have been obvious to a person of ordinary skill in the art to use Daruwalla's Technique and apparatus for using node ID as virtual private network (VPN) identifiers with Mitsunaga's Passive optical network system, station side apparatus and power consumption control method because it offers the advantage of Network functionality is improved because network paths can be segmented without requiring multiple routers.

As per claim 4, Mitsunaga in combination with Daruwalla teaches the apparatus of Claim 1, Mitsunaga further teaches wherein said data packets comprise ethernet frames (*Mitsunaga, Paragraph 0053 recites "In the case of a GE -PON, an identifier called a Logical Link ID, logical link identifier (LLID) is embedded in a preamble part of Ethernet frame, whereby data multiplexing of ONUs is realized with this identifier."*).

As per claim 5, Mitsunaga in combination with Daruwalla teaches the apparatus of Claim 4, Mitsunaga further teaches wherein each of said plurality of optical network units provides service to a separate number of private users (*Mitsunaga, Paragraph 0053 recites "In FIG. 1, terminals 1 are shown. On the upper-level side of the OLT 4, there is a Network Node Interface (NNI), in which the PON system is connected through this interface via a core network of the carrier to an upper-level network such as internet. As shown in FIG. 1, the OLT 4 and the ONUs 2 are connected at 1 to N in the PON system. Between the OLT 4 and the ONUs 2, plural logical links are set on one physical link, and a path to each ONU 2 is set by this logical link."* See also Paragraph 0005 which recites "In this way, the PON system is suitable for inexpensively providing

an internet connection service or a company oriented private line service to users distributed over a service area, because the equipment can be shared among the plural subscribers by multiplexing plural subscriber signals to make the one-to-multiple connection.”).

As per claim 6, Mitsunaga in combination with Daruwalla teaches the apparatus of Claim 5, Daruwalla further teaches wherein said uplink carries data including digitized voice and video data (*Daruwalla, Col. 1 Lines 11-18 recites “Broadband access technologies such as cable, fiber optic, and wireless have made rapid progress in recent years. Recently there has been a convergence of voice and data networks which is due in part to US deregulation of the telecommunications industry. In order to stay competitive, companies offering broadband access technologies need to support voice, video, and other high-bandwidth applications over their local access networks.”*).

It would have been obvious to a person of ordinary skill in the art to use Daruwalla’s Technique and apparatus for using node ID as virtual private network (VPN) identifiers with Mitsunaga’s Passive optical network system, station side apparatus and power consumption control method because it offers the advantage of Network functionality is improved because carries multiple types of communications data.

Regarding claim 13, claim 13 is directed to a similar method associated with the apparatus of claim 1 respectively. Claim 13 is similar in scope to claim 1, respectively, and are therefore rejected under similar rationale.

Allowable Subject Matter

5. Claims 8 and 10-12 are allowed.
6. The following is an examiner's statement of reasons for allowance:
7. The present invention is directed to A digital optical data network system for improving information security in Passive Optical Networks ("PON") by providing virtual information separation in the router, such as a premise router, or routers interfacing the entire PON, such as by utilizing virtual routing and forwarding, thus allowing safe data traffic between multiple carriers, service providers accessing the PON and multiple end users on the PON such as tenants in a building, employees of a business entity, or subscribers in a residential community.

A search was conducted and the closest prior art of Mitsunaga et al. (US 2012/0128349) in view of Daruwalla et al. (US 6,693,878) and Kolli et al. (US 2008/0212598) which are directed towards inventions with optical networking, fail to disclose, teach or even suggest the particular combination of steps or elements as recited in independent claim 8.

Mitsunaga in view of Daruwalla and Kolli fail to teach "sending said MPLS tagged data packages to a passive optical networks optical line terminal (OLT); aggregating within said OLT said MPLS tagged data packages into a common data feed; distributing said common data feed to said plurality of ONUs: wherein said distributing comprises: replicating said common data feed using at least one optical splitter connected to said plurality of ONUs: extracting, at each of said plurality of ONUs, from said common data feed those MPLS tagged data packages intended for a specific one of said plurality of private user devices." Applicant's inventive steps listed above is deemed novel for its

distribution and replication of a feed in an optical network. As a result this claim is in condition for Allowance.

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

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RODERICK TOLENTINO whose telephone number is (571)272-2661. The examiner can normally be reached on Mon- Fri 8am-4pm.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Luu Pham can be reached on 571-270-5002. 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.

RODERICK . TOLENTINO
Examiner
Art Unit 2439

/RODERICK TOLENTINO/
Primary Examiner, Art Unit 2439

<i>Notice of References Cited</i>	Application/Control No. 16/600,302		Applicant(s)/Patent Under Reexamination Vilella, Joseph L.	
	Examiner RODERICK TOLENTINO		Art Unit 2439	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-20020141421-A1	10-2002	Dupont, Jean-Lou	H04Q11/0478	370/403
*	B	US-20080212598-A1	09-2008	Kolli; Raja	H04L29/12933	370/409
*	C	US-20040223500-A1	11-2004	Sanderson, David M.	H04L63/0272	370/395.53
*	D	US-20110206370-A1	08-2011	Suvakovic; Dusan	H04Q11/0067	398/25
*	E	US-20130010640-A1	01-2013	HIGUCHI; Hidemitsu	H04L12/4641	370/254
*	F	US-20120128349-A1	05-2012	mitsunaga; Daiji	H04J14/0268	398/25
*	G	US-6693878-B1	02-2004	Daruwalla; Feisal Y.	H04L12/2801	370/235
	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. 20201024

<i>Search Notes</i> 	Application/Control No. 16/600,302	Applicant(s)/Patent Under Reexamination Vilella, Joseph L.
	Examiner RODERICK TOLENTINO	Art Unit 2439

CPC - Searched*		
Symbol	Date	Examiner
H04Q11/0067 H04B10/27 H04L63/0414	12/09/2019	HC
H04Q2011/0073 H04Q2011/0086	12/09/2019	HC

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
Performed inventor search in PALM	12/09/2019	HC
Performed inventor search in EAST	12/09/2019	HC
Performed inventive search terms in EAST	12/09/2019	HC
Updated EAST Keyword Search	07/13/2020	RT
Updated EAST Keyword Search	10/26/2020	RT

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

/RODERICK TOLENTINO/ Primary Examiner, Art Unit 2439	
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	13,030,025	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/26 07:26
L2	566	L1 and (splitter with replicat\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:26
L3	37	L1 and (splitter with replicat\$3 with (stream feed traffic))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:26
L4	2	L1 and (splitter with replicat\$3 with (stream feed traffic)) and "passive optical network"	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:27
S1	13,029,234	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/09 16:11
S2	974	(virtual near2 "routing table")	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:11
S3	14	(virtual near2 "routing table" with packets with (tag tagged Id identifier))	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:12
S4	8	(virtual near2 "routing table" with packets with (tag tagged Id identifier) with destination)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:16
S5	9	(virtual near2 "routing table" with packets with extract\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:22
S6	3	(virtual near2 "routing table" with packets with common near4 feed)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:23
S7	0	(virtual near2 "routing table" with packets near3 ignor\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:24
S8	3	(virtual near2 "routing table" with packets near3 intended)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:24
S9	1,478	S1 and (ethernet with frame with MAC same packet)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/09 16:39

S10	2,351	S1 and (ethernet with frame with MAC same packet)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:39
S11	1,016	S1 and (ethernet with frame with "MAC address" same packet)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:39
S12	8	S1 and (ethernet with ignor\$3 with "MAC address" same packet)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:40
S13	0	("80115221").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/13 11:44
S14	1	("8011522").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/13 11:44
S15	974	(virtual near2 "routing table")	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 13:21
S16	3	(virtual near2 "routing table" with optical)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 13:22
S17	11	(virtual near2 "routing table" same optical)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 13:22
S18	254	(virtual near2 "routing table" with routers)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 13:22
S19	41	(virtual near2 "routing table" with routers)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 13:23
S20	13,029,234	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:33
S21	0	S20 and ("Passive optical network") with "virtual routers"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:33
S22	0	S20 and ("Passive optical network") same "virtual routers"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:36
S23	5	S20 and ("Passive optical network") and "virtual routers"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:36
S24	0	S20 and ("Passive optical network" PON) same "virtual routers"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:38

S25	0	S20 and ("Passive optical network" PON) same (virtual near3 routing near3 table)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 14:41
S26	263	S20 and ("Passive optical network" PON) same "MAC address"	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 14:56
S27	58	S20 and ("Passive optical network" PON) same "MAC address" with table	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 14:57
S28	0	S20 and ("Passive optical network" PON) same "MAC address" with routing near2 table	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 15:16
S29	12	S20 and ("Passive optical network" PON) with routing near2 table	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 15:21
S30	2	S20 and ("Passive optical network" PON) with routing near2 tables	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:22
S31	0	S20 and ("Passive optical network" PON) same packets near4 routing near2 tables	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:32
S32	2	S20 and ("Passive optical network" PON) and packets near4 routing near2 tables	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:33
S33	5	S20 and (virtual near2 "routing tables" same ethernet)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:34
S34	3	S20 and (virtual near2 "routing tables" same MAC)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:36
S35	5	S20 and (virtual near2 "routing tables" near4 devices)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:44
S36	0	S20 and ("Passive optical network") same routing near3 tables same virtual	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:49
S37	0	S20 and ("Passive optical network" PON) same routing near3 tables same virtual	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:50
S38	3	S20 and ("Passive optical network" PON) same tables same virtual	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:51
S39	13,029,289	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:46

S40	100	S39 and ("virtual routing table")	US-PGPUB; USPAT; EPO	OR	ON	2020/07/14 10:46
S41	49	S39 and ("virtual routing tables")	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:47
S42	10	S39 and ("virtual routing tables") and "mac address"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:50
S43	0	S39 and ("virtual routing tables" same (PON optical))	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:51
S44	0	S39 and ("virtual routing tables") and PON	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:51
S45	0	S39 and ("virtual routing tables") and (passive near3 optical)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:51
S46	0	S39 and ("virtual routing tables") and PON	US-PGPUB; USPAT; EPO	OR	ON	2020/07/14 10:52
S47	16	S39 and ("virtual routing tables" with router)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:53
S48	13,030,025	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/23 08:34
S49	22	S48 and ("virtual routing tables") and MPLS	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/23 08:34
S50	0	S48 and ("virtual routing tables" same MPLS with traffic)	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/23 08:36
S51	75	S48 and (("virtual routing tables" VRF) same MPLS with traffic)	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/23 08:37
S52	79	S48 and (("virtual routing tables" VRF) same MPLS with traffic)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 08:38
S53	49	S48 and (("virtual routing tables" VRF) with MPLS with traffic)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 08:38
S54	114	S48 and (("virtual routing tables" VRF) with MPLS with (packets traffic))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 08:38

S55	8	S48 and ("virtual routing tables" VRF) with MPLS with (packets traffic) same ethernet)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 08:46
S56	1	S48 and ("virtual routing tables" VRF) with MPLS with (packets traffic) same supported)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 08:49
S57	29	S48 and ("virtual routing tables" VRF) with MPLS with (packets traffic) with route)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 08:50
S58	18	S48 and ("virtual routing tables" VRF) with MPLS with (packets traffic) with private)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 08:59
S59	0	S48 and ("virtual routing tables" VRF) with MPLS with (packets traffic) with route) and ONU	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 09:42
S60	11	S48 and ("virtual routing tables" VRF) with MPLS with (packets traffic) with route) and optical	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 09:44
S61	2	S48 and ("virtual routing tables" VRF) with MPLS with (packets traffic) with route) and uplink	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 09:45
S62	13,030,025	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/24 07:31
S63	31	S62 and (MPLS with OLT and ONU)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:31
S64	23	S62 and (MPLS with OLT same ONU)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:32
S65	0	S62 and (MPLS with OLT same ONU same splitter)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:32
S66	14	S62 and (MPLS with OLT same ONU same (traffic packet packages))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:41
S67	2	S62 and (MPLS with OLT same ONUs same (traffic packet packages))	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/24 07:44
S68	0	S62 and (MPLS with OLT same ONU same (traffic packet packages) same destinatio)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:45
S69	2	S62 and (MPLS with OLT same ONU same (traffic packet packages) same destination)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:46

S70	0	S62 and (MPLS with OLT same ONU same (traffic packet packages) same aggregat\$4)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:48
S71	0	S62 and (MPLS with OLT same ONU same aggregat\$4)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:48
S72	2	S62 and (MPLS with OLT same aggregat\$4)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:49
S73	0	S62 and (MPLS with OLT same combin\$3 with (feed stream))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:50
S74	13,030,025	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/25 08:23
S75	6	S74 and ((PON "passive optical network") same uplink same router same users)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/25 08:23
S76	13,030,025	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/25 12:00
S77	86	S76 and (optical near\$3 splitter with replicat\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/25 12:00
S78	3	S76 and (optical near\$3 splitter with replicat\$3 with (feed traffic stream))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/25 12:12
S79	13,030,025	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/26 06:51
S80	0	S79 and (MPLS with ONUs with splitter with common)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 06:51
S81	0	S79 and (MPLS with ONUs with splitter with (stream feed traffic))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 06:52
S82	0	S79 and (MPLS with ONUs with splitter same (stream feed traffic))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 06:58
S83	0	S79 and (MPLS same ONUs with splitter with (stream feed traffic))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 06:59
S84	140	S79 and (splitter with common with (stream feed traffic))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 06:59

S85	0	S79 and (splitter with common with (stream feed traffic) with replicat\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 06:59
S86	0	S79 and (splitter with common with (stream feed traffic) with tags)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:01
S87	0	S79 and (optical near3 splitter with (stream feed traffic) with MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:03
S88	0	S79 and (optical near3 splitter with MPLS with extract\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:05
S89	0	S79 and (optical near3 splitter with MPLS with ONUs)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:08
S90	0	S79 and (optical near3 splitter with replicat\$3 with ONUs)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:10
S91	0	S79 and (optical near3 splitter near6 MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:11
S92	903	S79 and (optical near3 splitter near6 ONUS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:12
S93	0	S79 and (optical near3 splitter near6 ONUS with MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:12
S94	0	S79 and (optical near3 splitter near6 ONUS same MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:12
S95	0	S79 and (splitter near6 ONUS with MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:12
S96	0	S79 and (splitter near6 ONUS same MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:12
S97	6	S79 and (splitter with MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:13
S98	119	S79 and (splitter with ONUs with (stream feed traffic))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:14
S99	0	S79 and (splitter with ONUs with (stream feed traffic) with extract\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:14

S100	0	S79 and (splitter with ONUs with (stream feed traffic) with tag)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:14
S101	32	S79 and (splitter with ONUs with (stream feed traffic) with filter\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:15
S102	0	S79 and (splitter with MPLS near3 (tag tagged))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:18
S103	0	S79 and (splitter same MPLS near3 (tag tagged))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:18
S104	8,140	S79 and (splitter same users)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:19
S105	0	S79 and (splitter same MPLS same users)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:19
S106	0	S79 and (ONUS with (tag tagged) with MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:22
S107	0	S79 and (ONU with (tag tagged) with MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:22

EAST Search History (Interference)

<This search history is empty>

10/26/2020 8:02:34 AM

C:\Users\rtolentino\Documents\EAST\Workspaces\Case 16600302.wsp

Nov 05 20 01:58p

Bernet

619 237 9499

p.1

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NOV 05 2020

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

WASHINGTON, D.C.

In re application of:	)	
	)	Examiner: Tolentino, Roderick
Joseph L. Vilella	)	
	)	Art Unit: 2439
Serial No: 16600302	)	
	)	
Filed: 2019-10-11	)	
	)	
For: Mutually secure optical data	)	
network and method	)	
	)	

AMENDMENT AFTER FINAL

Commissioner for Patents
Mail Stop AF
Fax No. (571) 273-8300

In response to the Office Action dated **2020-10-28**, please amend the application as indicated below.

In the Claims

Please cancel Claims 1, 4-6, and 13.

1. – 7. Cancelled.

8. (Previously presented) A digital data network communication method comprises:

accepting a plurality of private data streams into at least one passive optical network interface router serving a plurality of private user devices through a plurality of optical network units (ONUs);

configuring said at least one passive optical network interface router to virtually separate information intended for each of said plurality of private user devices, wherein said configuring comprises:

generating an independently unique virtual routing table for each of said plurality of private user devices using Virtual Routing and Forwarding (VRF);

uniquely tagging ethernet frames contained in said plurality of private data streams and intended for said first one of said plurality of private user devices according to entries in a first one of said virtual routing tables associated with said first one of said private user devices using Multi Protocol Label Switching (MPLS) to form MPLS tagged data packages;

sending said MPLS tagged data packages to a passive optical networks optical line terminal (OLT);

aggregating within said OLT said MPLS tagged data packages into a common data feed;

distributing said common data feed to said plurality of ONUs;

wherein said distributing comprises:

replicating said common data feed using at least one optical splitter connected to said plurality of ONUs;

extracting, at each of said plurality of ONUs, from said common data feed those MPLS tagged data packages intended for a specific one of said plurality of private user devices.

9. Cancelled.

10. (Original) The method of Claim 8, wherein each of said optical network units provides service to a separate number of private users.

11. (Original) The method of Claim 8, wherein said accepting further comprises:
interfacing a plurality of service provider data lines through a single headend.

12. (Original) The method of Claim 8, wherein said aggregating further comprises using an enterprise aggregating switch.

13. Cancelled.

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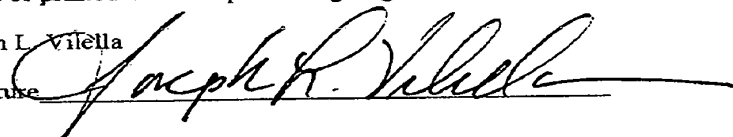
3

I hereby certify that this correspondence is being facsimile transmitted to the U.S. Patent and Trademark Office (Fax No. (571) 273-8300) on 2020-11-05.

Typed or printed name of person signing this certificate:

Joseph L. Vilella

Signature



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NOV 05 2020

619 237 9499

p.1

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C.**

In re application of:	)	
	)	Examiner: Tolentino, Roderick
Joseph L. Vilella	)	
	)	Art Unit: 2439
Serial No: 16600302	)	
	)	
Filed: 2019-10-11	)	
	)	
For: Mutually secure optical data	)	
network and method	)	

AMENDMENT AFTER FINAL

Commissioner for Patents
Mail Stop AF
Fax No. (571) 273-8300

In response to the Office Action dated 2020-10-28, please amend the application as indicated below.

In the Claims

Please cancel Claims 1, 4-6, and 13.

1. – 7. Cancelled.

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configuring said at least one passive optical network interface router to virtually separate information intended for each of said plurality of private user devices, wherein said configuring comprises:

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uniquely tagging ethernet frames contained in said plurality of private data streams and intended for said first one of said plurality of private user devices according to entries in a first one of said virtual routing tables associated with said first one of said private user devices using Multi Protocol Label Switching (MPLS) to form MPLS tagged data packages;

sending said MPLS tagged data packages to a passive optical networks optical line terminal (OLT);

aggregating within said OLT said MPLS tagged data packages into a common data feed;

distributing said common data feed to said plurality of ONUs;

wherein said distributing comprises:

replicating said common data feed using at least one optical splitter connected to said plurality of ONUs;

extracting, at each of said plurality of ONUs, from said common data feed those MPLS tagged data packages intended for a specific one of said plurality of private user devices.

9. Cancelled.

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11. (Original) The method of Claim 8, wherein said accepting further comprises:
interfacing a plurality of service provider data lines through a single headend.

12. (Original) The method of Claim 8, wherein said aggregating further comprises using an enterprise aggregating switch.

13. Cancelled.

REMARKS

Claims 8 and 10-12 remain pending in this application. Claims 1-7, 9, and 13 are cancelled. Claim 8 is the only independent claim.

All the pending claims have been allowed by the examiner. Therefore, a formal Notice of Allowance is earnestly solicited.

Applicant hereby reserves the right to further prosecute the original claims, the cancelled claims or any other broad claims supported by the disclosure in one or more continuing applications.

Respectfully submitted,

2020-11-05

Joseph L. Vilella
2031 Second Avenue
San Diego, California 92101
Telephone: (619) 884-8360

190072

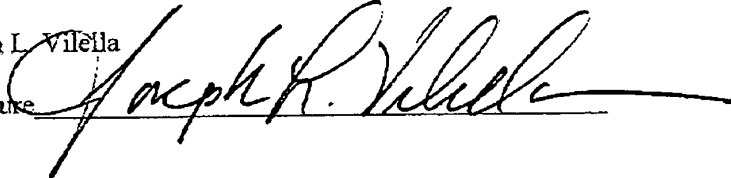
Certificate of Facsimile Transmission

I hereby certify that this correspondence is being facsimile transmitted to the U.S. Patent and Trademark Office (Fax No. (571) 273-8300) on 2020-11-05.

Typed or printed name of person signing this certificate:

Joseph L. Vilella

Signature



PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 16/600,302		Filing Date 10/11/2019		☐ 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	11/05/2020		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))		* 4		Minus ** 20		= 0		x \$100 =		0		
	Independent (37 CFR 1.16(h))		* 1		Minus *** 3		= 0		x \$480 =		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	
		(Column 1)		(Column 2)		(Column 3)							
AMENDMENT			CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))		*		Minus **		=		x \$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.										SLIE			
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".										/SHANDA E ROSS/			
*** 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.



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

NOTICE OF ALLOWANCE AND FEE(S) DUE

7590 11/30/2020
SPADA INNOVATIONS, INC.
JOSEPH L. VILELLA
2031 SECOND AVENUE
SAN DIEGO, CA 92101

EXAMINER	
TOLENTINO, RODERICK	
ART UNIT	PAPER NUMBER
2439	

DATE MAILED: 11/30/2020

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/600,302	10/11/2019	Joseph L. Vilella	190072	7123

TITLE OF INVENTION: Mutually secure optical data network and method

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$600	\$0.00	\$0.00	\$600	03/01/2021

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

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

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)

7590 11/30/2020
SPADA INNOVATIONS, INC.
JOSEPH L. VILELLA
2031 SECOND AVENUE
SAN DIEGO, CA 92101

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.
16/600,302	10/11/2019	Joseph L. Vilella	190072	7123

TITLE OF INVENTION: Mutually secure optical data network and method

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$600	\$0.00	\$0.00	\$600	03/01/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
TOLENTINO, RODERICK	2439	726-027000

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

1 _____
2 _____
3 _____

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

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document 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.
16/600,302	10/11/2019	Joseph L. Vilella	190072	7123
7590 11/30/2020 SPADA INNOVATIONS, INC. JOSEPH L. VILELLA 2031 SECOND AVENUE SAN DIEGO, CA 92101			EXAMINER TOLENTINO, RODERICK	
			ART UNIT 2439	PAPER NUMBER

DATE MAILED: 11/30/2020

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

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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.

Notice of Allowability	Application No. 16/600,302	Applicant(s) Vilella, Joseph L.	
	Examiner RODERICK TOLENTINO	Art Unit 2439	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 11/5/2020.
☐ 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 8 and 10-12. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
Certified copies:
a) ☐ All b) ☐ Some *c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892) 2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____. 3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____. 4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____.	5. ☐ Examiner's Amendment/Comment 6. ☒ Examiner's Statement of Reasons for Allowance 7. ☐ Other _____.
---	--

/RODERICK TOLENTINO/
Primary Examiner, Art Unit 2439

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.
2. Notice of Allowability is in response to the reply by Applicant filed on 11/5/2020. Claims 1, 4-6, and 13 have been canceled. Claims 8 and 10-12 are pending.

Allowable Subject Matter

3. Claims 8 and 10-12 are allowed.
4. The following is an examiner's statement of reasons for allowance:
5. The present invention is directed to A digital optical data network system for improving information security in Passive Optical Networks ("PON") by providing virtual information separation in the router, such as a premise router, or routers interfacing the entire PON, such as by utilizing virtual routing and forwarding, thus allowing safe data traffic between multiple carriers, service providers accessing the PON and multiple end users on the PON such as tenants in a building, employees of a business entity, or subscribers in a residential community.

A search was conducted and the closest prior art of Mitsunaga et al. (US 2012/0128349) in view of Daruwalla et al. (US 6,693,878) and Kolli et al. (US 2008/0212598) which are directed towards inventions with optical networking, fail to disclose, teach or even suggest the particular combination of steps or elements as recited in independent claim 8.

Mitsunaga in view of Daruwalla and Kolli fail to teach "sending said MPLS tagged data packages to a passive optical networks optical line terminal (OLT); aggregating

within said OLT said MPLS tagged data packages into a common data feed; distributing said common data feed to said plurality of ONUs: wherein said distributing comprises: replicating said common data feed using at least one optical splitter connected to said plurality of ONUs: extracting, at each of said plurality of ONUs, from said common data feed those MPLS tagged data packages intended for a specific one of said plurality of private user devices.” Applicant’s inventive steps listed above is deemed novel for its distribution and replication of a feed in an optical network. As a result this claim is in condition for Allowance.

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

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RODERICK TOLENTINO whose telephone number is (571)272-2661. The examiner can normally be reached on Mon- Fri 8am-4pm.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Luu Pham can be reached on 571-270-5002. 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.

RODERICK . TOLENTINO
Examiner
Art Unit 2439

/RODERICK TOLENTINO/
Primary Examiner, Art Unit 2439

<i>Notice of References Cited</i>	Application/Control No. 16/600,302		Applicant(s)/Patent Under Reexamination Vilella, Joseph L.	
	Examiner RODERICK TOLENTINO		Art Unit 2439	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-20020141421-A1	10-2002	Dupont, Jean-Lou	H04Q11/0478	370/403
*	B	US-20080212598-A1	09-2008	Kolli; Raja	H04L29/12933	370/409
*	C	US-20040223500-A1	11-2004	Sanderson, David M.	H04L63/0272	370/395.53
*	D	US-20110206370-A1	08-2011	Suvakovic; Dusan	H04Q11/0067	398/25
*	E	US-20130010640-A1	01-2013	HIGUCHI; Hidemitsu	H04L12/4641	370/254
*	F	US-20120128349-A1	05-2012	MITSUMAGA; Daiji	H04J14/0268	398/25
*	G	US-6693878-B1	02-2004	Daruwalla; Feisal Y.	H04L12/2801	370/235
*	H	US-20130084063-A1	04-2013	Hu; Junqiang	H04L49/10	398/2
*	I	US-20120014693-A1	01-2012	Cheng; Ning	H04J14/0282	398/34
*	J	US-20080273877-A1	11-2008	Palacharla; Paparao	H04J14/0282	398/64
*	K	US-20070092249-A1	04-2007	Akasaka; Yoichi	H04J14/0282	398/49
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FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Prommak et al., "Load distribution-survivable lighthpath routing for the optical virtual private network," Workshop on High Performance Switching and Routing, Merging Optical and IP Technologie Year: 2002 Conference Paper Publisher: IEEE
	V	Kim et al., "Design and implementation of ME-VPNS," 2012 14th International Conference on Advanced Communication Technology (ICACT) Year: 2012 Conference Paper Publisher: IEEE
	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. 20201117

Issue Classification 	Application/Control No. 16/600,302	Applicant(s)/Patent Under Reexamination Vilella, Joseph L.
	Examiner RODERICK TOLENTINO	Art Unit 2439

CPC						
Symbol				Type	Version	
H04Q	/	11	/	0067	F	2013-01-01
H04L	/	63	/	0414	I	2013-01-01
H04B	/	10	/	27	I	2013-01-01
H04Q	/	2011	/	0086	A	2013-01-01
H04Q	/	2011	/	0073	A	2013-01-01

CPC Combination Sets					
Symbol			Type	Set	Ranking
	/		/		

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	4	
/RODERICK TOLENTINO/ Primary Examiner, Art Unit 2439	17 November 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	8	1

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Issue Classification 	Application/Control No. 16/600,302	Applicant(s)/Patent Under Reexamination Vilella, Joseph L.
	Examiner RODERICK TOLENTINO	Art Unit 2439

INTERNATIONAL CLASSIFICATION			
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H04Q	/	11	/ 00
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US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)						
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NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 4	
/RODERICK TOLENTINO/ Primary Examiner, Art Unit 2439 (Primary Examiner) _____ (Date) 17 November 2020		O.G. Print Claim(s) 8	O.G. Print Figure 1

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Part of Paper No.: 20201117

Issue Classification 	Application/Control No. 16/600,302	Applicant(s)/Patent Under Reexamination Vilella, Joseph L.
	Examiner RODERICK TOLENTINO	Art Unit 2439

☐ 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
	1	2	10												
	2	3	11												
	3	4	12												
	4		13												
	5														
	6														
	7														
1	8														
	9														

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 4	
/RODERICK TOLENTINO/ Primary Examiner, Art Unit 2439 (Primary Examiner) _____ (Date) 17 November 2020		O.G. Print Claim(s) 8	O.G. Print Figure 1

<i>Search Notes</i> 	Application/Control No. 16/600,302	Applicant(s)/Patent Under Reexamination Vilella, Joseph L.
	Examiner RODERICK TOLENTINO	Art Unit 2439

CPC - Searched*		
Symbol	Date	Examiner
H04Q11/0067 H04B10/27 H04L63/0414	12/09/2019	HC
H04Q2011/0073 H04Q2011/0086	12/09/2019	HC

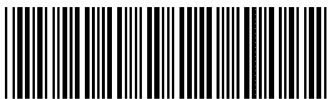
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Symbol	Date	Examiner

US Classification - Searched*			
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Search Notes		
Search Notes	Date	Examiner
Performed inventor search in PALM	12/09/2019	HC
Performed inventor search in EAST	12/09/2019	HC
Performed inventive search terms in EAST	12/09/2019	HC
Updated EAST Keyword Search	07/13/2020	RT
Updated EAST Keyword Search	10/26/2020	RT
Updated EAST Keyword Search	11/17/2020	RT
ACM Database Keyword Search	11/17/2020	RT
IEEE Database Keyword Search	11/17/2020	RT

/RODERICK TOLENTINO/ Primary Examiner, Art Unit 2439	
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<i>Search Notes</i> 	Application/Control No. 16/600,302	Applicant(s)/Patent Under Reexamination Vilella, Joseph L.
	Examiner RODERICK TOLENTINO	Art Unit 2439

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

Names

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10.1145/contrib-99659338842 (2)

Ajay Anil Mahimkar (2)

Charles E Rohrs (2)

Chunsheng Xin (2)

More (15)

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AT&T Inc. (2)

Massachusetts Institute of Technology (2)

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Reviewers
Craig Partridge (1)

Publications

Journal/Magazine Names

ACM SIGCOMM Computer Communication Review (5)
IEEE/ACM Transactions on Networking (5)
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ACM SIGMETRICS Performance Evaluation Review (1)
Communications of the ACM (1)

Proceedings/Book Names

ACM-SE 43: Proceedings of the 43rd annual Southeast regional conference - Volume 2 (1)
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ARTICLE

Blocking analysis of dynamic traffic grooming in mesh WDM optical networks
SIGs Conferences People Search ACM Digital Library

Chunsheng Xin

IEEE/ACM Transactions on Networking (TON), Volume 15, Issue 3 • June 2007, pp 721-733 • <https://doi.org/10.1109/TNET.2007.893234>

Traffic grooming in wavelength division multiplexing (WDM) optical networks routes and consolidates sub-wavelength connections onto lightpaths, to improve network utilization and reduce cost. It can be classified into static or dynamic, depending on ...

Highlights

Abstract

Traffic grooming in wavelength division multiplexing (WDM) optical networks routes and consolidates sub-wavelength connections onto lightpaths, to improve network utilization and reduce cost.

In this paper, an analytical model is developed for dynamic traffic grooming, allowing heterogeneous data rates for sub-wavelength connections, arbitrary alternate routing in both logical and physical topologies, and arbitrary wavelength conversion.

Full Text

Blocking Analysis of Dynamic Traffic Grooming in Mesh WDM Optical Networks
Chunsheng Xin Abstract-Traffic grooming in wavelength division multiplexing (WDM) optical networks routes and consolidates sub-wavelength connections onto lightpaths, to improve network utilization and reduce cost.

Furthermore, with the growing deployment of the Multi-Protocol Label Switching (MPLS) technology [3] in IP networks, a large amount of IP traffic is becoming dynamic circuit traffic in the form of LSPs.

The alternate routing with the first and second shortest routes, and the first-fit wavelength assignment are used in the optical network.

Subject

Network properties
Ring networks
Networks

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Media Formats

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ARTICLE

Bandwidth guaranteed routing with fast restoration against link and node failures

SIGs Conferences People

Randeep S. Bhatia Murali Kodialam T. V. Lakshman

Sudipta Sengupta

IEEE/ACM Transactions on Networking (TON), Volume 16, Issue 6 • December 2008, pp 1321–1330 • <https://doi.org/10.1109/TNET.2008.919325>

An important feature of MPLS networks is local restoration where detour paths are set-up a priori. The detour is such that failed links or nodes can be bypassed locally from the first node that is upstream from the failures. This local bypass activation ...

Highlights

Abstract

However, there are no satisfactory algorithms for the problem of preprovisioning fast restorable connections when the aggregate traffic demands are known (as would be the case when a set of routers are to be interconnected over an optical network or for pre-provisioned ATM over MPLS overlays). The contribution of this paper is a fast combinatorial approximation algorithm for maximizing throughput when the routed traffic is required to be locally restorable.

We compare the throughput of locally restorable routing with that of unprotected routing and 1+1-dedicated path protection on actual US/European ISP topologies taken from the Rocketfuel project [14].

Full Text

Index Terms—Fast restoration, MPLS, optical networks, protection, routing, traffic engineering. 1. INTRODUCTION DYNAMIC provisioning of bandwidth guaranteed paths with fast restoration capability is an important network service feature for both Multi-Protocol Label Switched (MPLS) networks [10] and optical mesh networks [12]. With optical extensions to the existing MPLS routing and signaling protocols, many of the concepts and mechanisms for dynamic provisioning in MPLS networks can be easily adapted for use in optical networks.

He currently is in the High Speed Networks Research Department, working on resource allocation and performance of communication systems including routing in MPLS systems, topology construction and routing in ad-hoc wireless networks, and reliable routing in optical networks.

Keywords

routing

Subject

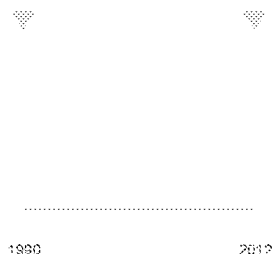
Ring networks
Routing protocols
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CoNEXT: International Conference On Emerging Networking Experiments And Technologies (1)
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Publication Date



RESEARCH-ARTICLE

Simulation of a VPN implementation based on MPLS protocol for a case study: VPN-MPLS for MSN-A1

N. Denane, A. Benacouda, S. Harous

MoMM '09. Proceedings of the 7th International Conference on Advances in Mobile Computing and Multimedia • December 2009, pp 589

–593 • <https://doi.org/10.1145/1821748.1821862>

In this paper, we present the implementation of a Virtual Private Network (VPN) using a Multi-Protocol Label Switching (MPLS) protocol. Because this protocol is very promising, economically and technologically, we have adopted it as the basic protocol ...

Highlights

Abstract

In this paper, we present the implementation of a Virtual Private Network (VPN) using a Multi-Protocol Label Switching (MPLS) protocol. Because this protocol is very promising, economically and technologically, we have adopted it as the basic protocol to simulate a case study of VPN-MPLS as part of a Multi-Services Network project of the Algerian Telecommunication Company "Algerie Telecom".

Full Text

Benacouda S Harous Département d'Informatique, College of Information Technology, Université de Sétif, Algeria UAE University, UAE ahbenacouda@univ-setif.dz harous@uaeu.ac.ae In this paper, we present the use of a protocol called Multi in this paper, we present the implementation of a Virtual Private Network (VPN) using a Multi-Protocol Label Switching (MPLS) protocol. THE MPLS Multi Protocol Label Switching (MPLS) is a mechanism for data transport based on the principle of labels communication [1]. The objective of Multi-Protocol Border Gateway Protocol (MPBGP) is to distribute routes between AS similar to OSPF.

Keywords

network

Subject

Networks
Network protocols



ARTICLE

Journals Magazines Proceedings Books

Oblivious routing of highly variable traffic in service overlays and IP backbones
SIGs Conferences People
Murali Kodialam T.V. Lakshman James E. Orlin Sudipta Sen Gupta

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IEEE/ACM Transactions on Networking (TON), Volume 17, Issue 2 • April 2009, pp 459
--472 • <https://doi.org/10.1109/TNET.2008.927257>

The emergence of new applications on the Internet like voice-over-IP, peer-to-peer, and video-on-demand has created highly dynamic and changing traffic patterns. In order to route such traffic with quality-of-service (QoS) guarantees without requiring ...

Highlights

Abstract

In order to route such traffic with quality-of-service (QoS) guarantees without requiring detection of traffic changes in real-time or reconfiguring the network in response to it, a routing and bandwidth allocation scheme has been recently proposed that allows preconfiguration of the network such that all traffic patterns permissible within the network's natural ingress-egress capacity constraints can be handled in a capacity efficient manner.

We also bring out the versatility of the scheme in not only handling widely fluctuating traffic but also accommodating applicability to several widely differing networking scenarios, including i) economical Virtual Private Networks (VPNs); ii) supporting indirection in specialized service overlay models like Internet Indirection Infrastructure (i3); iii) adding QoS guarantees to services that require routing through a network-based middlebox; and iv) reducing IP layer transit traffic and handling extreme traffic variability in IP-over- optical networks without dynamic reconfiguration of the optical layer. The two desirable properties of supporting indirection in specialized service overlay models and static optical layer provisioning in IP-over- optical networks are not present in other approaches for routing variable traffic, such as direct source-destination routing along fixed paths.

Full Text

We illustrate this through example applications of the routing scheme to i) economical Virtual Private Networks (VPNs); ii) providing Internet Indirection Infrastructure (i3) [22] like functionality with QoS guarantees in a network; iii) adding QoS guarantees to services that require routing through a network-based middlebox; and iv) reducing IP layer transit traffic and handling extreme traffic variability in IP-over- optical networks without dynamic reconfiguration of the optical layer.

Thus, any of the above approaches cannot be used for routing in service overlay networks. Direct source-destination routing, when applied to IP-over- optical networks, routes packets from source to destination along direct paths in the optical layer.

Depending on the underlying routing architecture, the Phase 1 and Phase 2 paths can be implemented as IP tunnels, optical layer circuits, or Label Switched Paths in Multi- Protocol Label Switching (MPLS) [17].

Subject

Network services
Routing protocols
Networks

 RESEARCH-ARTICLE

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[SIGs](#) [Conferences](#) [People](#)

 [Thomas Donald](#)  [Raluca-Maria Indre](#)  [Sara Quesada](#)

ITC '11: Proceedings of the 23rd International Teletraffic Congress • September 2011, pp 150–157

We propose a modified version of Optical Burst Switching (OBS) that adapts the size of switched data units to the network load. Specifically, we propose a two-way reservation OBS scheme in which every active source-destination pair attempts to reserve a ...

Highlights

Abstract

We propose a modified version of Optical Burst Switching (OBS) that adapts the size of switched data units to the network load.

We refer to this technique as Adaptive Optical Burst Switching. We prove that the proposed scheme is optimal in the sense that the network is stable for all traffic intensities in the capacity region. We also evaluate the throughput and delay performance of adaptive OBS through both analysis and simulation in order to assess the practical load ranges at which the network may operate.

Full Text

The routing bottleneck can be alleviated by means of optical switching, which enables payload to be carried exclusively in the optical domain.

In OBS networks, incoming IP packets are aggregated into optical bursts at the network edge before transmission.

Figure 4 depicts the considered routes for the bus, ring and star networks. The mesh network has one route per pair of nodes (i, j) such that $i < j$.

Subject

Network properties

Network structure

Networks



RESEARCH-ARTICLE

Journals Magazines Proceedings Books

R3: resilient routing reconfiguration
SIGs Conferences People

Search ACM Digital Library

Ye Wang, Hao Wang, Ajay Mahimkar, Richard Alimi, Yin Zhang,
Lili Qiu, Yang Richard Yang

SIGCOMM '10: Proceedings of the ACM SIGCOMM 2010 conference • August 2010, pp
291–302 • <https://doi.org/10.1145/1851182.1851218>

Network resiliency is crucial to IP network operations. Existing techniques to recover from one or a series of failures do not offer performance predictability and may cause serious congestion. In this paper, we propose Resilient Routing Reconfiguration ...

Also Published in:

ACM SIGCOMM Computer Communication Review: Volume 40 Issue 4, August 2010

Highlights

Abstract

Network resiliency is crucial to IP network operations. Existing techniques to recover from one or a series of failures do not offer performance predictability and may cause serious congestion. In this paper, we propose Resilient Routing Reconfiguration (R3), a novel routing protection scheme that is (i) provably congestion-free under a large number of failure scenarios; (ii) efficient by having low router processing overhead and memory requirements; (iii) flexible in accommodating different performance requirements (e.g., handling realistic failure scenarios, prioritized traffic, and the trade-off between performance and resilience); and (iv) robust to both topology failures and traffic variations. We then conduct extensive Emulab experiments and simulations using realistic network topologies and traffic demands.

Full Text

Categories and Subject Descriptors C.2.1 [Computer Communication Networks]: Network Architecture and Design- Network communications; C.2.2 [Computer Communication Networks]: Network Protocols- Routing protocols; C.2.3 [Computer Communication Networks]: Network Operations General Terms Algorithms, Performance, Reliability.

During the offline phase, we compute routing for the actual demand plus the virtual demand on the original network topology.

For this purpose, we use the same detour route ξe_1 to detour the fraction $pe_2(e_1) = 0.1$ of virtual demand xe_2 originally traversing e_1 .

Keywords

routing

Subject

Routing protocols

Networks

Network protocols

Provided by US Patent & Tia...

STIC

ARTICLE

Assessing network infrastructure

SIGs Conferences People

Jim Serebets

netWorker, Volume 2, Issue 4 • September 1998, pp 40

46 • <https://doi.org/10.1145/286293.285362>

Highlights

Full Text

Bandwidth is very scalable, and provisions have been made to allow for interoperability with existing LAN topologies via LAN emulation and Multi Protocol Over ATM (MPOA), a type of ATM routing. ATM's redundancy features and active alternate path routing, such as Private Network to Network interface (PNNi), are more robust than Ethernet's Spanning Tree. In addition, "meshing" remote locations provides alternate routes and reduces equipment costs, but typically, Permanent Virtual Circuits (PVCs) must be configured in advance.

Subject

Network architectures

Networks

0 725

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A hierarchical networking architecture based on new switching address

Search ACM Digital

Jixin Zhang, Mangui Liang

ICAIT '08. Proceedings of the 2008 International Conference on Advanced Infocomm Technology • July 2008, Article No.: 8, pp 1–4 • <https://doi.org/10.1145/1509315.1509324>

A clear target for computer communication technology is to support a high performance global network. The implementation bottleneck of high performance network is the operation of nodes not the bandwidth. There are some disadvantages at the process of ...

Highlights

Abstract

A clear target for computer communication technology is to support a high performance global network.

There are some disadvantages at the process of forwarding packet both in IP and ATM networking architecture. This paper describes a hierarchical networking architecture based on new switching address. It makes source routing the basis for interconnection, rather than an option as in IP.

Full Text

Categories and Subject Descriptors C.2.1 [Computer-Communication Networks]:

Network Architecture and Design General Terms Design Keywords hierarchical source routing, networking architecture, switching address, coding scheme 1.

In the paper [4], the output port source routing scheme only implement in AOPS (All-Optical Packet Switching), and that protocol is applied to carry IP or ATM packets between link layer and network layer of OSI model which similar to MPLS (Multi-Protocol Label Switching).

As the vector address contains route information, the switch in this network do not need maintain any route information.

Subject

Network architectures

Networks

ARTICLE

Journals Magazines Proceedings Books

Differentiated reliability (DiR) in wavelength division multiplexing time
SIGs Conferences People

Search ACM Digital

Andrea Fumagalli Marco Tacca

IEEE/ACM Transactions on Networking (TON), Volume 14, Issue 1 • February 2006, pp 159–168 • <https://doi.org/10.1109/TNET.2005.863708>

Extant (optical) networks normally offer two degrees of service reliability: full protection in the presence of a single fault in the network, and no protection at all. This situation reflects the historical duality that has its roots in the once ...

Highlights

Abstract

Extant (optical) networks normally offer two degrees of service reliability: full protection in the presence of a single fault in the network, and no protection at all. The datagram oriented service relies upon restoration, i.e., dynamic search for and reallocation of affected resources via actions such as routing table updates. The current trend in networking, however, is gradually driving the design of networks toward a unified solution that will jointly support traditional voice and data services, as well as a variety of novel multimedia applications. The reliability degree chosen for a given connection is thus determined by the application requirements, and not by the actual network topology, design constraints, robustness of the network components, and span of the connection. An efficient algorithm is proposed to sub-optimally design the wavelength division multiplexing (WDM) layer of a ring and illustrate the advantages of the DiR concept.

Full Text

Digital Object Identifier 10.1109/TNET.2005.863708 possible to employ protection mechanisms¹ at either the WDM layer [1] or the IP layer [2] by means of multi-protocol label switching (MPLS). Even within the same network architecture it may be advisable to provide multiple degrees of reliability, thus supporting virtual private networks with multiple reliability degrees. The route associated with at this step is chosen to be the routing for the demand under consideration.

Subject

Network services
Network types
Networks



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 Anat Premier-Eau

 Yehuda Afek

Haim Kaplan,

Edith Cohen,

 Michael Merril

PODC '01: Proceedings of the twentieth annual ACM symposium on Principles of distributed computing • August 2001, pp 43–52 • <https://doi.org/10.1145/383962.383980>

A new general theory about *restoration* of network paths is first introduced. The theory pertains to restoration of shortest paths in a network following failure, e.g., we prove that a shortest path in a network after removing k edges is the ...

Highlights

Abstract

A new general theory about restoration of network paths is first introduced. The theory pertains to restoration of shortest paths in a network following failure, e.g., we prove that a shortest path in a network after removing k edges is the concatenation of at most $k + 1$ shortest paths in the original network. The theory is then combined with efficient path concatenation techniques in MPLS (multi-protocol label switching), to achieve powerful schemes for restoration in MPLS based networks. We thus transform MPLS into a flexible and robust method for forwarding packets in a network. Finally, the different schemes suggested are evaluated experimentally on three large networks (a large ISP, the AS graph of the Internet, and the full Internet topology).

[Full Text](#)

The theory is then combined with efficient path concatenation techniques in MPLS (multi-protocol label switching), to achieve powerful schemes for restoration in MPLS based networks.

Multi-protocol lambda switching: Combining MPLS 70 'EdgeBypass-coat' 50 0 o 20 i, s
Cost stretch factor 3.2 - 5.31s Edge-Bypass: Weight 6.6.

Virtualpath routing for survivable ATM networks. *IEEE/ACM Transaction on Networking*, 4(1):22-39, February 1996. [13] H.

Subject

Network architectures

Networks

Provided by U.S. Patent & Tm...



ARTICLE

Journals Magazines Proceedings Books

Cross-layer path computation for dynamic traffic grooming
SIGS Conferences People

Search ACM Digital

Citunsheng Xin Feng He

ACM-SE 43: Proceedings of the 43rd annual Southeast regional conference - Volume 2 • March 2005, pp 9–13 • <https://doi.org/10.1145/1167253.1167257>

Traffic grooming in wavelength division multiplexing (WDM) optical networks is an operation to consolidate multiple low-speed traffic streams onto high-speed lightpaths. Traffic grooming of dynamic traffic over a dynamic logical topology, where ...

Highlights

Abstract

Traffic grooming in wavelength division multiplexing (WDM) optical networks is an operation to consolidate multiple low-speed traffic streams onto high-speed lightpaths.

Dynamic traffic grooming is a significant issue in WDM optical networks due to the customer's need of the "bandwidth-on-demand" service.

Full Text

The current WDM optical networks utilize wavelength routing to provision optical connections, called lightpaths, to interconnect client networks.

The client traffic is assumed consisting of traffic flows, or calls, in this paper, which can be ATM virtual path/channels (VP/VCs), or Label Switched Paths (LSPs) in IP networks with the Multi- Protocol Label Switching technology.

The shortest path routing for lightpaths and first-fit wavelength assignment are used in the optical network.

Subject

Network architectures
Networks

0 167



A novel network node architecture for high performance and function flexibility

ASP-DAC '01: Proceedings of the 2001 Asia and South Pacific Design Automation Conference • January 2001, pp 551–557 • <https://doi.org/10.1145/370155.370530>

Highlights

We developed a flexible network node that is tuned for high-speed and multilayer packet manipulation.

The optical signal is terminated, and Ethernet packets are extracted with a network card on a computer.

Subject

Network types

Networks

Network performance evaluation



REPORT

Journals

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Future Heterogeneous Networks
SIGs Conferences People

Conferences

People

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Vincent Chan + 2
Victor Frost + 2

The workshop FutureHetNets 2011 on "Highly Controllable Dynamic Heterogeneous Networking" was held on March 24–25, 2011 at NASA Ames Research Center in Mountain View, California. It was sponsored by the Large Scale Networking Coordinating Group (LSN) ...

Highlights

Abstract

It was sponsored by the Large Scale Networking Coordinating Group (LSN) of the Networking and Information Technology Research and Development (NITRD) interagency community, and supported by the National Science Foundation (NSF) and NASA.

The workshop was designed to uncover tough networking problems, especially those driven by the properties of new physical layer communication systems, and explore architecture constructs that may provide realistic solutions for the realization of an integrated heterogeneous network.

Device technologies and hardware subsystems are mature enough to provide at least two orders of magnitude increase in network speeds.

Full Text

Network types a. Packet switching b. Circuit switching; carrier class Ethernet (≥ 100Gbps) c. Hybrids: Multi-Protocol Label Switching (MPLS), Generalized Multi-Protocol Label Switching (GMPLS) d.

Where the division occurs and how many segments are used is an open question for future networks. Each network segment furthermore may include multiple communication modalities such as wireless, fiber optics, or satellite. 4.1.2 Core Networks Today core networks are almost entirely based upon fiber optics due to the high data capacities associated with traffic that has been aggregated

This is especially true for optical physical layer innovation, which is so costly to implement. A large virtual distributed testbed could be designed, with GENI as one component.

Subject

Network properties

Network range:

Networks

0 212

1

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ACM SIGMETRICS Performance Evaluation Review, Volume 39, Issue 1 • June 2011, pp
97–108 • <https://doi.org/10.1145/2007118.2007128>

Today's networks typically handle *traffic engineering* (e.g., tuning the routing-protocol parameters to optimize the flow of traffic) and *failure recovery* (e.g., pre-installed backup paths) independently. In this paper, we propose a unified way to ...

Highlights

Abstract

Today's networks typically handle traffic engineering (e.g., tuning the routing-protocol parameters to optimize the flow of traffic) and failure recovery (e.g., pre-installed backup paths) independently.

Our experiments with traffic measurements and topology data (including shared risks in the underlying transport network) from a large ISP identify a “sweet spot” that achieves near-optimal load balancing under a variety of failure scenarios, with a relatively small amount of state in the routers. We believe that our solution for joint traffic engineering and failure recovery will appeal to Internet Service Providers as well as the operators of data-center networks.

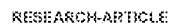
[Full Text](#)

Routing tables can be compressed by using the same MPLS labels for routes with a common path to the destination. Specifically, if two routes to destination t pass through router r , and these routes share the same path between the router r and the destination t , the same outbound label should be used in the routing table of router r . These functions can be implemented in the hypervisor, such as the virtual switch that often runs on server machines in data centers.

Subject

- Network services
- Network management
- Networks

2



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 Jennifer Rexford

...108 • <https://doi.org/10.1145/1993744.1993756>

Highlights

Today's networks typically handle traffic engineering (e.g., tuning the routing-protocol parameters to optimize the flow of traffic) and failure recovery (e.g., pre-installed backup paths) independently.

[Full Text](#)

Subject

- Network services
- Network management
- Networks

ARTICLE

Journals Magazines Proceedings Books

Improved quasi-path restoration in mesh networks
SIGs Conferences People

Search ACM Digital

Maulin Patel R. Chandrasekaran S. Venkatesan

IEEE/ACM Transactions on Networking (TON), Volume 16, Issue 1 • February 2008, pp 144–156 • <https://doi.org/10.1109/TNET.2007.8996032>

Restoration of disrupted traffic is critical in today's high-speed self-healing telecommunication networks. A restoration scheme dynamically discovers alternate paths bypassing the failed component. This paper presents an (online) improved quasi-path ...

Highlights

Abstract

Restoration of disrupted traffic is critical in today's high-speed self-healing telecommunication networks.

The (offline) spare capacity planning problem deals with the allocation of spare capacity to each link in the network, such that the spare capacity requirement is minimized, while guaranteeing the desired level of restoration in the event of a link failure.

The experimental analysis shows that network topology and demand patterns have a significant impact on the spare capacity savings offered by one scheme over the other.

Full Text

Shared Risk Link Group (SRLG) is proposed as the fundamental concept to resource management in the Generalized Multi-Protocol Label Switching (GMPLS) control plane [11], [12].

His research interests include mobile ad-hoc and sensor network protocols, body area networking, survivable telecommunication networks, mobile computing and cognitive radios.

His interests are in distributed systems, fault-tolerant network design, mobile computing, system and network forensics and mobile and sensor networks. 144 IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 16, NO. 1, FEBRUARY 2008 PATEL et al.: IMPROVED QUASI-PATH RESTORATION IN MESH NETWORKS 145 146 IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 16, NO. 1, FEBRUARY 2008 PATEL et al.: IMPROVED QUASI-PATH RESTORATION IN MESH NETWORKS 147 148 IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 16, NO. 1, FEBRUARY 2008 PATEL et al.: IMPROVED QUASI-PATH RESTORATION IN MESH NETWORKS 149 150 IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 16, NO. 1, FEBRUARY 2008 PATEL et al.: IMPROVED QUASI-PATH RESTORATION IN MESH NETWORKS 151 152 IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 16, NO. 1, FEBRUARY 2008 PATEL et al.: IMPROVED QUASI-PATH RESTORATION IN MESH NETWORKS 153 154 IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 16, NO. 1, FEBRUARY 2008 PATEL et al.: IMPROVED QUASI-PATH RESTORATION IN MESH NETWORKS 155 156 IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 16, NO. 1, FEBRUARY 2008

Subject

Network properties
Routing protocols
Networks

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RESEARCH-ARTICLE

Journals Magazines Proceedings Books

High capacity service provider design using GMPLS for IP next generation networks.
SIGs Conferences People Search ACM Digital

Ashish Tarwar Pishika Mehta Tauqir Azam

CUBE '12. Proceedings of the CUBE International Information Technology Conference • September 2012, pp 186–191 • <https://doi.org/10.1145/2381716.2381752>

This paper presents the details of internal architecture of backbone network of GMPLS based high capacity service providers to provide better performance suitable for Next-Generation Networks. The service provider configuration exploits the latest ...

Highlights

Abstract

This paper presents the details of internal architecture of backbone network of GMPLS based high capacity service providers to provide better performance suitable for Next-Generation Networks.

Authors have presented a sample CISCO, Juniper and Ciena based deployment of the service provider (routing, switching and transport) considering the support of latest protocols, security, power optimization and future extensibility.

The presented network service provider is a general purpose service provider and the core can be modified to provide any services that need high capacity Next Generation backbone network.

Full Text

The border routers in the four corners between the optical network and the IP network maintain both routing and optical topology information.

A PE that imports an RT installs that route in its routing table. The import route target is associated with each VRF and identifies the VPNv4 routes to be imported into the VRF for the specific customer.

"Generalized Multi- Protocol Label Switching (GMPLS) Architecture." n.d., <http://tools.ietf.org/html/rfc3945>. 21 J.

Subject

Network properties
Network structure
Networks



RESEARCH-ARTICLE

Journals Magazines Proceedings Books

Cabernet: connectivity architecture for better network services
SIGs Conferences People

Search ACM Digital

Yaping Zhu, Rui Zhang-Shen, Sampath Ranganathan, Jennifer Rexford

CoNEXT '08: Proceedings of the 2008 ACM CoNEXT Conference • December 2008,
Article No.: 64, pp 1–6 • <https://doi.org/10.1145/1544012.1544076>

Deploying and managing wide-area network services is exceptionally challenging. Despite having servers at many locations, a *service provider* must rely on an underlying best-effort network; a *network provider* can offer services over its own customized ...

Highlights

Abstract

Deploying and managing wide-area network services is exceptionally challenging. Despite having servers at many locations, a service provider must rely on an underlying best-effort network; a network provider can offer services over its own customized network, but only within limited footprint.

We introduce the connectivity layer, which uses virtual links purchased from infrastructure providers to run virtual networks with the necessary geographic footprint, reliability, and performance for the service providers. As an example, we present a cost-effective way to support IPTV delivery through wide-area IP multicast that runs on top of a reliable virtual network.

Full Text

Such virtual links are limited by the optical fiber footprint. 2) The widely used Multi-Protocol Label Switching (MPLS) can provide virtual links (tunnels) between two nodes that are not directly connected. 3) IP-in-IP encapsulation provides tunnels with best-effort service. It can also offer virtual networks with customized routing to select paths with QoS constraints, using reactive routing protocols similar in spirit to RON [11, 12]. We describe how to instantiate virtual networks at different layers on the infrastructure nodes and present the run-time support for the control and data planes. 3.1 Instantiating Virtual Networks A connectivity or service virtual network is composed of a network topology, a control plane to compute routes, and a data plane to forward packets.

Subject

Network services
Network architectures
Networks



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Network processing in content inspection applications

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Feliks J. Welfelt

ISSS '01, Proceedings of the 14th international symposium on Systems
synthesis • September 2001, pp 197–201 • <https://doi.org/10.1145/500061.500047>

This paper will show how NP can be used for complicated tasks including advanced classification of packets. Advanced classification requires the NP to look beyond the layer 3-4 header of the protocol, deep into the session and application layer payload. ...

Highlights

[Full Text](#)

THE NETWORK PROCESSING CHALLENGE To deliver enhanced, next generation services like converged voice and data, streaming video, point-and-click calling, secure virtual private networks, and differentiated Quality of Service (QoS) levels, system designers must address the challenge of building a network processing architecture that efficiently executes each network processing function.

NETWORK PROCESSING IN NEXT GENERATION NETWORKS Carrier data networks have evolved as a non-homogeneous set of end-user stations, servers and communication devices connected by electrical, optical and wireless links. But in multi-protocol environments, where PDUs are often encapsulated in protocols such as L2TP, PPP, IPsec, when MPLS shims-complex parsing operations are required in order to get to desired fields in the PDU.



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Comparison of Raw and Internet protocols in a HIPPI/ATM SONET-based network

Search ACM Digital

Raj K. Singh, Stephen G. Tell, Shaun J. Bharati

ACM SIGCOMM Computer Communication Review, Volume 26, Issue 1 • January 1996,
pp 18–28 • <https://doi.org/10.1145/232335.232342>

We compare implementation of Raw and Internet protocols (TCP, UDP) on a programmable HIPPI host-interface called the Network Interface Unit. The network interface unit connects Pixel-Planes 5, a message-based graphics multicomputer, to a wide area gigabit network called VISTAnet. The BISON network consists of a SONET cross-connect switch and an ATM switch. We discuss the tradeoffs between protocols for our target application and present a comparison of end-to-end throughput based on empirical measurements.

Highlights

Abstract

We compare implementation of Raw and Internet protocols (TCP, UDP) on a programmable HIPPI host-interface called the Network Interface Unit. The network interface unit connects Pixel-Planes 5, a message-based graphics multicomputer, to a wide area gigabit network called VISTAnet. The BISON network consists of a SONET cross-connect switch and an ATM switch. We discuss the tradeoffs between protocols for our target application and present a comparison of end-to-end throughput based on empirical measurements.

Full Text

In order to support the VISTAnet application, this programming paradigm extended across the network. 2.3 The Network is The VISTAnet network is based on the emerging BISON standards and uses SONET (Synchronous Optical Network) framing to transmit Asynchronous Transfer Mode (ATM) cells. Specifically, since this runs on top of a source-routed network, the functions implementing routing are unnecessary. J To From Pixel- Network Planes Ring Fig. 3: NIU hardware and protocol stack architecture The multi-protocol stack is implemented as a set of subroutines with a few well-defined entry points that can be called from several threads as appropriate.

Subject

Dependable and fault-tolerant systems and networks
Networks
Network protocols

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(((("Full Text & Metadata": "Optical network") AND "Full Text & Metadata": Virtual NEAR/5 routing) AND "Full Text & Metadata": MPLS)

Filters Applied: 1872 - 2012

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☐ Open Access Only

Year

Single Year

Range

2000

2012

From

To

2000

2012

Author

Affiliation

Publication Title

Publisher

Conference Location

Publication Topics

☐ Load distribution-survivable lightpath routing for the optical virtual private network
C. Prommak;D. Tipper
Workshop on High Performance Switching and Routing, Merging Optical and IP Technologies
Year: 2002 | Conference Paper | Publisher: IEEE
Cited by: Papers (3)

Abstract (439 Kb)
Load distribution-survivable lightpath routing for the optical virtual private network
C. Prommak;D. Tipper
Workshop on High Performance Switching and Routing, Merging Optical and IP Technologies
Year: 2002 | Conference Paper | Publisher: IEEE

☐ Design of Multicast Service Architecture in an Ethernet Passive Optical Network
HyeonSik Yoon;JeaHoon Yu
COIN-NGNCON 2006 - The Joint International Conference on Optical Internet and Next Generation Network
Year: 2006 | Conference Paper | Publisher: IEEE
Cited by: Papers (1)

Abstract (947 Kb)
Design of Multicast Service Architecture in an Ethernet Passive Optical Network
HyeonSik Yoon;JeaHoon Yu
COIN-NGNCON 2006 - The Joint International Conference on Optical Internet and Next Generation Network
Year: 2006 | Conference Paper | Publisher: IEEE

☐ Metropolitan/access optical network architecture to supply virtual private network, integrating layer-2&3 routings by optical/electrical hybrid switching

<https://ieeexplore.ieee.org/search/searchresult.jsp?action=search&newsearch=true&match...> 11/17/2020

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

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	13,029,234	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/09 16:11
S2	974	(virtual near2 "routing table")	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:11
S3	14	(virtual near2 "routing table" with packets with (tag tagged Id identifier))	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:12
S4	8	(virtual near2 "routing table" with packets with (tag tagged Id identifier) with destination)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:16
S5	9	(virtual near2 "routing table" with packets with extract\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:22
S6	3	(virtual near2 "routing table" with packets with common near4 feed)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:23
S7	0	(virtual near2 "routing table" with packets near3 ignor\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:24
S8	3	(virtual near2 "routing table" with packets near3 intended)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:24
S9	1,478	S1 and (ethernet with frame with MAC same packet)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/09 16:39
S10	2,351	S1 and (ethernet with frame with MAC same packet)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:39
S11	1,016	S1 and (ethernet with frame with "MAC address" same packet)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:39
S12	8	S1 and (ethernet with ignor\$3 with "MAC address" same packet)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/09 16:40
S13	0	("80115221").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/13 11:44

S14	1	("8011522").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/13 11:44
S15	974	(virtual near2 "routing table")	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 13:21
S16	3	(virtual near2 "routing table" with optical)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 13:22
S17	11	(virtual near2 "routing table" same optical)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 13:22
S18	254	(virtual near2 "routing table" with routers)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 13:22
S19	41	(virtual near2 "routing table" with routers)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 13:23
S20	13,029,234	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:33
S21	0	S20 and ("Passive optical network") with "virtual routers"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:33
S22	0	S20 and ("Passive optical network") same "virtual routers"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:36
S23	5	S20 and ("Passive optical network") and "virtual routers"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:36
S24	0	S20 and ("Passive optical network" PON) same "virtual routers"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 14:38
S25	0	S20 and ("Passive optical network" PON) same (virtual near3 routing near3 table)	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 14:41
S26	263	S20 and ("Passive optical network" PON) same "MAC address"	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 14:56
S27	58	S20 and ("Passive optical network" PON) same "MAC address" with table	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 14:57
S28	0	S20 and ("Passive optical network" PON) same "MAC address" with routing near2 table	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 15:16

S29	12	S20 and ("Passive optical network" PON) with routing near2 table	US-PGPUB; USPAT; EPO	OR	ON	2020/07/13 15:21
S30	2	S20 and ("Passive optical network" PON) with routing near2 tables	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:22
S31	0	S20 and ("Passive optical network" PON) same packets near4 routing near2 tables	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:32
S32	2	S20 and ("Passive optical network" PON) and packets near4 routing near2 tables	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:33
S33	5	S20 and (virtual near2 "routing tables" same ethernet)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:34
S34	3	S20 and (virtual near2 "routing tables" same MAC)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:36
S35	5	S20 and (virtual near2 "routing tables" near4 devices)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:44
S36	0	S20 and ("Passive optical network") same routing near3 tables same virtual	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:49
S37	0	S20 and ("Passive optical network" PON) same routing near3 tables same virtual	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:50
S38	3	S20 and ("Passive optical network" PON) same tables same virtual	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/13 15:51
S39	13,029,289	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:46
S40	100	S39 and ("virtual routing table")	US-PGPUB; USPAT; EPO	OR	ON	2020/07/14 10:46
S41	49	S39 and ("virtual routing tables")	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:47
S42	10	S39 and ("virtual routing tables") and "mac address"	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:50
S43	0	S39 and ("virtual routing tables" same (PON optical))	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:51

S44	0	S39 and ("virtual routing tables") and PON	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:51
S45	0	S39 and ("virtual routing tables") and (passive near3 optical)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:51
S46	0	S39 and ("virtual routing tables") and PON	US-PGPUB; USPAT; EPO	OR	ON	2020/07/14 10:52
S47	16	S39 and ("virtual routing tables" with router)	US-PGPUB; USPAT; EPO	OR	OFF	2020/07/14 10:53
S48	13,030,025	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/23 08:34
S49	22	S48 and ("virtual routing tables") and MPLS	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/23 08:34
S50	0	S48 and ("virtual routing tables" same MPLS with traffic)	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/23 08:36
S51	75	S48 and (("virtual routing tables" VRF) same MPLS with traffic)	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/23 08:37
S52	79	S48 and (("virtual routing tables" VRF) same MPLS with traffic)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 08:38
S53	49	S48 and (("virtual routing tables" VRF) with MPLS with traffic)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 08:38
S54	114	S48 and (("virtual routing tables" VRF) with MPLS with (packets traffic))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 08:38
S55	8	S48 and (("virtual routing tables" VRF) with MPLS with (packets traffic) same ethernet)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 08:46
S56	1	S48 and (("virtual routing tables" VRF) with MPLS with (packets traffic) same supported)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 08:49
S57	29	S48 and (("virtual routing tables" VRF) with MPLS with (packets traffic) with route)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 08:50
S58	18	S48 and (("virtual routing tables" VRF) with MPLS with (packets traffic) with private)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 08:59

S59	0	S48 and ("virtual routing tables" VRF) with MPLS with (packets traffic) with route) and ONU	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 09:42
S60	11	S48 and ("virtual routing tables" VRF) with MPLS with (packets traffic) with route) and optical	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 09:44
S61	2	S48 and ("virtual routing tables" VRF) with MPLS with (packets traffic) with route) and uplink	US-PGPUB; USPAT; EPO	OR	ON	2020/10/23 09:45
S62	13,030,025	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/24 07:31
S63	31	S62 and (MPLS with OLT and ONU)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:31
S64	23	S62 and (MPLS with OLT same ONU)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:32
S65	0	S62 and (MPLS with OLT same ONU same splitter)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:32
S66	14	S62 and (MPLS with OLT same ONU same (traffic packet packages))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:41
S67	2	S62 and (MPLS with OLT same ONUs same (traffic packet packages))	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/24 07:44
S68	0	S62 and (MPLS with OLT same ONU same (traffic packet packages) same destinatio)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:45
S69	2	S62 and (MPLS with OLT same ONU same (traffic packet packages) same destination)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:46
S70	0	S62 and (MPLS with OLT same ONU same (traffic packet packages) same aggregat\$4)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:48
S71	0	S62 and (MPLS with OLT same ONU same aggregat\$4)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:48
S72	2	S62 and (MPLS with OLT same aggregat\$4)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:49
S73	0	S62 and (MPLS with OLT same combin\$3 with (feed stream))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/24 07:50

S74	13,030,025	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/25 08:23
S75	6	S74 and ((PON "passive optical network") same uplink same router same users)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/25 08:23
S76	13,030,025	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/25 12:00
S77	86	S76 and (optical near3 splitter with replicat\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/25 12:00
S78	3	S76 and (optical near3 splitter with replicat\$3 with (feed traffic stream))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/25 12:12
S79	13,030,025	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/26 06:51
S80	0	S79 and (MPLS with ONUs with splitter with common)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 06:51
S81	0	S79 and (MPLS with ONUs with splitter with (stream feed traffic))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 06:52
S82	0	S79 and (MPLS with ONUs with splitter same (stream feed traffic))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 06:58
S83	0	S79 and (MPLS same ONUs with splitter with (stream feed traffic))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 06:59
S84	140	S79 and (splitter with common with (stream feed traffic))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 06:59
S85	0	S79 and (splitter with common with (stream feed traffic) with replicat\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 06:59
S86	0	S79 and (splitter with common with (stream feed traffic) with tags)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:01
S87	0	S79 and (optical near3 splitter with (stream feed traffic) with MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:03
S88	0	S79 and (optical near3 splitter with MPLS with extract\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:05

S89	0	S79 and (optical near3 splitter with MPLS with ONUs)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:08
S90	0	S79 and (optical near3 splitter with replicat\$3 with ONUs)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:10
S91	0	S79 and (optical near3 splitter near6 MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:11
S92	903	S79 and (optical near3 splitter near6 ONUS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:12
S93	0	S79 and (optical near3 splitter near6 ONUS with MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:12
S94	0	S79 and (optical near3 splitter near6 ONUS same MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:12
S95	0	S79 and (splitter near6 ONUS with MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:12
S96	0	S79 and (splitter near6 ONUS same MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:12
S97	6	S79 and (splitter with MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:13
S98	119	S79 and (splitter with ONUs with (stream feed traffic))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:14
S99	0	S79 and (splitter with ONUs with (stream feed traffic) with extract\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:14
S100	0	S79 and (splitter with ONUs with (stream feed traffic) with tag)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:14
S101	32	S79 and (splitter with ONUs with (stream feed traffic) with filter\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:15
S102	0	S79 and (splitter with MPLS near3 (tag tagged))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:18
S103	0	S79 and (splitter same MPLS near3 (tag tagged))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:18

S104	8,140	S79 and (splitter same users)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:19
S105	0	S79 and (splitter same MPLS same users)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:19
S106	0	S79 and (ONUS with (tag tagged) with MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:22
S107	0	S79 and (ONU with (tag tagged) with MPLS)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:22
S108	13,030,025	@ad<"20120802"	US-PGPUB; USPAT; EPO	OR	OFF	2020/10/26 07:26
S109	566	S108 and (splitter with replicat\$3)	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:26
S110	37	S108 and (splitter with replicat\$3 with (stream feed traffic))	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:26
S111	2	S108 and (splitter with replicat\$3 with (stream feed traffic)) and "passive optical network"	US-PGPUB; USPAT; EPO	OR	ON	2020/10/26 07:27
S112	1	("20080212598").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/10/26 08:27

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	(ONU and VRF and MPLS).clm.	US-PGPUB; USPAT	OR	OFF	2020/11/17 14:21
L2	0	(ONU and VRF and OIT).clm.	US-PGPUB; USPAT	OR	OFF	2020/11/17 14:21
L3	0	(ONU and VRF and (packet package)).clm.	US-PGPUB; USPAT	OR	ON	2020/11/17 14:22
L4	19	(ONU and Virtual and forward\$3 and (packet package)).clm.	US-PGPUB; USPAT	OR	ON	2020/11/17 14:23
L5	0	(ONU and Virtual and forward\$3 and (feed stream)).clm.	US-PGPUB; USPAT	OR	ON	2020/11/17 14:23
L6	42	(ONU and Virtual and forward\$3 and optical).clm.	US-PGPUB; USPAT	OR	ON	2020/11/17 14:23

11/17/2020 2:25:35 PM

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((("Full Text & Metadata":Optical NEAR/8 network) AND "Full Text & Metadata":Virtual NEAR/5 routing) AND "Full Text & Metadata":ONU))

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2006 ☐ 2012 ☐

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☒ Design of Multicast Service Architecture in an Ethernet Passive Optical Network

HyeonSik Yoon;JeaHoon Yu

COIN-NGNCON 2006 - The Joint International Conference on Optical Internet and Next Generation Network

Year: 2006 | Conference Paper | Publisher: IEEE

Cited by: Papers (1)

Abstract

(947 Kb)

☒ New Optical VPN Configuration using Wavelength Routers in a WDM-Passive Optical Network

Kimio Oguchi;Kohei Okada;Shohei Terada;Kunio Tojo

2007 16th International Conference on Computer Communications and Networks

Year: 2007 | Conference Paper | Publisher: IEEE

Cited by: Papers (2)

Abstract

(403 Kb)

☒ Design and implementation of ME-VPNS

Byeongsik Kim;Seunghyun Yoon;Youhyeon Jeong;Hoyoung Song

2012 14th International Conference on Advanced Communication Technology (ICACT)

Year: 2012 | Conference Paper | Publisher: IEEE

Abstract

(1041 Kb)

Conference
Location



Publication Topics



☒ **Strategies for a Solution Convergence Networks**



Octavio J. Salcedo Parra;Giovani Narvaez Pantoja;Gustavo Lopez Rubio
2011 7th International Conference on Wireless Communications, Networking
and Mobile Computing

Year: 2011 | Conference Paper | Publisher: IEEE

Abstract

(530 Kb)

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

WASHINGTON, D.C.

In re application of:	)	
	)	Examiner: Tolentino, Roderick
Joseph L. Vilella	)	
	)	Art Unit: 2439
Serial No: 16600302	)	
	)	
Filed: 2019-10-11	)	
	)	
For: Mutually secure optical data	)	
network and method	)	

AMENDMENT AFTER FINAL

Commissioner for Patents
Mail Stop AF
Fax No. (571) 273-8300

In response to the Office Action dated **2020-10-28**, please amend the application as indicated below.

OK TO ENTER: /R.T/

11/17/2020

PART B - FEE(S) TRANSMITTAL

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

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Alexandria, Virginia 22313-1450

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Joseph L. Vilella (Typed or printed name)
Joseph L. Vilella (Signature)
12/2/20 (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/600,402	09/11/2019	Joseph L. Vilella	100072	7123

TITLE OF INVENTION: Mutually secure optical data network and method

APPL. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$600	\$0.00	\$0.00	\$600	03/01/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
TOLENTINO, RODERICK	2439	726-027009

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. Fee printing on the patent (two-page, list)

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
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PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE (CITY AND STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☒ Individual ☐ Corporation or other private group entity ☐ Government

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

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- ☐ 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.

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Authorized Signature: Joseph L. Vilella

Date: 12/2/20

Typed or printed name: Joseph L. Vilella

Registration No. _____

Electronic Patent Application Fee Transmittal				
Application Number:		16600302		
Filing Date:		11-Oct-2019		
Title of Invention:		Mutually secure optical data network and method		
First Named Inventor/Applicant Name:		Joseph L. Vilella		
Filer:		Joseph L. Vilella		
Attorney Docket Number:		190072		
Filed as Small 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:				
UTILITY APPL ISSUE FEE	2501	1	600	600

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				600

Electronic Acknowledgement Receipt	
EFS ID:	41271437
Application Number:	16600302
International Application Number:	
Confirmation Number:	7123
Title of Invention:	Mutually secure optical data network and method
First Named Inventor/Applicant Name:	Joseph L. Vilella
Customer Number:	175346
Filer:	Joseph L. Vilella
Filer Authorized By:	
Attorney Docket Number:	190072
Receipt Date:	02-DEC-2020
Filing Date:	11-OCT-2019
Time Stamp:	12:30:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$600
RAM confirmation Number	E2020B2C37193824
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	Issue_fee_transmital_16600302.pdf	1220710 c890a45e384388247bd02cc40141386f630e12f8	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	29890 0603175f26ab697fc207ff2d4d8545cf3267d823	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			1250600		
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 NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
16/600,302		2439	



Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 175346 on 12/02/2020

- Correspondence Address
- Maintenance Fee Address

The address of record for Customer Number 175346 is:

175346
Joseph L. Vilella
2031 Second Avenue
San Diego, CA 92101

PART 1 - ATTORNEY/APPLICANT COPY

page 1 of 1

Nokia Exhibit No. 1006
Nokia v. SPADA
IPR2025-01442, U.S. Patent No. 11,589,142
Page 223 of 235



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/600,302	10/11/2019	Joseph L. Vilella	190072	7123
175346	7590	12/21/2020	EXAMINER TOLENTINO, RODERICK	
Joseph L. Vilella 2031 Second Avenue San Diego, CA 92101			ART UNIT 2439	PAPER NUMBER
			MAIL DATE 12/21/2020	DELIVERY MODE PAPER

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

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

Notice of Allowability	Application No. 16/600,302	Applicant(s) Vilella, Joseph L.	
	Examiner RODERICK TOLENTINO	Art Unit 2439	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 Printer Rush 12/9/2020.
☐ 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 8 and 10-12. 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. <u>12/17/2020</u> .	

/RODERICK TOLENTINO/ Primary Examiner, Art Unit 2439	
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Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.
2. Corrected Notice of Allowability is in response to fixing minor errors authorized by Applicant. Claims 1, 4-6, 13 and 14 have been canceled. Claims 8 and 10-12 are pending.

EXAMINER'S AMENDMENT

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in an interview with Joseph Vilella on 12/17/2020.

The application has been amended as follows:

10. (Currently Amended) The method of Claim ~~9~~ 8, wherein said distributing comprises associating destinations listed in said first one of said virtual routing tables with said first one of said optical network units.

11. (Currently Amended) The method of Claim ~~9~~ 8, wherein each of said optical network units provides service to a separate number of private users.

12. (Currently Amended) The method of Claim 9 8, wherein said accepting further comprises: interfacing a plurality of service provider data lines through a single headend.

14. (Canceled)

Allowable Subject Matter

4. Claims 8 and 10-12 are allowed.

5. The following is an examiner's statement of reasons for allowance:

6. The present invention is directed to A digital optical data network system for improving information security in Passive Optical Networks ("PON") by providing virtual information separation in the router, such as a premise router, or routers interfacing the entire PON, such as by utilizing virtual routing and forwarding, thus allowing safe data traffic between multiple carriers, service providers accessing the PON and multiple end users on the PON such as tenants in a building, employees of a business entity, or subscribers in a residential community.

A search was conducted and the closest prior art of Mitsunaga et al. (US 2012/0128349) in view of Daruwalla et al. (US 6,693,878) and Kolli et al. (US 2008/0212598) which are directed towards inventions with optical networking, fail to disclose, teach or even suggest the particular combination of steps or elements as recited in independent claim 8.

Mitsunaga in view of Daruwalla and Kolli fail to teach "sending said MPLS tagged data packages to a passive optical networks optical line terminal (OLT); aggregating within said OLT said MPLS tagged data packages into a common data feed; distributing said common data feed to said plurality of ONUs: wherein said distributing comprises:

replicating said common data feed using at least one optical splitter connected to said plurality of ONUs: extracting, at each of said plurality of ONUs, from said common data feed those MPLS tagged data packages intended for a specific one of said plurality of private user devices.” Applicant’s inventive steps listed above is deemed novel for its distribution and replication of a feed in an optical network. As a result this claim is in condition for Allowance.

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

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RODERICK TOLENTINO whose telephone number is (571)272-2661. The examiner can normally be reached on Mon- Fri 8am-4pm.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Luu Pham can be reached on 571-270-5002. 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.

RODERICK . TOLENTINO
Examiner
Art Unit 2439

/RODERICK TOLENTINO/
Primary Examiner, Art Unit 2439

<i>Examiner-Initiated Interview Summary</i>	Application No. 16/600,302	Applicant(s) Vilella, Joseph L.		
	Examiner RODERICK TOLENTINO	Art Unit 2439	AIA (First Inventor to File) Status No	Page 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	Title	Type
RODERICK TOLENTINO	Primary Examiner	Telephonic
Joseph Viella	Applicant	

Date of Interview: 17 December 2020

Issues Discussed:

Proposed Amendment(s)

Examiner contacted Applicant to propose amendments to fix minor errors. Applicant authorized the amendments

/RODERICK TOLENTINO/ Primary Examiner, Art Unit 2439	
Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04 Please further see: MPEP 713.04 Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b) 37 CFR § 1.2 Business to be transacted in writing	

Applicant recordation instructions:It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

Issue Classification 	Application/Control No. 16/600,302	Applicant(s)/Patent Under Reexamination Vilella, Joseph L.
	Examiner RODERICK TOLENTINO	Art Unit 2439

CPC						
Symbol				Type	Version	
H04Q	/	11	/	0067	F	2013-01-01
H04L	/	63	/	0414	I	2013-01-01
H04B	/	10	/	27	I	2013-01-01
H04Q	/	2011	/	0086	A	2013-01-01
H04Q	/	2011	/	0073	A	2013-01-01

CPC Combination Sets					
Symbol			Type	Set	Version
	/		/		

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	4	
/RODERICK TOLENTINO/ Primary Examiner, Art Unit 2439	17 December 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	8	1

U.S. Patent and Trademark Office

Part of Paper No.: 20201217

Issue Classification 	Application/Control No. 16/600,302	Applicant(s)/Patent Under Reexamination Vilella, Joseph L.
	Examiner RODERICK TOLENTINO	Art Unit 2439

INTERNATIONAL CLASSIFICATION			
CLAIMED			
H04Q	/	11	/ 00
H04L	/	29	/ 06
NON-CLAIMED			
	/		/

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

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

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	4	
/RODERICK TOLENTINO/ Primary Examiner, Art Unit 2439	17 December 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	8	1

U.S. Patent and Trademark Office

Part of Paper No.: 20201217

Issue Classification 	Application/Control No. 16/600,302	Applicant(s)/Patent Under Reexamination Vilella, Joseph L.
	Examiner RODERICK TOLENTINO	Art Unit 2439

☐ 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
	1	2	10												
	2	3	11												
	3	4	12												
	4		13												
	5		14												
	6														
	7														
1	8														
	9														

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 4	
/RODERICK TOLENTINO/ Primary Examiner, Art Unit 2439 (Primary Examiner) _____ (Date) 17 December 2020		O.G. Print Claim(s) 8	O.G. Print Figure 1



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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/600,302	01/26/2021	10904649	190072	7123
175346	7590	01/06/2021		
Joseph L. Vilella 2031 Second Avenue San Diego, CA 92101				

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 48 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):

Joseph L. Vilella, San Diego, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

IR103 (Rev. 10/09)