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P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/523,299	04/19/2016	9319852	0370.2043DIV (996710)	1015

99499 7590 03/30/2016
Edell, Shapiro, & Finnan, LLC
9801 Washingtonian Blvd.
Suite 750
Gaithersburg, MD 20878

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

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

Shmuel Shaffer, Palo Alto, CA;
Cisco Technology, Inc., San Jose, CA;
Amit Barave, Sunnyvale, CA;
Steven Christenson, Campbell, CA;
Marcelo Oliveira, San Jose, 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.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

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

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

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.

99499 7590 12/22/2015
Edell, Shapiro, & Finnan, LLC
9801 Washingtonian Blvd.
Suite 750
Gaithersburg, MD 20878

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/523,299	10/24/2014	Shmuel Shaffer	0370.2043DIV (996710)	1015

TITLE OF INVENTION: Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	03/22/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
JAIN, ANKUR	2649	455-519000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
- (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Edell, Shapiro & Finnan, LLC

2 _____

3 _____

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

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

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

Cisco Technology, Inc.

San Jose, CA

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☒ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

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

- ☐ A check is enclosed.
- ☒ Payment by credit card. XXXXXXXXXXXXXXXXXXXX
- ☒ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 05-0460 (enclose an extra copy of this form).

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 /Mark J. DeBoy/

Date March 15, 2016

Typed or printed name Mark J. DeBoy

Registration No. 66983

Electronic Patent Application Fee Transmittal

Application Number:	14523299			
Filing Date:	24-Oct-2014			
Title of Invention:	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation			
First Named Inventor/Applicant Name:	Shmuel Shaffer			
Filer:	Mark James DeBoy/Stephanie Jeppi			
Attorney Docket Number:	0370.2043DIV (996710)			
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	1501	1	960	960

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				960

Electronic Acknowledgement Receipt

EFS ID:	25196190
Application Number:	14523299
International Application Number:	
Confirmation Number:	1015
Title of Invention:	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation
First Named Inventor/Applicant Name:	Shmuel Shaffer
Customer Number:	99499
Filer:	Mark James DeBoy/Stephanie Jeppi
Filer Authorized By:	Mark James DeBoy
Attorney Docket Number:	0370.2043DIV (996710)
Receipt Date:	15-MAR-2016
Filing Date:	24-OCT-2014
Time Stamp:	13:41:52
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$960
RAM confirmation Number	11171
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)	PTOL-85-ToUpload.pdf	114505	no	1
			9c6ca2aa25dd17ddcd7eca54b1ff98f75e1036a5		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30822	no	2
			3994c402c37c3042fa13a992207b397e84a4db6c		
Warnings:					
Information:					
Total Files Size (in bytes):			145327		
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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Edell, Shapiro, & Finnan, LLC
9801 Washingtonian Blvd.
Suite 750
Gaithersburg, MD 20878



**Courtesy Reminder for
Application Serial No: 14/523,299**

Attorney Docket No: 0370.2043DIV (996710)
Customer Number: 99499
Date of Electronic Notification: 12/22/2015

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:
epatent@usiplaw.com

To view your correspondence online or update your email addresses, please visit us anytime at <https://sportal.uspto.gov/secure/myportal/privatepair>. If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.



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www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

99499 7590 12/22/2015
Edell, Shapiro, & Finnan, LLC
9801 Washingtonian Blvd.
Suite 750
Gaithersburg, MD 20878

EXAMINER

JAIN, ANKUR

ART UNIT

PAPER NUMBER

2649

DATE MAILED: 12/22/2015

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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14/523,299

10/24/2014

Shmuel Shaffer

0370.2043DIV (996710)

1015

TITLE OF INVENTION: Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	03/22/2016

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: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

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

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

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.

99499 7590 12/22/2015
Edell, Shapiro, & Finnan, LLC
9801 Washingtonian Blvd.
Suite 750
Gaithersburg, MD 20878

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/523,299	10/24/2014	Shmuel Shaffer	0370.2043DIV (996710)	1015

TITLE OF INVENTION: Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	03/22/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
JAIN, ANKUR	2649	455-519000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached. ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.	2. For printing on the patent front page, list (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____ (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____ 3 _____
---	---

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

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

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

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

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.

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NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____
 Typed or printed name _____ Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/523,299	10/24/2014	Shmuel Shaffer	0370.2043DIV (996710)	1015
99499	7590	12/22/2015	EXAMINER	
Edell, Shapiro, & Finnan, LLC			JAIN, ANKUR	
9801 Washingtonian Blvd.			ART UNIT	PAPER NUMBER
Suite 750			2649	
Gaithersburg, MD 20878				

DATE MAILED: 12/22/2015

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

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

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

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

Notice of Allowability	Application No. 14/523,299	Applicant(s) SHAFFER ET AL.	
	Examiner ANKUR JAIN	Art Unit 2649	AIA (First Inventor to File) 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 11/30/15.
☐ 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 20-24, 26-36, and 38-41. 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 _____. | |

/ANKUR JAIN/
Primary Examiner, Art Unit 2649

EXAMINER'S AMENDMENT

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 a telephone interview with Attorney Mark J. DeBoy.

The application has been amended as follows:

1.-19. (Canceled)

20. (Currently Amended) An apparatus comprising a processor, wherein the processor is configured to:

~~an information determination component that identifies~~ identify information related to an endpoint to obtain identified information; and

~~a negotiation component that negotiates~~ negotiate a communication session with an interoperability server (IS) ~~to dynamically determine if the endpoint should be connected to a virtual talk group via a proxy or directly connected to the virtual talk group~~ based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS; and

receive a first determination from the IS that the endpoint is not in adherence with capabilities of the predefined floor control mechanism and that a proxy is to be dynamically inserted to connect the endpoint to a virtual talk group, wherein the

capabilities comprise quality of service, rules of transmission and trusted endpoint identity.

21. (Currently Amended) The apparatus of claim 20, wherein the processor is further configured to ~~further comprising a capability determination component that identifies~~ identify media capabilities associated with the endpoint, the media capabilities employed by the IS to dynamically determine if the endpoint should be connected to the virtual talk group *via* the proxy.

22. (Currently Amended) The apparatus of claim 20, wherein the processor is further configured to ~~further comprising an identity determination component that~~ determines ~~determine~~ an identity associated with the endpoint, the identity employed by the IS to dynamically determine if the endpoint should be connected to the virtual talk group *via* the proxy.

23. (Currently Amended) A method comprising:

initiating communication with a non-compatible communication device;
identifying information associated with an initiating device; and
negotiating a communication session with an interoperability server (IS) to ~~dynamically determine if the non-compatible communication device should be connected to a virtual talk group via a proxy or directly connected to the virtual talk group~~ based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS; and
receiving a first determination from the IS that the initiating device is not in adherence with capabilities of the predefined floor control mechanism and that a proxy is to be dynamically inserted to connect the initiating device to a virtual talk

Art Unit: 2649

group, wherein the capabilities comprise quality of service, rules of transmission and trusted endpoint identity.

24. (Original) The method of claim 23, wherein the information associated with the initiating

device includes at least one of media capability information associated with the initiating device or an identity of the initiating device.

25. (Canceled).

26. (Previously Presented) The method of claim 23, further comprising transmitting media to the proxy over a private network through custom messages if it is evaluated that the proxy is employed.

27. (Previously Presented) The method of claim 23, further comprising, attaching the initiating device directly to the virtual talk group and transmitting media directly to the virtual talk group if the proxy is not employed to attach the initiating device to the virtual talk group.

28. (Previously Presented) The apparatus of claim 21, further comprising a transmitter, wherein the transmitter transmits data to the virtual talk group if it is determined that the proxy is not employed to connect the endpoint to the virtual talk group.

29. (Previously Presented) The apparatus of claim 21, further comprising a transmitter, wherein the transmitter transmits data to the proxy over a private channel if it is determined that the proxy is employed to connect the endpoint to the virtual talk group.

30. (Currently Amended) An endpoint comprising:
a transmitter and a receiver;
a user interface;
a processor coupled to the user interface, wherein the processor:
identifies information related to the endpoint; and
negotiates a communication session with an interoperability server to
dynamically determine if the non-compatible communication device should be
~~connected to a virtual talk group via a proxy or directly connected to the virtual~~
~~talk group~~-based in part on at least one of the identified information or a
predefined floor control mechanism associated with the interoperability server;
and
receive a first determination from the interoperability server that the
endpoint is not in adherence with capabilities of the predefined floor control
mechanism and that a proxy is to be dynamically inserted to connect the
endpoint to a virtual talk group, wherein the capabilities comprise quality of
service, rules of transmission and trusted endpoint identity.

31. (Previously Presented) The endpoint of claim 30, wherein the processor identifies media capabilities associated with the endpoint, the media capabilities employed by the interoperability server to dynamically determine if the endpoint should be connected to the virtual talk group via the proxy.

32. (Previously Presented) The endpoint of claim 30, wherein the processor determines an identity associated with the endpoint, the identity employed by the interoperability server to dynamically determine if the endpoint should be connected to a virtual talk group via the proxy.

33. (Previously Presented) The endpoint of claim 30, wherein the processor causes the transmitter to transmit data to the virtual talk group if it is determined that the proxy is not employed to connect the endpoint to the virtual talk group.

34. (Previously Presented) The endpoint of claim 30, wherein the processor causes the transmitter to transmit data to the proxy over a private channel if it is determined that the proxy is employed to connect the endpoint to the virtual talk group.

35. (Currently Amended) A non-transitory computer readable storage media comprising instructions that, when executed by a processor, cause the processor to perform operations comprising:

initiating communication with a non-compatible communication device;

identifying information associated with an initiating device; and

negotiating a communication session with an interoperability server ~~to dynamically determine if the non-compatible communication device should be connected to a virtual talk group via a proxy or directly connected to the virtual talk group~~ based in part on at least one of the identified information or a predefined floor control mechanism associated with the interoperability server; and

receiving a first determination from the IS that the initiating device is not in adherence with capabilities of the predefined floor control mechanism and that a proxy is to be dynamically inserted to connect the initiating device to a virtual talk group, wherein the capabilities comprise quality of service, rules of transmission and trusted endpoint identity.

36. (Previously Presented) The non-transitory computer readable storage media of claim 35, wherein the information associated with the initiating device includes at least one of media capability information associated with the initiating device or an identity of the initiating device.

37. (Canceled).

38. (Previously Presented) The non-transitory computer readable storage media of claim 36, further comprising instructions operable to cause the processor to transmit media to the proxy over a private network through messages if it is evaluated that the proxy is employed.

39. (Previously Presented) The non-transitory computer readable storage media of claim 36, further comprising instructions operable to cause the processor to connect the initiating device directly to the virtual talk group and to transmit media directly to the virtual talk group if the proxy is not employed to attach the initiating device to the virtual talk group.

40. (Currently Amended) The apparatus of claim 20, wherein the processor is configured to the negotiation component is configured to:

~~receive a first determination from the IS that the endpoint is not in adherence with capabilities of the predefined floor control mechanism and that the proxy is to be dynamically inserted to connect the endpoint to the virtual talk group, wherein the capabilities comprise quality of service, rules of transmission and trusted endpoint identity;~~

receive a second determination from the IS to connect the endpoint directly to the virtual talk group without the proxy when the endpoint is conforming with the capabilities, and

connect the endpoint to the virtual talk group in response to receiving one of the first determination or the second determination.

41. (Currently Amended) The apparatus of claim 20, wherein the processor is further configured to monitor ~~information determination component monitors~~ endpoints directly connected to the virtual talk group and determines that a directly connected endpoint is not conforming with a floor control policy of the virtual talk group.

Allowable Subject Matter

Claims 20-24, 26-36, and 38-41 are allowed.

The following is an examiner's statement of reasons for allowance: The prior art does NOT teach:

An apparatus comprising a processor, wherein the processor is configured to:

~~an information determination component that identifies~~ identify information related to an endpoint to obtain identified information; and

~~a negotiation component that negotiates~~ negotiate a communication session with an interoperability server (IS) ~~to dynamically determine if the endpoint should be connected to a virtual talk group via a proxy or directly connected to the virtual talk group~~ based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS; and

receive a first determination from the IS that the endpoint is not in adherence with capabilities of the predefined floor control mechanism and that a proxy is to be dynamically inserted to connect the endpoint to a virtual talk group, wherein the capabilities comprise quality of service, rules of transmission and trusted endpoint identity.

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

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANKUR JAIN whose telephone number is (571)272-9747. The examiner can normally be reached on M-F, 9:00 am to 4:00 pm, EST.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ANKUR JAIN/

Primary Examiner, Art Unit 2649

Issue Classification 	Application/Control No. 14523299	Applicant(s)/Patent Under Reexamination SHAFFER ET AL.	
	Examiner ANKUR JAIN	Art Unit 2649	

CPC						
Symbol					Type	Version
H04W		4	/	08	F	2013-01-01
H04L		65	/	605	I	2013-01-01
H04L		65	/	105	I	2013-01-01
H04L		69	/	24	I	2013-01-01
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CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE		Total Claims Allowed:	
		20	
(Assistant Examiner)	(Date)	O.G. Print Claim(s)	O.G. Print Figure
/ANKUR JAIN/ Primary Examiner.Art Unit 2649	12/14/15	1	FIG. 8
(Primary Examiner)	(Date)		

Issue Classification 	Application/Control No. 14523299	Applicant(s)/Patent Under Reexamination SHAFFER ET AL.
	Examiner ANKUR JAIN	Art Unit 2649

☐ Claims renumbered in the same order as presented by applicant															
☐ CPA															
☐ T.D.															
☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		17	15	33										
	2		18	16	34										
	3		19	17	35										
	4	1	20	18	36										
	5	2	21		37										
	6	5	22	19	38										
	7	8	23	20	39										
	8	9	24	6	40										
	9		25	7	41										
	10	10	26												
	11	11	27												
	12	3	28												
	13	4	29												
	14	12	30												
	15	13	31												
	16	14	32												

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/ANKUR JAIN/ Primary Examiner.Art Unit 2649	12/14/15	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	FIG. 8

Search Notes 	Application/Control No. 14523299	Applicant(s)/Patent Under Reexamination SHAFFER ET AL.
	Examiner ANKUR JAIN	Art Unit 2649

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
455	519	8/20/2015	AJ

SEARCH NOTES		
Search Notes	Date	Examiner
see attached	8/20/2015	AJ

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
455	519	12/14/2015	AJ

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	14/523299.APP.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/14 12:36
L2	1216	455/519.CCLS.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/14 12:36
S1	5	("20110004636" "20070105579" "20070270172" "20070105579" "20090093235" "20040224668").PN.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/19 14:24
S2	5	("20040224668" "20070105579" "20070270172" "20090093235" "20110004636").PN.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/19 14:25
S3	5	S1 or S2	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/19 14:25
S4	1	14/523299.APP.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/19 14:44
S5	0	12/127397.APP. AND (identification WITH information)	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/19 14:55
S6	2	12/127397.APP. AND (identif\$6 WITH information)	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/19 15:02
S7	1	14/523299.APP. AND (identif\$6 WITH information)	US-PGPUB;	OR	ON	2015/08/19 16:15

			USPAT; EPO; JPO; IBM_TDB;			
S8	5	(US-20110004636-\$ or US-20090093235-\$ or US-20070270172-\$ or US-20070105579-\$ or US-20040224668-\$).did.	US-PGPUB	OR	ON	2015/08/19 17:23
S9	4	S8 AND (identif\$7 WITH information\$2)	US-PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 17:23
S10	0	(transmi\$7 or output\$6 or send\$4 or sent\$4 or emit\$5 or broadcast\$4 or communicat\$3 or forward\$3 or retransmi\$7 or transfer\$4) near7 (identif\$6 near5 (capability or identification or identity)) near7 (interoperability ADJ server\$2)	US-PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 17:43
S11	52982	(transmi\$7 or output\$6 or send\$4 or sent\$4 or emit\$5 or broadcast\$4 or communicat\$3 or forward\$3 or retransmi\$7 or transfer\$4) near7 (identif\$6 near5 (capability or identification or identity))	US-PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 17:44
S12	75	S11 AND ((interoperability or "IS") ADJ server\$2)	US-PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 17:46
S13	594968	(transmi\$7 or output\$6 or send\$4 or sent\$4 or emit\$5 or broadcast\$4 or communicat\$3 or forward\$3 or retransmi\$7 or transfer\$4) near7 (capability or identification or identity)	US-PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 17:51
S14	26	S13 AND (interoperability ADJ server\$2)	US-PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 17:52
S15	7582	S13 AND (VTG or (virtual ADJ talk ADJ group\$4) or PTT or (push\$4 near4 talk\$4))	US-PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:10
S16	1353	S13 SAME (VTG or (virtual ADJ talk ADJ group\$4) or PTT or (push\$4 near4 talk\$4))	US-PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:10
S17	1206	S16 AND ("455".CLAS. or "370".CLAS. or H04B.CPCL. or H04W.CPCL. or H04H.CPCL. or H04J.CPCL. or	US-PGPUB; USPAT;	OR	ON	2015/08/19 18:11

		H04L.CPCL. or H04M.CPCL. or H04N.CPCL.)	EPO; JPO; IBM_TDB;			
S18	276	S17 AND interoperab\$5	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:11
S19	3	S17 AND (interoperab\$6 ADJ server)	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:12
S20	8065821	(telephone\$2 or (cellular ADJ telephone\$2) or (mobile ADJ unit\$2) or (wireless ADJ communication ADJ apparatus\$3) or (radio ADJ telephone\$2) or (radio ADJ unit\$2) or (cellular ADJ telephone\$2) or mobile\$2 or (mobile ADJ station\$2) or (cell ADJ phone\$2) or (cellular ADJ (phone\$2 or telephone\$2)) or handheld or (handheld ADJ unit\$2) or (user ADJ device\$2) or (user ADJ equipment\$2) or (user ADJ terminal\$2) or UE or terminal\$2 or (access ADJ terminal\$2) or AT or subscriber\$2 or PDA or (communication ADJ device\$2) or (end ADJ user\$2) or (mobile ADJ phone\$2) or (mobile ADJ device\$2) or (user ADJ agent\$2) or (mobile ADJ host\$2) or (mobile ADJ node\$2) or (mobile ADJ terminal\$2) or station\$2 or endpoint\$2 or (handy near2 phone\$2) or handyphone\$2 or (handy ADJ phone\$2) or WTRU)	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:20
S21	240929	S13 SAME S20	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:23
S22	2108	S21 SAME (VTG or (virtual ADJ talk ADJ group\$4) or PTT or (push\$4 near4 talk\$4) or (floor near4 control\$4) or interoperab\$5)	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:25
S23	23	S21 SAME (VTG or (virtual ADJ talk ADJ group\$4) or PTT or (push\$4 near4 talk\$4) or (floor near4 control\$4)) SAME interoperab\$6	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:26
S24	2	"20100234057"	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:38

S25	1	14/523299.APP. AND compatib\$5	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/20 14:47
S26	2	"20070036100" AND (GPS SAME endpoint\$2)	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/20 14:58
S27	2	"20070036100" AND (GPS SAME processor\$2)	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/20 14:59
S28	2	"20070105579"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/20 15:32
S29	1	14/523299.APP. AND negot\$6	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/20 15:33
S30	2	"20070105579"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/20 15:38
S31	1	14/058305.APP.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/21 11:51
S32	1	14/058305.APP. AND (characteristic\$2)	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/21 11:52
S33	1	14/058305.APP. AND (ambient SAME antenna\$2)	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/21 12:07
S34	2	"20100282849"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/21 12:54

S35	2	11/470862.APP.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/21 13:05
S36	1	14/523299.APP.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/07 14:00
S37	1	14/523299.APP. AND (determin\$4 WITH endpoint\$4 WITH proxy)	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/07 14:01
S38	931	(Shaffer near4 Shmuel)".INV. "	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/10 14:32
S39	30	(Barave near4 Amit)".INV. "	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/10 14:33
S40	89	(Christenson near4 Steven).INV.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/10 14:33
S41	60	(Oliveira near4 Marcelo)".INV. "	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/10 14:33
S42	16700	(Cisco).as.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/10 14:34
S43	17127	S38 or S39 or S40 or S41 or S42	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/10 14:35
S44	0	S43 AND (negotiat\$6 SAME virtual SAME floor).CLM.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/10 14:35

S45	2	S43 AND (negotiat\$6 SAME floor).CLM.	US- PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/10 14:36
S46	2	12/127397.APP.	US- PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/10 14:36
S47	1	14/523299.APP.	US- PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/10 14:46
S48	2	10/645928.APP.	US- PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/10 15:55
S49	2	10/869415.APP. AND sequenc\$4	US- PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/12/10 15:59

12/ 14/ 2015 12:36:56 PM
C:\ Users\ ajain1\ Documents\ EAST\ Workspaces\ 14523299.wsp

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	14/523,299
First Named Inventor	:	Shmuel Shaffer
Confirmation No.	:	1015
Filed	:	October 24, 2014
TC/A.U.	:	2649
Examiner	:	Ankur Jain
Customer No.	:	99499
Docket No.	:	0370.2043DIV (955474-US.02)
Title	:	INTEROPERABILITY AND COMMUNICATIONS SYSTEM DYNAMIC MEDIA PROXY BASED ON CAPABILITY NEGOTIATION

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

AMENDMENT

Sir:

In response to the Office Action mailed August 31, 2015, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims, which begins on page 2 of this paper.

Remarks begin after the claims.

Amendments to the Claims:

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

Listing of Claims:

1.-19. (Canceled)

20. (Currently Amended) An apparatus comprising:

an information determination component that identifies information related to an endpoint to obtain identified information; and

a negotiation component that negotiates a communication session with an interoperability server (IS) to dynamically determine if the endpoint should be connected to a virtual talk group via a proxy or directly connected to the virtual talk group based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS.

21. (Currently Amended) The apparatus of claim 20, further comprising a capability determination component that identifies media capabilities associated with the endpoint, the media capabilities employed by the IS to dynamically determine if the endpoint should be connected to [[a]]the virtual talk group ~~(VTG)~~ via [[a]]the proxy.

22. (Currently Amended) The apparatus of claim 20, further comprising an identity determination component that determines an identity associated with the endpoint, the identity employed by the IS to dynamically determine if the endpoint should be connected to [[a]]the virtual talk group ~~(VTG)~~ via [[a]]the proxy.

23. (Currently Amended) A method comprising:

initiating communication with a non-compatible communication device;
identifying information associated with an initiating device; and
negotiating a communication session with an interoperability server (IS) to dynamically determine if the non-compatible communication device should be connected to a virtual talk group via a proxy or directly connected to the virtual talk group based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS.

24. (Original) The method of claim 23, wherein the information associated with the initiating device includes at least one of media capability information associated with the initiating device or an identity of the initiating device.

25. (Canceled).

26. (Currently Amended) The method of claim ~~25~~23, further comprising transmitting media to the proxy over a private network through custom messages if it is evaluated that ~~[[a]]~~the proxy is employed.

27. (Currently Amended) The method of claim ~~25~~23, further comprising, attaching the initiating device directly to the ~~VTG~~ virtual talk group and transmitting media directly to the ~~VTG~~ virtual talk group if ~~[[a]]~~the proxy is not employed to attach the initiating device to the ~~VTG~~ virtual talk group.

28. (Currently Amended) The apparatus of claim 21, further comprising a transmitter, wherein the transmitter transmits data to the virtual talk group if it is determined that ~~[[a]]~~the proxy is not employed to connect the endpoint to the virtual talk group.

29. (Previously Presented) The apparatus of claim 21, further comprising a transmitter, wherein the transmitter transmits data to the proxy over a private channel if it is determined that the proxy is employed to connect the endpoint to the virtual talk group.

30. (Currently Amended) An endpoint comprising:

a transmitter and a receiver;

a user interface;

a processor coupled to the user interface, wherein the processor:

identifies information related to the endpoint; and

negotiates a communication session with an interoperability server to dynamically determine if the non-compatible communication device should be connected to a virtual talk group via a proxy or directly connected to the virtual talk group based in part on at least one of the identified information or a predefined floor control mechanism associated with the interoperability server.

31. (Currently Amended) The endpoint of claim 30, wherein the processor identifies media capabilities associated with the endpoint, the media capabilities employed by the interoperability server to dynamically determine if the endpoint should be connected to ~~[[a]]the~~ virtual talk group via ~~[[a]]the~~ proxy.

32. (Currently Amended) The endpoint of claim 30, wherein the processor determines an identity associated with the endpoint, the identity employed by the interoperability server to dynamically determine if the endpoint should be connected to a virtual talk group via ~~[[a]]the~~ proxy.

33. (Currently Amended) The endpoint of claim 30, wherein the processor causes the transmitter to transmit data to the virtual talk group if it is determined that ~~[[a]]the~~ proxy is not employed to connect the endpoint to the virtual talk group.

34. (Previously Presented) The endpoint of claim 30, wherein the processor causes the transmitter to transmit data to the proxy over a private channel if it is determined that the proxy is employed to connect the endpoint to the virtual talk group.

35. (Currently Amended) A non-transitory computer readable storage media comprising instructions that, when executed by a processor, cause the processor to perform operations comprising:

- initiating communication with a non-compatible communication device;
- identifying information associated with an initiating device; and
- negotiating a communication session with an interoperability server to dynamically determine if the non-compatible communication device should be connected to a virtual talk group via a proxy or directly connected to the virtual talk group based in part on at least one of the identified information or a predefined floor control mechanism associated with the interoperability server.

36. (Previously Presented) The non-transitory computer readable storage media of claim 35, wherein the information associated with the initiating device includes at least one of media capability information associated with the initiating device or an identity of the initiating device.

37. (Canceled).

38. (Currently Amended) The non-transitory computer readable storage media of claim 36, further comprising instructions operable to cause the processor to transmit media to the proxy over a private network through messages if it is evaluated that ~~[[a]]~~the proxy is employed.

39. (Currently Amended) The non-transitory computer readable storage media of claim 36, further comprising instructions operable to cause the processor to connect the initiating device directly to the virtual talk group and to transmit media directly to the virtual talk group if ~~[[a]]~~the proxy is not employed to attach the initiating device to the virtual talk group.

40. (New) The apparatus of claim 20, wherein the negotiation component is configured to:

receive a first determination from the IS that the endpoint is not in adherence with capabilities of the predefined floor control mechanism and that the proxy is to be dynamically inserted to connect the endpoint to the virtual talk group, wherein the capabilities comprise quality of service, rules of transmission and trusted endpoint identity;

receive a second determination from the IS to connect the endpoint directly to the virtual talk group without the proxy when the endpoint is conforming with the capabilities, and

connect the endpoint to the virtual talk group in response to receiving one of the first determination or the second determination.

41. (New) The apparatus of claim 20, wherein the information determination component monitors endpoints directly connected to the virtual talk group and determines that a directly connected endpoint is not conforming with a floor control policy of the virtual talk group.

REMARKS

Status of the Application

Claims 20-39 are all of the claims pending in the application, all of which have received substantive examination and currently stand rejected. Specifically, all of the claims have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Pre-Grant Publication No. 2007/0036100 to Shaffer et al. (hereinafter "Shaffer I") in view of U.S. Pre-Grant Publication No. 2007/0105579 to Shaffer et al. (hereinafter "Shaffer II"). No other grounds of rejection or objection have been presented. The following remarks address each ground of rejection set forth by the Examiner.

Per the present amendment, some of the features of claims 21 and 27 have been amended into the independent claims of the application, claims 25 and 37 have been canceled without prejudice or disclaimer, and new claims 40 and 41 have been added. Applicant respectfully submits that the new claims are fully supported throughout the application as originally filed, and no new matter has been added. For example, support for the new claims may be found in FIG. 7 and the accompanying description from the specification, as well as paragraph [0034] of the specification.

Claim Rejections

Claims 20-24, 26-36, 38 and 39 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shaffer I in view of Shaffer II. Applicant respectfully traverses the rejections for the following reasons.

Specifically, amended claim 20 recites, *inter alia*:

a negotiation component that negotiates a communication session with an interoperability server (IS) to dynamically determine if the endpoint should be connected to a virtual talk group *via* a proxy or directly connected to the virtual talk group based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS.

Applicant respectfully submits that the cited art fails to teach or suggest *at least* the above recited features of claim 20.

As an initial matter, Applicant notes that the grounds of rejection concede that Shaffer I fails to teach or suggest a negotiation component as recited in claim 1. *See, e.g., Office Action* at page 3. Accordingly, for the combination of Shaffer I and Shaffer II to present a *prima facie* case of obviousness, the recited negotiation component must be taught or suggested in Shaffer II. Applicant respectfully submits that no such negotiation component is taught in Shaffer II.

By way of background, the negotiation component recited in claim 20 is used to determine "if the endpoint should be connected to a virtual talk group *via* a proxy or directly connected to the virtual talk group." In other words, the negotiation component is used when determining how the endpoint device should connect to the virtual talk group. More specifically, the negotiation component is used when determining which of at least two options will be used to connect the endpoint to the virtual talk group: a connection through a proxy or a direct connection to the virtual talk group. No such negotiation component is taught or suggested in Shaffer II.

For example, the Shaffer II disclosure is directed to ways of facilitating "push-to-talk" services, i.e., half-duplex communications, using a combination of full-duplex and half-duplex devices. *See, e.g., Shaffer II* at ¶¶ [0022]-[0025]. Specifically, the IS 100 in Shaffer provides "floor control" for the full-duplex device to ensure that the full-duplex device does not transmit data at the same time a different half-duplex device is attempting to transmit data. *See, e.g., Shaffer II* at ¶ [0059]-[0061]. In the grounds of rejections, it alleged that the "[negotiation component] is not different than the floor control negotiations between IS 100 and endpoint 80." *Office Action* at 3. Accordingly, if it is assumed *arguendo* that the facilitation of the half-duplex communications with the full-duplex device corresponds to the recited "proxy," there is no teaching or suggestion of a negotiation module that is used to determine whether "the endpoint should be connected to a virtual talk group *via* a proxy or directly connected to the virtual talk group."

The Shaffer II disclosure assumes that the endpoint device has already connected to the virtual talk group through the use of the IS 100. There is no negotiation between the endpoint 80 and the IS 100. Instead, the Shaffer II disclosure begins at the point where the IS 100 is already facilitating the communications between the endpoints. This "starting point" for Shaffer II, i.e.,

Shaffer II assumes that IS 100 will always facilitate endpoint communications, is illustrated throughout the reference, and the starting point of the flowcharts of FIGs. 6-8 in particular. *See, e.g., Shaffer* at FIG. 6, ref. num. 300 ("Facilitate push-to-talk communication session between full duplex endpoint and plurality of half duplex endpoints"); *see also Shaffer* at FIG. 7, ref. num. 400 ("Facilitate push-to-talk communication session between full duplex endpoint and plurality of half duplex endpoints"); *see also Shaffer* at FIG. 8, ref. num. 500 ("Receive plurality of monitored push-to-talk communication streams over high bandwidth connection"). Conspicuously absent from these flowcharts (and everywhere else in Shaffer II) is any determination between utilizing IS 100 and directly connecting the endpoint to the virtual talk group. Instead, Shaffer II simply assumes that IS 100 will insert itself into the communications between the endpoints. Therefore, Shaffer II fails to teach or suggest a "negotiation component that ... dynamically determine[s] if the endpoint should be connected to a virtual talk group *via* a proxy or directly connected to the virtual talk group."

In light of the above, Applicant respectfully submits that claim 20 patentably distinguishes over the cited art. Applicant further submits that claims 23, 30 and 35 patentably distinguish over the cited art *at least* for reasons analogous to those presented with regard to claim 20. Finally, Applicant respectfully submits that claims 21, 22, 24, 26-29, 31-34, 36, 38 and 39 patentably distinguish over the cited art due *at least* to the respective dependencies from claims 20, 23, 30 and 35, as well as their additionally recited features.

New Claims

Per the present amendment, new claims 40 and 41 have been added. Applicant respectfully submits that the new claims patentably distinguish over the cited art due *at least* to their respective dependencies from claim 20, as well as their additionally recited features. For example, claim 41 recites that the "information determination component monitors endpoints directly connected to the virtual talk group and determines that a directly connected endpoint is not conforming with a floor control policy of the virtual talk group." Applicant respectfully submits that the cited art fails to teach or suggest any such monitoring by an endpoint device.

Conclusion

In view of the foregoing, Applicant respectfully requests the Examiner to find the application to be in condition for allowance with claims 20-24, 26-36 and 38-41. However, if for any reason the Examiner feels that the application is not now in condition for allowance, the Examiner is respectfully requested to call the undersigned attorney to discuss any unresolved issues and to expedite the disposition of the application.

Applicant does not believe that any fees or extensions of time are currently necessary. Nevertheless, Applicant hereby petitions for any extension of time that may be necessary to maintain the pendency of this application, and the Commissioner is hereby authorized to charge payment of any additional fees required for the above-identified application or credit any overpayment to Deposit Account No. 05-0460.

Dated: November 30, 2015

Respectfully submitted by:

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Electronic Acknowledgement Receipt

EFS ID:	24209393
Application Number:	14523299
International Application Number:	
Confirmation Number:	1015
Title of Invention:	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation
First Named Inventor/Applicant Name:	Shmuel Shaffer
Customer Number:	99499
Filer:	Mark James DeBoy/A. Karina Diaz
Filer Authorized By:	Mark James DeBoy
Attorney Docket Number:	0370.2043DIV (996710)
Receipt Date:	30-NOV-2015
Filing Date:	24-OCT-2014
Time Stamp:	13:26:46
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		AmdReOA2015-08-31.pdf	193975 61af438428f7b9ae0c4c95eabdb58fb2a0aa9e0d	yes	10

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	10
Warnings:			
Information:			
Total Files Size (in bytes):		193975	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.			

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/523,299	Filing Date 10/24/2014	☐ To be Mailed
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ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

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(i))	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$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

AMENDMENT	(Column 1)	(Column 2)	(Column 3)	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
	11/30/2015	CLAIMS REMAINING AFTER AMENDMENT					
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X \$80 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X \$420 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
TOTAL ADD'L FEE						0	

AMENDMENT	(Column 1)	(Column 2)	(Column 3)	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
		CLAIMS REMAINING AFTER AMENDMENT					
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =	
	☐ 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.

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

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

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

LIE
/ANNIE C. SINGLETON/

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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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/523,299	10/24/2014	Shmuel Shaffer	0370.2043DIV (996710)	1015
99499	7590	08/31/2015	EXAMINER	
Edell, Shapiro, & Finnan, LLC			JAIN, ANKUR	
9801 Washingtonian Blvd.				
Suite 750				
Gaithersburg, MD 20878				
			ART UNIT	PAPER NUMBER
			2649	
			NOTIFICATION DATE	DELIVERY MODE
			08/31/2015	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):

epatent@usiplaw.com

Office Action Summary	Application No. 14/523,299	Applicant(s) SHAFFER ET AL.	
	Examiner ANKUR JAIN	Art Unit 2649	AIA (First Inventor to File) Status No

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

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

Status

- 1) ☒ Responsive to communication(s) filed on 10/24/14.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) ☒ Claim(s) 20-39 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) _____ is/are allowed.
- 7) ☒ Claim(s) 20-39 is/are rejected.
- 8) ☐ Claim(s) _____ is/are objected to.
- 9) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 12/10/14 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

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

Certified copies:

- a) ☐ All b) ☐ Some** c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

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

DETAILED ACTION

Claim Rejections - 35 USC § 103

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

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

Claims 20-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaffer et al, US 2007/0036100 A1 (hereafter referenced as Shaffer1), in view of Shaffer et al, US 2007/0105579 A1 (hereafter referenced as Shaffer2).

Regarding **Claims 20, 23, 30, and 35**, Shaffer1 teaches “an information determination component that identifies information related to an endpoint to obtain identified information; initiating communication with a non-compatible communication device; identifying information associated with an initiating device; a transmitter and a receiver; a user interface; a processor coupled to the user interface, wherein the processor: identifies information related to the endpoint” (see Paragraphs 0026-0027, 0054-0056, 0064, 0093-0094, 0096, and Figures 1, 3, and 7). “Identified information and identifying information associated with an initiating device/endpoint” is no different than location information of an endpoint being transmitted using GPS technology and the processor 86 involved with this process, as outlined in Paragraphs 0054-0056 and 0096 . Furthermore, “non-compatible communication device” is clearly no different than the outlined portions of Paragraphs 0026-0027, 0064, and 0093-0094 regarding the

interoperability system (IS) facilitating communications amongst endpoints of different communications networks/different frequencies/different channels. Shaffer1 does not teach “a negotiation component that negotiates a communication session with an interoperability server (IS) based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS.” However, Shaffer2 teaches “a negotiation component that negotiates a communication session with an interoperability server (IS) based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS” (see Paragraphs 0060-0061, 0094-0095, and Figure 6). The Examiner firmly submits that this is no different than the floor control negotiations between IS 100 and endpoint 80. It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify Shaffer1 to incorporate a negotiation component that negotiates a communication session with an interoperability server (IS) based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS, as taught by Shaffer2, for the purpose of increasing the versatility and functionality of the media communication methodology of Shaffer1, and since both Shaffer1 and Shaffer2 identically disclose PTT functionality in a virtual talk group (VTG) environment amongst endpoints, facilitated by an Interoperability System (IS), as disclosed in Paragraphs 0064 and 0066 of Shaffer2; and Paragraph 0053 and Figure 3 of Shaffer1.

Regarding **Claim 21 and 31**, Shaffer1 teaches “further comprising a capability determination component that identifies media capabilities associated with the endpoint, the media capabilities employed by the IS to dynamically determine if the endpoint

should be connected to a virtual talk group (VTG) via a proxy” (see Paragraphs 0026-0027, 0054-0056, 0064, 0093-0094, 0096, and Figures 1, 3, and 7).

Regarding **Claim 22 and 32**, Shaffer1 teaches “further comprising an identity determination component that determines an identity associated with the endpoint, the identity employed by the IS to dynamically determine if the endpoint should be connected to a virtual talk group (VTG) via a proxy” (see Paragraphs 0026-0027, 0054-0056, 0064, 0093-0094, 0096, and Figures 1, 3, and 7).

Regarding **Claim 24 and 36**, Shaffer1 teaches “wherein the information associated with the initiating device includes at least one of media capability information associated with the initiating device or an identity of the initiating device” (see Paragraphs 0026-0027, 0054-0056, 0064, 0093-0094, 0096, and Figures 1, 3, and 7).

Regarding **Claim 25 and 37**, Shaffer1 teaches “further comprising evaluating if a proxy is employed to attach the initiating device to a virtual talk group (VTG)” (see Paragraphs 0026-0027, 0054-0056, 0064, 0093-0094, 0096, and Figures 1, 3, and 7).

Regarding **Claim 26 and 38**, Shaffer1 teaches “further comprising transmitting media to the proxy over a private network through custom messages if it is evaluated that a proxy is employed” (see Paragraphs 0026-0027, 0054-0056, 0064, 0093-0094, 0096, and Figures 1, 3, and 7).

Regarding **Claim 27 and 39**, Shaffer1 teaches “further comprising, attaching the initiating device directly to the VTG and transmitting media directly to the VTG if a proxy is not employed to attach the initiating device to the VTG” (see Paragraphs 0026-0027, 0054-0056, 0064, 0093-0094, 0096, and Figures 1, 3, and 7).

Regarding **Claim 28 and 33**, Shaffer1 teaches “further comprising a transmitter, wherein the transmitter transmits data to the virtual talk group if it is determined that a proxy is not employed to connect the endpoint to the virtual talk group” (see Paragraphs 0026-0027, 0054-0056, 0064, 0093-0094, 0096, and Figures 1, 3, and 7).

Regarding **Claim 29 and 34**, Shaffer1 teaches “further comprising a transmitter, wherein the transmitter transmits data to the proxy over a private channel if it is determined that the proxy is employed to connect the endpoint to the virtual talk group” (see Paragraphs 0026-0027, 0054-0056, 0064, 0093-0094, 0096, and Figures 1, 3, and 7).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ankur Jain whose telephone number is 571-272-9747. The examiner can normally be reached on M-F, 9:00 am to 4:00 pm, EST.

Art Unit: 2649

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ANKUR JAIN/

Primary Examiner, Art Unit 2649

Notice of References Cited	Application/Control No. 14/523,299	Applicant(s)/Patent Under Reexamination SHAFFER ET AL.	
	Examiner ANKUR JAIN	Art Unit 2649	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-2007/0036100 A1	02-2007	Shaffer; Shmuel	H04W4/021	370/328
*	B	US-2007/0105579 A1	05-2007	Shaffer; Shmuel	H04L65/605	455/519
	C	US-				
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	14/523299.APP. AND compatib\$5	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/20 14:47
L2	2	"20070036100" AND (GPS SAME endpoint\$2)	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/20 14:58
L3	2	"20070036100" AND (GPS SAME processor\$2)	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/20 14:59
L4	2	"20070105579"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/20 15:32
L5	1	14/523299.APP. AND negot\$6	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/20 15:33
L6	2	"20070105579"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/20 15:38
S1	5	("20110004636" "20070105579" "20070270172" "20070105579" "20090093235" "20040224668").PN.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/19 14:24
S2	5	("20040224668" "20070105579" "20070270172" "20090093235" "20110004636").PN.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/19 14:25
S3	5	S1 or S2	US-PGPUB;	OR	ON	2015/08/19 14:25

			USPAT; EPO; JPO; IBM_TDB;			
S4	1	14/523299.APP.	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 14:44
S5	0	12/127397.APP. AND (identification WITH information)	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 14:55
S6	2	12/127397.APP. AND (identif\$6 WITH information)	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 15:02
S7	1	14/523299.APP. AND (identif\$6 WITH information)	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 16:15
S8	5	(US-20110004636-\$ or US- 20090093235-\$ or US-20070270172-\$ or US-20070105579-\$ or US-20040224668- \$).did.	US- PGPUB	OR	ON	2015/08/19 17:23
S9	4	S8 AND (identif\$7 WITH information\$2)	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 17:23
S10	0	(transmi\$7 or output\$6 or send\$4 or sent\$4 or emit\$5 or broadcast\$4 or communicat\$3 or forward\$3 or retransmi\$7 or transfer\$4) near7 (identif\$6 near5 (capability or identification or identity)) near7 (interoperability ADJ server\$2)	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 17:43
S11	52982	(transmi\$7 or output\$6 or send\$4 or sent\$4 or emit\$5 or broadcast\$4 or communicat\$3 or forward\$3 or retransmi\$7 or transfer\$4) near7 (identif\$6 near5 (capability or identification or identity))	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 17:44
S12	75	S11 AND ((interoperability or "IS") ADJ server\$2)	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 17:46
S13	594968	(transmi\$7 or output\$6 or send\$4 or sent\$4 or emit\$5 or broadcast\$4 or communicat\$3 or forward\$3 or	US- PGPUB; USPAT;	OR	ON	2015/08/19 17:51

		retransmi\$7 or transfer\$4) near7 (capability or identification or identity)	EPO; JPO; IBM_TDB;			
S14	26	S13 AND (interoperability ADJ server\$2)	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 17:52
S15	7582	S13 AND (VTG or (virtual ADJ talk ADJ group\$4) or PTT or (push\$4 near4 talk\$4))	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:10
S16	1353	S13 SAME (VTG or (virtual ADJ talk ADJ group\$4) or PTT or (push\$4 near4 talk\$4))	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:10
S17	1206	S16 AND ("455".CLAS. or "370".CLAS. or H04B.CPCL. or H04W.CPCL. or H04H.CPCL. or H04J.CPCL. or H04L.CPCL. or H04M.CPCL. or H04N.CPCL.)	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:11
S18	276	S17 AND interoperab\$5	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:11
S19	3	S17 AND (interoperab\$6 ADJ server)	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:12
S20	8065821	(telephone\$2 or (cellular ADJ telephone\$2) or (mobile ADJ unit\$2) or (wireless ADJ communication ADJ apparatus\$3) or (radio ADJ telephone\$2) or (radio ADJ unit\$2) or (cellular ADJ telephone\$2) or mobile\$2 or (mobile ADJ station\$2) or (cell ADJ phone\$2) or (cellular ADJ (phone\$2 or telephone\$2)) or handheld or (handheld ADJ unit\$2) or (user ADJ device\$2) or (user ADJ equipment\$2) or (user ADJ terminal\$2) or UE or terminal\$2 or (access ADJ terminal\$2) or AT or subscriber\$2 or PDA or (communication ADJ device\$2) or (end ADJ user\$2) or (mobile ADJ phone\$2) or (mobile ADJ device\$2) or (user ADJ agent\$2) or (mobile ADJ host\$2) or (mobile ADJ node\$2) or (mobile ADJ terminal\$2) or station\$2 or endpoint\$2 or (handy near2 phone\$2) or handyphone\$2 or (handy ADJ phone\$2) or WTRU)	US- PGPUB; USPAT; EPO; JPO; IBM_TDB;	OR	ON	2015/08/19 18:20

S21	240929	S13 SAME S20	US- PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/19 18:23
S22	2108	S21 SAME (VTG or (virtual ADJ talk ADJ group\$4) or PTT or (push\$4 near4 talk\$4) or (floor near4 control\$4) or interoperab\$5)	US- PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/19 18:25
S23	23	S21 SAME (VTG or (virtual ADJ talk ADJ group\$4) or PTT or (push\$4 near4 talk\$4) or (floor near4 control\$4)) SAME interoperab\$6	US- PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/19 18:26
S24	2	"20100234057"	US- PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2015/08/19 18:38

8/ 20/ 2015 4:53:14 PM
C:\ Users\ ajain1\ Documents\ EAST\ Workspaces\ 14523299.wsp



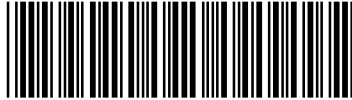
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BIB DATA SHEET

CONFIRMATION NO. 1015

SERIAL NUMBER 14/523,299	FILING or 371(c) DATE 10/24/2014 RULE	CLASS 455	GROUP ART UNIT 2649	ATTORNEY DOCKET NO. 0370.2043DIV (996710)		
APPLICANTS Cisco Technology, Inc., San Jose, CA; INVENTORS Shmuel Shaffer, Palo Alto, CA; Amit Barave, Sunnyvale, CA; Steven Christenson, Campbell, CA; Marcelo Oliveira, San Jose, CA; ** CONTINUING DATA ***** This application is a DIV of 12/127,397 05/27/2008 PAT 8892149 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 11/03/2014						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /ANKUR JAIN/ Acknowledged Examiner's Signature		☐ Met after Allowance AJ Initials	STATE OR COUNTRY CA	SHEETS DRAWINGS 11	TOTAL CLAIMS 20	INDEPENDENT CLAIMS 4
ADDRESS Edell, Shapiro, & Finnan, LLC 9801 Washingtonian Blvd. Suite 750 Gaithersburg, MD 20878 UNITED STATES						
TITLE Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation						
FILING FEE RECEIVED 2160	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

<i>Index of Claims</i> 	Application/Control No. 14523299	Applicant(s)/Patent Under Reexamination SHAFFER ET AL.
	Examiner ANKUR JAIN	Art Unit 2649

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

☐ Claims renumbered in the same order as presented by applicant		☐ CPA		☐ T.D.		☐ R.1.47			
CLAIM		DATE							
Final	Original	08/20/2015							
	1	-							
	2	-							
	3	-							
	4	-							
	5	-							
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	28	✓							
	29	✓							
	30	✓							
	31	✓							
	32	✓							
	33	✓							
	34	✓							
	35	✓							
	36	✓							

<i>Index of Claims</i> 	Application/Control No. 14523299	Applicant(s)/Patent Under Reexamination SHAFFER ET AL.
	Examiner ANKUR JAIN	Art Unit 2649

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

☐ Claims renumbered in the same order as presented by applicant		☐ CPA		☐ T.D.		☐ R.1.47			
CLAIM		DATE							
Final	Original	08/20/2015							
	37	✓							
	38	✓							
	39	✓							

Search Notes 	Application/Control No. 14523299	Applicant(s)/Patent Under Reexamination SHAFFER ET AL.
	Examiner ANKUR JAIN	Art Unit 2649

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
455	519	8/20/2015	AJ

SEARCH NOTES		
Search Notes	Date	Examiner
see attached	8/20/2015	AJ

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		14/523299	
	Filing Date		10/24/14	
	First Named Inventor	Shmuel Shaffer		
	Art Unit			
	Examiner Name			
	Attorney Docket Number		0370.2043DIV	

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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20110004636	A1	2011-01-06	Parkkinen et al.	
	2	20040224668	A1	2004-11-11	Shell et al.	
	3	20070105579	A1	2007-05-10	Shaffer et al.	
	4	20090093235	A1	2009-04-09	Grealish et al.	
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STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number		
Filing Date		
First Named Inventor	Shmuel Shaffer	
Art Unit		
Examiner Name		
Attorney Docket Number	0370.2043DIV	

Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² i	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
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	1	Cisco Systems. Cisco Brings IP Networking to World of Two-Way Radios. http://newsroom.cisco.com/dlls/2005/ts_102405.html . Last accessed June 3, 2008.	☐
	2	Cisco Systems. Enable Communication Interoperability. http://www.cisco.com/en/US/products/ps6712/products_announcement0900aecd803498d8.html . Last accessed June 3, 2008.	☐

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Examiner Signature	/Ankur Jain/	Date Considered	08/20/2015
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 14/523,299
First Named Inventor : Shmuel Shaffer
Confirmation No. : 1015
Filed : October 24, 2014
TC/A.U. : 2649
Examiner : JAIN, ANKUR
Customer No. : 99499
Docket No. : 0370.2043DIV (996710)
Title : Interoperability and Communications System
Dynamic Media Proxy Based on Capability
Negotiation

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

Further to the telephone discussion conducted on August 17, 2015 with the Examiner handling this application, this is to confirm that the claims that are to be examined in this application are claims 20-39 as presented in the Preliminary Amendment filed on October 24, 2014.

Dated: August 17, 2015

Respectfully submitted by:

EDELL, SHAPIRO & FINNAN, LLC
CUSTOMER NO. 99499
9801 Washingtonian Blvd., Suite 750
Gaithersburg, MD 20878
(301) 424-3640

/D. Andrew Floam/
D. Andrew Floam
Reg. No. 34597

Electronic Acknowledgement Receipt

EFS ID:	23226926
Application Number:	14523299
International Application Number:	
Confirmation Number:	1015
Title of Invention:	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation
First Named Inventor/Applicant Name:	Shmuel Shaffer
Customer Number:	99499
Filer:	D. Andrew Floam/Amanda Johnson
Filer Authorized By:	D. Andrew Floam
Attorney Docket Number:	0370.2043DIV (996710)
Receipt Date:	17-AUG-2015
Filing Date:	24-OCT-2014
Time Stamp:	16:01:24
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	Letter.pdf	92190 a3fa364fd1610e415504b805118c6313ca75490d	no	1

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New International Application Filed with the USPTO as a Receiving Office

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/523,299	10/24/2014	Shmuel Shaffer	0370.2043DIV (996710)

CONFIRMATION NO. 1015

PUBLICATION NOTICE



OC000000073385798

99499
Edell, Shapiro, & Finnan, LLC
9801 Washingtonian Blvd.
Suite 750
Gaithersburg, MD 20878

Title:Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation

Publication No.US-2015-0045082-A1

Publication Date:02/12/2015

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

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 14/523,299
First Named Inventor : Shmuel Shaffer
Confirmation No. : 1015
Filed : October 24, 2014
TC/A.U. : 2649
Examiner : Unknown
Customer No. : 99499
Docket No. : 0370.2043DIV (996710)
Title : Interoperability and Communications System Dynamic
Media Proxy Based on Capability Negotiation

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

SUBMISSION OF DECLARATION

Sir:

Transmitted herewith is a Declaration associated with the subject patent application.

The Director is hereby authorized to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. In addition, the Director is hereby authorized to charge any additional appropriate fees that may be required during the pendency of the above-identified application (e.g., in the concurrent or in any future reply), as well as to credit any overpayment, to Deposit Account No. **05-0460**.

Dated: December 10, 2014

Respectfully submitted by:

EDELL, SHAPIRO & FINNAN, LLC
CUSTOMER NO. 99499
9801 Washingtonian Blvd., Suite 750
Gaithersburg, MD 20878
(301) 424-3640

/D. Andrew Floam/
D. Andrew Floam
Reg. No. 34597

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

Title of
Invention

**Interoperability and Communications System Dynamic Media
Proxy Based on Capability Negotiation**

As a 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.

LEGAL NAME OF INVENTOR

Inventor: Shmuel Shaffer

Date: 10/18/2014

Signature: Shmuel Shaffer

LEGAL NAME OF ADDITIONAL JOINT INVENTOR

Inventor: Amit Barave

Date: _____

Signature: _____

LEGAL NAME OF ADDITIONAL JOINT INVENTOR

Inventor: Steven Christenson

Date: _____

Signature: _____

LEGAL NAME OF ADDITIONAL JOINT INVENTOR

Inventor: Marcelo Oliveira

Date: _____

Signature: _____

Note: An application data sheet (PTO/AIA/14 or equivalent), naming the entire inventive entity, either accompanies this form or was filed previously and thus is currently of record in the file.

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

Title of
Invention

**Interoperability and Communications System Dynamic Media
Proxy Based on Capability Negotiation**

As a 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.

LEGAL NAME OF INVENTOR

Inventor: Shmuel Shaffer

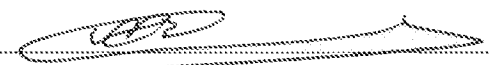
Date: _____

Signature: _____

LEGAL NAME OF ADDITIONAL JOINT INVENTOR

Inventor: Amit Barave

Date: 12/9/2014

Signature:  _____

LEGAL NAME OF ADDITIONAL JOINT INVENTOR

Inventor: Steven Christenson

Date: _____

Signature: _____

LEGAL NAME OF ADDITIONAL JOINT INVENTOR

Inventor: Marcelo Oliveira

Date: _____

Signature: _____

Note: An application data sheet (PTO/AIA/14 or equivalent), naming the entire inventive entity, either accompanies this form or was filed previously and thus is currently of record in the file.

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LEGAL NAME OF INVENTOR

Inventor: Shmuel Shaffer

Date: _____

Signature: _____

LEGAL NAME OF ADDITIONAL JOINT INVENTOR

Inventor: Amit Barave

Date: _____

Signature: _____

LEGAL NAME OF ADDITIONAL JOINT INVENTOR

Inventor: Steven Christenson

Date: October 22, 2014

Signature: 

LEGAL NAME OF ADDITIONAL JOINT INVENTOR

Inventor: Marcelo Oliveira

Date: _____

Signature: _____

Note: An application data sheet (PTO/AIA/14 or equivalent), naming the entire inventive entity, either accompanies this form or was filed previously and thus is currently of record in the file.

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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.

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Note: An application data sheet (PTO/AIA/14 or equivalent), naming the entire inventive entity, either accompanies this form or was filed previously and thus is currently of record in the file.

INTEROPERABILITY AND COMMUNICATIONS SYSTEM DYNAMIC MEDIA PROXY BASED ON CAPABILITY NEGOTIATION

BACKGROUND

[0001] Businesses around the world including public and private groups, such as security and safety personnel (*e.g.*, police, fire fighters and ambulance drivers) use communication networks that employ differing technologies and/or standards for communication. Many networks utilize land mobile radios communicating through push-to-talk technologies. However, communications among different endpoints of different networks such as endpoints that employ differing technologies and/or standards may be difficult. Collaboration between the different agencies and networks tends to be ad hoc and inefficient and involves laborious manual intervention.

[0002] Interoperability systems can employ an Internet protocol (IP) network collaboration platform that brings two-way radios into the realm of IP networking, offering all the benefits of this widely embraced, standards-based technology and extending the reach of two-way radios to other voice, video and data networks. Interoperability systems employ standards-based IP technologies to join various non-compatible communications systems into one, cohesive infrastructure. The interoperability system expects certain behavioral conformance from the end points in the system to maintain a consistent end user experience, such as, but not limited to, audio quality, number of active talkers in a group, or talk group features (*e.g.* floor control, priority, pre-emption, *etc.*). Endpoints developed and controlled by the interoperability system software can adhere to the expected behavioral characteristics. However, endpoints based on platforms external to the interoperability system cannot automatically conform to the expected characteristics. Further, endpoints that are not complying with the interoperability system behavior cannot respect floor control of the system. Such endpoints can lose out on talk group features, such as, talker-id. Furthermore, endpoints based on non- interoperability platforms can potentially abuse the system through intentional and/or unintentional rogue behavior.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] FIG. 1 illustrates a block diagram of an example system that can be employed to dynamically join various non-compatible communication systems into a cohesive infrastructure.

[0004] FIG. 2 illustrates an example endpoint that initiates a communication session according to an embodiment of the subject specification.

[0005] FIG. 3 illustrates an example interoperability system that can dynamically facilitate communication between non-compatible communication devices in accordance with embodiment of the specification.

[0006] FIG. 4 illustrates an example system that facilitates collection of information associated with an endpoint that initiates a communication session according to an embodiment of the subject specification.

[0007] FIG. 5 illustrates an example interoperability system that can dynamically determine where media processing can be performed in accordance with an embodiment of the specification.

[0008] FIG. 6 illustrates an example system that can be employed to communicate with an interoperability system according to an embodiment of the specification.

[0009] FIG. 7 illustrates an example flow chart of procedures that dynamically facilitate communication between non-compatible communication devices in accordance with embodiment of the specification.

[0010] FIG. 8 illustrates an example flow chart of procedures for dynamically communicating with a device in an interoperability communication system *via* a dynamic media proxy in accordance with the specification.

[0011] FIG. 9 illustrates an example flow chart of procedures that facilitate utilization of a dynamic media proxy, according to an embodiment of the subject specification.

[0012] FIG. 10 illustrates a block diagram of a computer operable to execute the disclosed architecture.

[0013] FIG. 11 illustrates a schematic block diagram of an exemplary computing environment in accordance with the subject specification.

DESCRIPTION OF EXAMPLE EMBODIMENTS

OVERVIEW

[0014] The following presents a simplified overview of the claimed subject matter in order to provide a basic understanding of some embodiments described herein. This is not an extensive overview of the claimed subject matter. It is intended to neither identify key or critical elements of the claimed subject matter nor to delineate the scope of that subject matter. Its sole purpose is to present some concepts of the claimed subject matter in a simplified form as a prelude to the more detailed description of example embodiments that is presented later.

[0015] The system disclosed and claimed herein, in one embodiment thereof, can dynamically facilitate communication between two or more non-compatible communication devices. The system can dynamically decide to act as a media proxy for a particular communication device and deliver full featured media services to the device. The decision to connect a device *via* a proxy can be made dynamically based on the capabilities of the communication devices and available system resources.

[0016] According to another embodiment of the system, an endpoint that initiates communication can include an information determination component that can determine media capabilities of the endpoint and/or the identity of the endpoint. Furthermore, a negotiation component can advertise the determined information and negotiate a session with an interoperability server (IS) over a private channel. The endpoint can communicate with the IS through custom messaging.

[0017] In accordance with another embodiment of the specification, an IS can include an information collection component that can collect information associated with an endpoint that initiates communication. The information can include media capabilities of the endpoint and/or its identity and/or attributes. A resource determination component can determine information associated with available system resources, for example, bandwidth and/or memory. The IS can further include an analysis component that can analyze the information associated with the endpoint and the system resources to determine if the endpoint can be connected to a VTG *via* a proxy. The analysis component can identify an endpoint that does not adhere to specific rules of transmission and can dynamically connect such an endpoint to a VTG *via* a proxy to prevent the endpoint from transmitting media into an active VTG that already has multiple talkers streaming media. A dynamic proxy component can

employ a proxy for the endpoint based on the analysis and dynamically establish a path for communication.

[0018] Another embodiment of the claimed subject matter relates to a system that can dynamically determine where media processing can be performed in an interoperability system. The determination can be based in part on the available system resources and/or the media capabilities of the endpoints that are joining a virtual talk group (VTG).

[0019] In accordance with yet another embodiment of the specification, the system can assess a security risk associated with allowing a particular endpoint to join a VTG directly. If the identity of the endpoint cannot be validated as trusted and/or secure, the system can either reject the communication request or act as a proxy for the endpoint and join the VTG on behalf of the endpoint. Thus, the system can access control over potential rogue endpoints. The parameters of the VTG can be dynamically altered to conceal the VTG from an identified rogue endpoint, preventing the endpoint from streaming media into the VTG.

[0020] The following description and the annexed drawings set forth in detail certain illustrative embodiments of the claimed subject matter. These embodiments may be indicative, however, of but a few of the various ways in which the principles of the claimed subject matter may be employed and the claimed subject matter is intended to include many and/or all such embodiments and their equivalents. Other advantages and novel features of the claimed subject matter will become apparent from the following description of example embodiments when considered in conjunction with the drawings.

[0021] The following terms are used throughout the description, the definitions of which are provided herein to assist in understanding various embodiments of the subject specification. The specification is now described with reference to the drawings, wherein like reference numerals are used to refer to like elements throughout. In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the subject specification. It may be evident, however, that the specification can be practiced without these specific details. In other instances, well-known structures and devices are shown in block diagram form in order to facilitate describing the specification.

[0022] As used in this application, the terms “component” and “system” are intended to refer to an entity capable of processing information (*e.g.*, computer-related entity), either hardware, a combination of hardware and software, software, or software in execution. For example, a component can be, but is not limited to being, a process running on a processor, a processor, an object, an executable, a thread of execution, a program, and/or a computer. By way of illustration, both an application running on a server and the server can be a component. One or more components can reside within a process and/or thread of execution, and a component can be localized on one computer and/or distributed between two or more computers.

[0023] As used herein, the term to “infer” or “inference” refer generally to the process of reasoning about or inferring states of the system, environment, and/or user from a set of observations as captured *via* events and/or data. Inference can be employed to identify a specific context or action, or can generate a probability distribution over states, for example. The inference can be probabilistic—that is, the computation of a probability distribution over states of interest based on a consideration of data and events. Inference can also refer to techniques employed for composing higher-level events from a set of events and/or data. Such inference results in the construction of new events or actions from a set of observed events and/or stored event data, whether or not the events are correlated in close temporal proximity, and whether the events and data come from one or several event and data sources.

[0024] Furthermore, the claimed subject matter may be implemented as a method, apparatus, or article of manufacture using standard programming and/or engineering techniques to produce software, firmware, hardware, or any combination thereof to control a computer to implement the disclosed subject matter. The term “article of manufacture” as used herein is intended to encompass a computer program accessible from any computer-readable device, carrier, or media. For example, computer readable media can include but are not limited to magnetic storage devices (*e.g.*, hard disk, floppy disk, magnetic strips...), optical disks (*e.g.*, compact disk (CD), digital versatile disk (DVD)...), smart cards, and flash memory devices (*e.g.*, card, stick, key drive...). Additionally it should be appreciated that a carrier wave can be employed to carry computer-readable electronic data such as those used in transmitting and receiving electronic mail or in accessing a network such as the Internet or a local area network (LAN). Of course, those skilled in the art will

recognize many modifications may be made to this configuration without departing from the scope or spirit of the claimed subject matter.

[0025] The system disclosed herein, relates to interoperability systems that can dynamically insert a media proxy based on capability negotiation, according to an embodiment of the invention. Conventional systems expect certain behavioral conformance from end points, such as but not limited to, RTCP (Real Time Transport Control Protocol) support, active stream selection, *etc.* and provide statically configured proxies to enable communication. Further, conventional systems cannot provide an access control over potential malicious endpoints.

[0026] The subject disclosure relates generally to communication networks and in particular to an interoperability system that facilitates a dynamic insertion of a media proxy based on capability negotiation. The subject specification provides a system and methodology that may support endpoints that are not compliant with an interoperability system behavior and can assess the security risk is allowing endpoints to join a talk group. Further, the system can dynamically proxy such endpoints and optimize system resource utilization.

[0027] Referring initially to the drawings, FIG. 1 illustrates a system 100 that can be employed to dynamically join various non-compatible communication systems into one, cohesive infrastructure. As an example, the system 100 can allow users of two-way radios, often called push-to-talk radios, and other voice devices, such as cell phones and regular telephones, to directly communicate and collaborate. In one embodiment, the system 100 can include an interoperability server (IS) 102, endpoints 104 and communication networks 106 that can be connected through a network 108.

[0028] The IS 102 can facilitate communication between different non-compatible communication devices, such as endpoints 104. As an example, IS 102 can facilitate communications between a two-way radio and a mobile device. Though two-way radios offer an excellent way for mobile workers within a limited geographic area to communicate, most two-way radio systems cannot interact with any other communications system since they use non-compatible technologies. In another example embodiment, IS 102 can facilitate communication between users of UHF radios and VHF radios or amongst users who use different channels on the same frequency band (*e.g.*, VHF). In other instances, radio signals cannot reach certain areas because of interference or physical barriers, cutting off radio users from the rest of the team or organization. IS 102 can connect two-way radios to other networks, for

example, by employing IP (internet protocol) technology standards, and help extend their reach. Thus, IS 102 can bring non-compatible communication devices, such as, push-to-talk (PTT) radios, into a dynamic, real-time, and information-rich collaboration environment and can allow an entity to communicate with a PPT radio with another communication device.

[0029] According to an embodiment, IS 102 can employ a system approach to offer a framework based on IP services to provide and maintain a consistent end user experience and data interoperability among endpoints 104 of networks 106 that employ different technologies. IS 102 can allow endpoints 104 to participate in one or more communication sessions based on capability negotiation. The endpoints 104 can initiate a communication session and advertise its capabilities to the IS 102. The IS 102 can then determine if the endpoint 104 can be allowed to join a talk group based on the information collected about the endpoint 104. Furthermore, the IS 102 determines if the endpoint 104 can directly connect to the talk group or if it should be connected *via* a proxy. The IS 102 can dynamically proxy the endpoint 104 based on information regarding the endpoint 104 and information regarding resources of the system (*e.g.* bandwidth, memory) and/or specific transmission rules based on the number of active media streams in a virtual talk group.

[0030] Endpoints 104 can include, but are not limited to, non-compatible communication devices that can participate in a communication session, such as, PTT radios, IP phones, personal digital assistants (PDAs), personal computers, land mobile radios (LMR), and the like. A communication session can be an active communication between two or more endpoints 104, for example, a communication session can occur between endpoint 1 and endpoint N. The data communicated during the communication session can be most any format of data, such as, but not limited to, voice, text, audio, video, multimedia, control, other information or a combination thereof. It can be appreciated that although N endpoints are illustrated in the figure, namely, endpoint 1 to endpoint N (where N is a natural number from 1 to infinity), most any number of endpoints can be connected to network 108 and/or to networks 106. Endpoints 104 that are not compliant with the communication networks 106 can employ IS 102 to leverage features of the networks 106.

[0031] System 100 can include one or more communication networks 106. The networks 106 can include, but are not limited to, IP, non-IP, wireless or wired networks and can be distributed locally or across multiple geographic locations. As

an example, networks 106 can include, a local area network (LAN), a wide area network (WAN), a metropolitan area network (MAN), a cellular network, a public switched telephone network (PSTN), a public or private network, a land mobile radios (LMR) network, a satellite network, an internet network or any combination thereof.

[0032] Referring now to Figure 2, there is illustrated an example endpoint 104 in accordance with an embodiment of the specification. As discussed *supra*, the endpoint 104 can be a non-compatible communication device, such as, but not limited to, a telephone, a cellular phone, an IP phone, a PDA, a fax machine, a PC, a camera, a camcorder, an LMR, a software radio, such as, Push-to-Talk Management Center (PMC) or the like. According to an embodiment of the subject specification, the endpoint 104 can include an information determination component 202 that can be employed to determine information related to the endpoint 104.

[0033] In one embodiment, the information determination component 202 can include a capability determination component 204 and/or an identity determination component 206. The capability determination component 204 can determine media capabilities associated with the endpoint 104, such as, but not limited to, the supported control protocol(s) or the number of incoming streams per talk group or channel supported by the endpoint 104. Further, the identity determination component 206 can determine an identity associated with the endpoint 104, such as a talker-id, or IP address. In another example embodiment, the identity of the endpoint can provide the name of the manufacturer and can indicate the capabilities of the said endpoint.

[0034] The endpoint 104 can further include a negotiation component 208 that can be employed to negotiate capabilities of the endpoint 104 with an IS 102 (FIG. 1). The negotiation component 208 can advertise media capabilities and/ or the identity associated with the endpoint 104 as determined by the information determination component 202. More specifically, the negotiation component 208 can determine if the endpoint 104 has initiated a communication and would like to participate in a virtual talk group (VTG). The negotiation component 208 can negotiate a session with an IS 102 (FIG. 1) over a private unicast and/or multicast channel. Further, the negotiation component 208 can present determined and/or identified capabilities and/or identity associated with the endpoint 104. Based on the information provided by the negotiation component 208, the IS 102 (FIG. 1) can determine if the endpoint 104 should be allowed to join the VTG and also determine if the endpoint should be

directly connected to the VTG or should be connected *via* a proxy based in part on the system's 100 (FIG. 1) floor control policy. Furthermore, the IS 102 (FIG. 1) can determine if the endpoint 104 adheres to the rules of transmission. If the endpoint 104 does not adhere to rules of transmission, it can be dynamically connected to the VTG *via* a proxy to prevent transmitting media into an active VTG that already has multiple talkers streaming media into it, and thus rendering the VTG useless. In an example embodiment, if the endpoint 104 is admitted into a VTG without proper credentials, it can be continuously monitored by other endpoints for its adherence with system's floor control policy. If another endpoint identifies the monitored endpoint as non-conforming with the floor control policy of the system, the IS 102 (FIG. 1) can dynamically insert a proxy between the endpoint 104 and the VTG. In addition, the parameters of the VTG can be dynamically altered to conceal the VTG from the identified endpoint and prevent it from streaming into the VTG.

[0035] As an example, the endpoint 104 can be an IP phone in accordance with an embodiment of the specification. The IP phone can initiate a communication with another endpoint, such as a cellular phone that is part of a VTG. The information determination component 202 can identify the capabilities associated with the IP phone, such as, built in media termination, multicast stack support, Extensible Markup Language (XML) services. Further, the information determination component 202 can determine that the IP phone does not support RCTP. The negotiation component 208 can negotiate a session with the IS (FIG. 1) over a private unicast/multicast channel and can present the identity and capability of the IP phone to the IS FIG. 1) over the private channel employing custom messages. The IS (FIG. 1) can then proxy for the IP phone since the IP phone does not support RTCP. The IP phone can transfer traffic over the private channel to the IS (FIG. 1), which can stream the traffic to the VTP and vice versa. Alternately or in addition, the information determination component 202 can determine that the IP phone does not adhere to the limit of a specified number of multicast streams per VTG and the IS FIG. 1) can connect the IP phone to the VTG *via* a proxy. Since the proxy is a trusted component, the proxy can refrain from streaming media into a VTG which already has a maximum number of active media streams as specified by the specific rules of transmission.

[0036] FIG. 3 illustrates an example IS 102 in accordance with embodiment of the specification. The IS 102 can be employed to facilitate communication between

different non-compatible communication devices. Additionally, the IS 102 can be employed to assess security risks associated with a particular endpoint and also be employed to optimize system resources during communication sessions.

[0037] In an embodiment, the IS 102 can include an information collection component 302 that can determine information regarding an endpoint that has initiated a communication session. The information collection component 302 can collect information from the endpoint through custom messages over a private channel. The information can include, but is not limited to, media capabilities of the endpoint, the identity of the endpoint and/or attributes of the endpoint.

[0038] The IS 102 can further include a resource determination component 304 that can determine available system resources, *e.g.* bandwidth, and/or memory. The system resource information can be employed to optimize resource utilization, for example, by load sharing. The resource determination component 304 can dynamically update the system resource information, such that the IS 102 has up-to-date information regarding the availability of system resources. The information regarding the available system resources can be employed to negotiate the dynamic utilization of a proxy for a particular endpoint and establish a communication path based on the resource information and/or the capability information.

[0039] The information collected by the information collection component 302 and the information determined by resource determination component 304 can be analyzed by an analysis component 306. The analysis component 306 can determine if the endpoint can provide the quality of service required in the VTG based on the analysis of the capabilities of the endpoint. In one embodiment, the analysis component 306 can detect an endpoint which may not adhere to the rules of transmission based on collected information. In one embodiment, the analysis component 306 can analyze the information to decide if the requesting endpoint can be allowed to join the VTG and further determine if the endpoint can join the VTG directly.

[0040] The analysis component 306 can validate the endpoint identity as secured and/or trusted and determine if the requesting endpoint is a trusted endpoint or potentially a rouge endpoint. It can be appreciated that the analysis component 306 can also identify a malicious endpoint by validating the endpoint identity as malicious. If the requesting endpoint is identified as malicious, the analysis component 306 can reject the request for communication from the endpoint. Further,

the analysis component 306 can determine if a non malicious endpoint can join a VTG directly.

[0041] The analysis component 306 can analyze the capabilities of the endpoint (determined by the information collecting component 302) to determine if the endpoint should be connected *via* a proxy. If the capabilities are analyzed to be non-conforming to the IS 102, a dynamic proxy component 308 is employed to proxy the endpoint. It can be appreciated that the dynamic proxy component 308 and the IS 102 can reside on the same or on different servers. Logically, the IS 102 can facilitate the creation and maintenance of the VTG as it is responsible for the control signals and the dynamic proxy component 308 can deal with a media component (not shown). Thus, although the dynamic proxy component 308 is depicted as a part of the IS 102, it can be appreciated that the dynamic proxy component can reside on a separate server. In one embodiment, the IS 102 can be attached to network 106 (or 108) while the dynamic proxy may be attached to another network 108 (or 106).

[0042] If the analyzed capabilities conform to the IS, the endpoint can be allowed to directly join the VTG. As an example, if the analysis component 306 determines that the requesting endpoint does not support RTCP, the IS 102 can proxy the endpoint. In an embodiment, if the analyzed capabilities cannot confirm that the endpoint would prevent media streaming into a multicast address, which already has a maximum number of active media streams, the IS 102 can connect the endpoint *via* a dynamic proxy. Furthermore, the analysis component 306 dynamically determines if a proxy can be utilized based on the system resource information provided by the resource determination component 304. The analysis component 306 can additionally employ machine learning to facilitate automating one or more features in accordance with the subject specification.

[0043] The subject specification (*e.g.*, in connection with validation of an endpoint to join a VTG) can employ various AI-based schemes for carrying out various embodiments thereof. For example, a process for determining if an endpoint can directly join a VTG can be facilitated *via* an automatic classifier system and process. Moreover, where the endpoint requests to join a particular VTG, the classifier can be employed to determine if the endpoint can be allowed to join the VTG and/or the endpoint can be allowed to join the VTG directly.

[0044] A classifier is a function that maps an input attribute vector, $x = (x_1, x_2, x_3, x_4, x_n)$, to a confidence that the input belongs to a class, that is, $f(x) =$

confidence(class). Such classification can employ a probabilistic and/or statistical-based analysis (*e.g.*, factoring into the analysis utilities and costs) to prognose or infer an action that a user desires to be automatically performed. In the case of interoperability systems, for example, attributes can be capabilities and/or identity of the endpoint or other data-specific attributes derived from the capabilities and/or identity, and the classes can be categories or areas of interest. In one example embodiment, the classification is made base on the sub-network to which the endpoint is attached.

[0045] A support vector machine (SVM) is an example of a classifier that can be employed. The SVM operates by finding a hypersurface in the space of possible inputs, which the hypersurface attempts to split the triggering criteria from the non-triggering events. Intuitively, this makes the classification correct for testing data that is near, but not identical to training data. Other directed and undirected model classification approaches include, *e.g.*, naïve Bayes, Bayesian networks, decision trees, neural networks, fuzzy logic models, and probabilistic classification models providing different patterns of independence can be employed. Classification as used herein also is inclusive of statistical regression that is utilized to develop models of priority.

[0046] As will be readily appreciated from the subject specification, the subject specification can employ classifiers that are explicitly trained (*e.g.*, *via* a generic training data) as well as implicitly trained (*e.g.*, *via* observing user behavior, receiving extrinsic information). For example, SVM's are configured *via* a learning or training phase within a classifier constructor and feature selection module. Thus, the classifier(s) can be used to automatically learn and perform a number of functions, including but not limited to determining according to a predetermined criteria. Referring back to FIG. 3, the IS 102 can include a dynamic proxy component 308 that can be dynamically employed to proxy the endpoint based on the analysis performed by the analysis component 306. The dynamic proxy component 308 can communicate with the endpoint through a private session and join the VTG on behalf of the endpoint. Thus, the dynamic proxy component 308 can establish a communication path based on capability negotiation. The dynamic proxy component 308 can behave as a fully-compliant endpoint and relay relevant information and/or features to the endpoint for which it serves as a proxy through custom messaging. Additionally, the dynamic proxy component 308 can provide talk group features, such

as, but not limited to, floor control, talker-id, priority and/or pre-emption on behalf of the endpoint. In one embodiment, if the endpoint is admitted into a VTG without proper credentials, it can be continuously monitored by other endpoints for its adherence with system's floor control policy. If another endpoint identifies that the monitored endpoint as non-conforming with the floor control policy of the system, the dynamic proxy component 308 can dynamically insert a proxy between the endpoint 104 and the VTG.

[0047] As an example, if an IP phone initiated a connection to a specific VTG, the information collection component 302 can collect information regarding the IP phone and determine that the IP phone cannot offer full featured RTCP support, talker-id, priority or pre-emption features. The analysis component 306 can determine that the IP phone should be connected to the VTG *via* a proxy based in part on the information associated with system resources. The dynamic proxy component 308 can then join the intended VTG on behalf of the IP phone. The audio traffic from the IP phone can be received by the dynamic proxy component 308 over a private channel and can be streamed to the intended VTG and vice versa. The dynamic proxy component 308 can preempt the IP phone and prevent the media stream from the IP phone to be streamed into the VTG based on an analysis by the IS 102.

[0048] Referring now to FIG. 4, there is illustrated an example system 400 that facilitates collection of information associated with an endpoint that initiates a communication session. The example information collection component 302 depicted in the system can be employed to gather, identify and/or determine information advertised by an endpoint. The information collection component 302 can generally include a capability collection component 402 that can be employed to determine information regarding media capabilities of a requesting endpoint. The media capabilities can include behavioral characteristics, such as, but are not limited to, RTCP support, the ability to detect that other members of the VTG are speaking and consequently not streaming media into the said VTG, active stream selection, and/or talk group features. The system 400 can dynamically employ a proxy for the endpoint if the capabilities of the said endpoint are determined to be non-conforming to IS standards.

[0049] The information collection component 302 can also include an identity collection component 404 that can be employed to determine the identity of the requesting endpoint. The identity of the endpoint can be employed to validate the

security of the endpoint. Further, an attribute collection component 406 can collect attributes associated with the endpoint from the packets sent by the endpoint. If the identity of the endpoint is not determined, the information from the attributes can be utilized to verify the security of the endpoint. As an example, the attribute can include security credentials of the endpoint.

[0050] FIG. 5 illustrates an example system 500 that can dynamically determine where media processing can be performed in an interoperability system. The system 500 can include an IS 102 that can facilitate communication between communication devices that employ non-compatible technologies for communication. For example, user 1 and user 2 can employ two-way radios while user 3 can employ a handheld device, such as a cellular phone. It can be appreciated that user 1, user 2 and user 3 can employ most any communication device including, but not limited to, a telephone, a mobile phone, a PMC, an IP phone, a PDA, a fax machine, a PC, a camera, a video camera, a LMR or a combination thereof. Furthermore, it can be appreciated that although only three users are illustrated in the figure, two or more users can employ the disclosed system.

[0051] As an example, a scenario wherein user 3 from domain 2 wants to communicate with two users from domain 1 (user 1 and user 2) can be described with respect to FIG. 5. The user 3 can initiate communication through a hand held device, such as an IP phone. The users in domain 1 employ different standards for communication as the user in domain 2. When a user joins a VTG, the location and resources on an endpoint employed by the user are considered. During communication, user 1 and user 2 from domain 1 can stream media from domain 1 to domain 2. This can be achieved in two ways, namely, transfer the two media streams from domain 1 to domain 2 & mix them in the endpoint (*e.g.* IP phone) or utilize a proxy in domain 1 that can process the media streams in domain 1 and transfer a single media stream to domain 2. The IS 102 can determine the location where media processing can occur, for example, by an analysis component 306 (FIG. 3). The IS 102 determines the available system resources (*e.g.* by a resource determination component shown in FIG. 3) and capabilities of the devices employed by the users (*e.g.* by an information collection component shown in FIG. 3) to determine an optimal location for media processing. For example, if current available bandwidth is low, the IS 102 can utilize a proxy to process the media streams from user 1 and user 2 in domain 1 and transfer a single media stream to user 3 in domain 2. Furthermore,

the dynamic proxy component 308 (FIG. 3), in the IS 102, can monitor the IP multicast address/port and determine if there are other active media streams on the multicast address. If the analysis component 306 (FIG. 3), in the IS 102, detects more than a maximum specified number of active media streams on the multicast address, the dynamic proxy component 308 (FIG. 3) can back up and refrain from transmitting media to the multicast address. If user 3 does not adhere to the specified transmission rule, it can transmit media into an already busy VTG. The analysis component 306(FIG. 3) can check if user 3 has the capability to adhere to the specified rule. If the IS 102 cannot ensure that the user 3 would adhere to the said rule, the IS 102 can connect the user 3 to the VTG *via* a proxy. Since the proxy is a trusted component, it would refrain from streaming media into an active VTG which already has a maximum number of active media streams.

[0052] Referring now to FIG. 6, there is illustrated an example system 600 that can be employed to communicate with an interoperability system. In an embodiment, the system 600 can include most any device or system, such as, endpoint 104 that can be employed for communication. The endpoint 104 can support half duplex and/or full duplex communication.

[0053] The endpoint 104 can generally include a user interface 602 that can be employed by an entity, such as a user to initiate or receive communication. The user interface can include a speaker, a microphone, a visual display, a keypad or a combination thereof. The keypad may include HW buttons and/or menu driven soft buttons. The endpoint 104 can further include a processor 604 that can perform operations within the endpoint 104 and a memory 606 that can store information within the endpoint 104. Furthermore, the endpoint 104 can include an information determination component 202 that can be employed to identify information associated with the endpoint 104, such as capability information and/or identity information. A negotiation component 208 can be employed to exchange capability information with an interoperability server (not shown) during communication. It is to be appreciated that information determination component 202 and negotiation component 208 can be the same or similar as, and/or can contain the same or similar functionality as illustrated in Figure 2 and other figures and described herein.

[0054] A transmitter/receiver 608 can be employed to transmit and receive data from/to the endpoint 104. It can be appreciated that the transmitter and receiver can be separate modules or integrated as a single module. The transmitter/ receiver

608 can transmit information determined by the information collection component 202 to an interoperability server (not shown) over a private channel to initiate communication. The transmitter/receiver 608 can employ wireless and/or wired communication to transmit/receive information.

[0055] FIG. 7 illustrates an example methodology 700 that can facilitate dynamic communication between non-compatible communication devices in accordance with embodiment of the specification. While, for purposes of simplicity of explanation, the one or more methodologies shown herein, *e.g.*, in the form of a flow chart, are shown and described as a series of acts, it is to be understood and appreciated that the subject specification is not limited by the order of acts, as some acts may, in accordance with the specification, occur in a different order and/or concurrently with other acts from that shown and described herein. For example, those skilled in the art will understand and appreciate that a methodology could alternatively be represented as a series of interrelated states or events, such as in a state diagram. Moreover, not all illustrated acts may be required to implement a methodology in accordance with the specification.

[0056] Referring back to FIG. 7, a communication between devices can be initiated at 702. The devices can employ non-compatible technologies and/or standards for communication. At 704, media capabilities and/or identity of the device that initiated communication can be advertised. At 706, a decision can be made if the device is allowed to join a VTG based on its identity. If the device identity is determined to be untrusted or malicious the device cannot be allowed to join the VTG and the request can be rejected at 708. If the device identity is determined to be trusted or safe, it can be determined if the device should join *via* proxy, as shown at 710. The determination at 710 can be based on the media capabilities of the device and the available system resources. If it is determined that the device does not need to join *via* proxy since the device can adhere to the behavioral characteristics of an interoperability system, such as but not limited to, transmission rules, the device can be directly connected to the VTG, as shown at 712. However, if the device demonstrates that it cannot comply with the behavioral characteristics of the interoperability system, the device can be attached to a VTG *via* a proxy. In one embodiment, if it cannot be determined that the endpoint can adhere to specified rules of transmission, the endpoint can be connected to the VTG *via* a proxy. At 714, a dynamic proxy can be employed for attaching the endpoint device to the VTG. In one

embodiment, if the endpoint is admitted into a VTG without proper credentials, it can be monitored for its adherence with a floor control policy, such as a specified rule of transmission. If it is identified that the monitored endpoint is non-conforming with the floor control policy, a proxy can dynamically be inserted between the endpoint and the VTG.

[0057] At 716, a dynamic path can be established for communication from the endpoint device to the dynamic proxy and the proxy to the intended device in the VTG. The dynamic path can be based on the available system resources, such as, but not limited to, memory and/or bandwidth.

[0058] Referring now to FIG. 8, there is illustrated an example methodology 800 of communicating with a device in an interoperability communication system *via* a dynamic media proxy in accordance with the specification. At 802, communication with a non-compatible communication device(s) can be initiated. At 804, media capability information associated with the initiating device can be determined. At 806, an identity of the initiating device can be determined. At 808, it can be determined if a proxy is employed to attach the initiating device to the given VTG. If a proxy is not employed to attach the endpoint device to the given VTG, media can be transmitted directly to a VTG at 810. Thus, the initiating device can directly communicate with an indented device in the VTG. If it is determined that the proxy is employed to attach the endpoint device to the given VTG, media can be transmitted to the proxy over a private network through custom messages at 812.

[0059] FIG. 9 illustrates an example methodology of utilizing a dynamic media proxy in accordance with the specification. At 902, a communication request can be received. The request can be from most any endpoint (*e.g.* PTT radio) to initiate communication with another endpoint (*e.g.* cellular phone). At 904, information associated with the requesting endpoint can be dynamically determined. The information can include, but is not limited to, media capabilities, device identity attributes associated with the device and/or the device's capability to adhere to a specified transmission rule. At 906, system resource information, such as, but not limited to, bandwidth, memory and/or number of active media streams can be collected. At 908, the collected information can be analyzed. At 910 a dynamic media proxy can be utilized to facilitate communication between non-compatible communication devices based on the collected information. In one embodiment, the VTG can be monitored for number of active media streams and media transmission

between the endpoint can be established *via* a proxy if a maximum number of active media streams are detected and it is determined that the endpoints do not adhere to the transmission rule.

[0060] Referring now to FIG. 10, there is illustrated a block diagram of a computer operable to execute the disclosed architecture that can be employed to join various non-compatible communications systems into a cohesive infrastructure by employing a dynamic media proxy based on capability negotiation. In order to provide additional context for various embodiments of the subject specification, FIG. 10 and the following discussion are intended to provide a brief, general description of a suitable computing environment 1000 in which the various embodiments of the specification can be implemented. While the specification has been described above in the general context of computer-executable instructions that may run on one or more computers, those skilled in the art will recognize that the specification also can be implemented in combination with other program modules and/or as a combination of hardware and software.

[0061] Generally, program modules include routines, programs, components, data structures, *etc.*, that perform particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the inventive methods can be practiced with other computer system configurations, including single-processor or multiprocessor computer systems, minicomputers, mainframe computers, as well as personal computers, hand-held computing devices, microprocessor-based or programmable consumer electronics, and the like, each of which can be operatively coupled to one or more associated devices.

[0062] The illustrated embodiments of the specification may also be practiced in distributed computing environments where certain tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules can be located in both local and remote memory storage devices.

[0063] A computer includes a variety of computer-readable media. Computer-readable media can be any available media that can be accessed by the computer and includes both volatile and nonvolatile media, removable and non-removable media. By way of example, and not limitation, computer-readable media can comprise computer storage media and communication media. Computer storage media includes both volatile and nonvolatile, removable and non-removable media

implemented in any method or technology for storage of information such as computer-readable instructions, data structures, program modules or other data. Computer storage media includes, but is not limited to, RAM, ROM, EEPROM, flash memory or other memory technology, CD-ROM, digital versatile disk (DVD) or other optical disk storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the desired information and which can be accessed by the computer.

[0064] Communication media embodies computer-readable instructions, data structures, program modules or other data in a modulated data signal such as a carrier wave or other transport mechanism, and includes any information delivery media. The term “modulated data signal” means a signal that has one or more of its characteristics set or changed in such a manner as to encode information in the signal. By way of example, and not limitation, communication media includes wired media such as a wired network or direct-wired connection, and wireless media such as acoustic, RF, infrared and other wireless media. Combinations of the any of the above should also be included within the scope of computer-readable media.

[0065] With reference again to FIG. 10, the example environment 1000 for implementing various embodiments of the specification includes a computer 1002, the computer 1002 including a processing unit 1004, a system memory 1006 and a system bus 1008. The system bus 1008 couples system components including, but not limited to, the system memory 1006 to the processing unit 1004. The processing unit 1004 can be any of various commercially available processors. Dual microprocessors and other multi-processor architectures may also be employed as the processing unit 1004. In some embodiments, the processor unit 1004 can include a digital signal processor (DSP).

[0066] The system bus 1008 can be any of several types of bus structure that may further interconnect to a memory bus (with or without a memory controller), a peripheral bus, and a local bus using any of a variety of commercially available bus architectures. In some embodiments, the bus can be a fast network resulting in a distributed components attached to the network. The system memory 1006 includes read-only memory (ROM) 1010 and random access memory (RAM) 1012. A basic input/output system (BIOS) is stored in a non-volatile memory 1010 such as ROM, EPROM, EEPROM, which BIOS contains the basic routines that help to transfer

information between elements within the computer 1002, such as during start-up. The RAM 1012 can also include a high-speed RAM such as static RAM for caching data.

[0067] The computer 1002 further includes an internal hard disk drive (HDD) 1014 (*e.g.*, EIDE, SATA), which internal hard disk drive 1014 may also be configured for external use in a suitable chassis (not shown), a magnetic floppy disk drive (FDD) 1016, (*e.g.*, to read from or write to a removable diskette 1018) and an optical disk drive 1020, (*e.g.*, reading a CD-ROM disk 1022 or, to read from or write to other high capacity optical media such as the DVD). The hard disk drive 1014, magnetic disk drive 1016 and optical disk drive 1020 can be connected to the system bus 1008 by a hard disk drive interface 1024, a magnetic disk drive interface 1026 and an optical drive interface 1028, respectively. The interface 1024 for external drive implementations includes at least one or both of Universal Serial Bus (USB) and IEEE 1394 interface technologies. Other external drive connection technologies are within contemplation of the subject specification.

[0068] The drives and their associated computer-readable media provide nonvolatile storage of data, data structures, computer-executable instructions, and so forth. For the computer 1002, the drives and media accommodate the storage of any data in a suitable digital format. Although the description of computer-readable media above refers to a HDD, a removable magnetic diskette, and a removable optical media such as a CD or DVD, it should be appreciated by those skilled in the art that other types of media which are readable by a computer, such as zip drives, magnetic cassettes, flash memory cards, cartridges, and the like, may also be used in the example operating environment, and further, that any such media may contain computer-executable instructions for performing the methods of the specification.

[0069] A number of program modules can be stored in the drives and RAM 1012, including an operating system 1030, one or more application programs 1032, other program modules 1034 and program data 1036. All or portions of the operating system, applications, modules, and/or data can also be cached in the RAM 1012. It is appreciated that the specification can be implemented with various commercially available operating systems or combinations of operating systems.

[0070] A user can enter commands and information into the computer 1002 through one or more wired/wireless input devices, *e.g.*, a keyboard 1038 and a pointing device, such as a mouse 1040. Other input devices (not shown) may include a microphone, an IR remote control, a joystick, a game pad, a stylus pen, touch

screen, or the like. These and other input devices are often connected to the processing unit 1004 through an input device interface 1042 that is coupled to the system bus 1008, but can be connected by other interfaces, such as a parallel port, an IEEE 1394 serial port, a game port, a USB port, an IR interface, *etc.*

[0071] A monitor 1044 or other type of display device is also connected to the system bus 1008 *via* an interface, such as a video adapter 1046. In addition to the monitor 1044, a computer includes other peripheral output devices (not shown), such as speakers, printers, *etc.*

[0072] The computer 1002 may operate in a networked environment using logical connections *via* wired and/or wireless communications to one or more remote computers, such as a remote computer(s) 1048. The remote computer(s) 1048 can be a workstation, a server computer, a router, a personal computer, endpoint device, portable computer, microprocessor-based entertainment appliance, a peer device or other common network node, and includes many or all of the elements described relative to the computer 1002, although, for purposes of brevity, only a memory/storage device 1050 is illustrated. The logical connections depicted include wired/wireless connectivity to a local area network (LAN) 1052 and/or larger networks, *e.g.*, a wide area network (WAN) 1054. Such LAN and WAN networking environments are commonplace in offices and companies, and facilitate enterprise-wide computer networks, such as intranets, all of which may connect to a global communications network, *e.g.*, the Internet.

[0073] When used in a LAN networking environment, the computer 1002 is connected to the local network 1052 through a wired and/or wireless communication network interface or adapter 1056. The adapter 1056 may facilitate wired or wireless communication to the LAN 1052, which may also include a wireless access point disposed thereon for communicating with the wireless adapter 1056.

[0074] When used in a WAN networking environment, the computer 1002 can include a modem 1058, or is connected to a communications server on the WAN 1054, or has other means for establishing communications over the WAN 1054, such as by way of the Internet. The modem 1058, which can be internal or external and a wired or wireless device, is connected to the system bus 1008 *via* the serial port interface 1042. In a networked environment, program modules depicted relative to the computer 1002, or portions thereof, can be stored in the remote memory/storage device 1050. It will be appreciated that the network connections shown are example

and other means of establishing a communications link between the computers can be used.

[0075] The computer 1002 is operable to communicate with any wireless devices or entities operatively disposed in wireless communication, *e.g.*, a printer, scanner, desktop and/or portable computer, portable data assistant, communications satellite, any piece of equipment or location associated with a wirelessly detectable tag (*e.g.*, a kiosk, news stand, restroom), and telephone. This includes at least Wi-Fi and Bluetooth™ wireless technologies. Thus, the communication can be a predefined structure as with a conventional network or simply an ad hoc communication between at least two devices.

[0076] Wi-Fi, or Wireless Fidelity, allows connection to the Internet from a couch at home, a bed in a hotel room, or a conference room at work, without wires. Wi-Fi is a wireless technology similar to that used in a cell phone that enables such devices, *e.g.*, computers, to send and receive data indoors and out; anywhere within the range of a base station. Wi-Fi networks use radio technologies called IEEE 802.11 (a, b, g, *etc.*) to provide secure, reliable, fast wireless connectivity. A Wi-Fi network can be used to connect computers to each other, to the Internet, and to wired networks (which use IEEE 802.3 or Ethernet). Wi-Fi networks operate in the unlicensed 2.4 and 5 GHz radio bands, at an 11 Mbps (802.11a) or 54 Mbps (802.11b) data rate, for example, or with products that contain both bands (dual band), so the networks can provide real-world performance similar to the basic 10BaseT wired Ethernet networks used in many offices.

[0077] Referring now to FIG. 11, there is illustrated a schematic block diagram of an exemplary computing environment 1100 that can facilitate communication between non-compatible communication devices in accordance with embodiment of the specification. The system 1100 includes one or more client(s) 1102. The client(s) 1102 can be hardware and/or software (*e.g.*, threads, processes, computing devices). The client(s) 1102 can house cookie(s) and/or associated contextual information by employing the subject specification, for example.

[0078] The system 1100 also includes one or more server(s) 1104. The server(s) 1104 can also be hardware and/or software (*e.g.*, threads, processes, computing devices). The servers 1104 can house threads to perform transformations by employing the specification, for example. One possible communication between a client 1102 and a server 1104 can be in the form of a data packet adapted to be

transmitted between two or more computer processes. The data packet may include a cookie and/or associated contextual information, for example. The system 1100 includes a communication framework 1106 (*e.g.*, a global communication network such as the Internet) that can be employed to facilitate communications between the client(s) 1102 and the server(s) 1104.

[0079] Communications can be facilitated *via* a wired (including optical fiber) and/or wireless technology. The client(s) 1102 are operatively connected to one or more client data store(s) 1108 that can be employed to store information local to the client(s) 1102 (*e.g.*, cookie(s) and/or associated contextual information). Similarly, the server(s) 1104 are operatively connected to one or more server data store(s) 1110 that can be employed to store information local to the servers 1104.

[0080] The aforementioned systems have been described with respect to interaction between several components. It should be appreciated that such systems and components can include those components or sub-components specified therein, some of the specified components or sub-components, and/or additional components. Sub-components could also be implemented as components communicatively coupled to other components rather than included within parent components. Further yet, one or more components and/or sub-components may be combined into a single component providing aggregate functionality. The components may also interact with one or more other components not specifically described herein for the sake of brevity, but known by those of skill in the art.

[0081] What has been described above includes examples of the specification. It is, of course, not possible to describe every conceivable combination of components or methodologies for purposes of describing the subject specification, but one of ordinary skill in the art may recognize that many further combinations and permutations of the specification are possible. Accordingly, the specification is intended to embrace all such alterations, modifications and variations that fall within the spirit and scope of the appended claims. Furthermore, to the extent that the term “includes” is used in either the detailed description or the claims, such term is intended to be inclusive in a manner similar to the term “comprising” as “comprising” is interpreted when employed as a transitional word in a claim.

CLAIMS

What is claimed is:

1. An apparatus, comprising:
an analysis component that dynamically determines if an endpoint should be connected to a virtual talk group (VTG) based in part on an analysis of at least one of information associated with the endpoint or information determined based on the adherence of the endpoint with a predefined floor control mechanism; and
a dynamic proxy component that is employed to dynamically proxy the endpoint based on the determination.
2. The apparatus of claim 1, wherein the floor control mechanism specifies that the endpoint does not transmit into a given VTG that has more than a specified number of active media streams.
3. The apparatus of claim 1, further comprising a resource determination component that identifies a plurality of available system resources to optimize resource utilization.
4. The apparatus of claim 1, further comprising an identity collection component that receives an identity of the endpoint to assess a security risk associated with the endpoint.
5. The apparatus of claim 4 wherein the identity collection component employs credentials resident on the endpoint.
6. The apparatus of claim 5, wherein the security risk associated with the endpoint is that the endpoint transmits into a given VTG without adhering with the floor control policy of the system.
7. The apparatus of claim 1, further comprising an attribute collection component that receives attributes associated with the endpoint to at least one of determine a security risk associated with the endpoint or facilitate the analysis.

8. The apparatus of claim 1 wherein one or more disparate endpoints identify the endpoint as non-conforming with the floor control mechanism based in part on monitoring the endpoint.
9. The apparatus of claim 8, wherein a proxy is dynamically inserted between the endpoint and the VTG if the endpoint is identified as non-conforming with the floor control mechanism.
10. The apparatus of claim 8 wherein the parameters of the VTG are dynamically altered to conceal the VTG from the identified endpoint and prevent the endpoint from streaming into the VTG.
11. The apparatus of claim 1, wherein the dynamic proxy component dynamically establishes a communication path between the endpoint and one or more disparate endpoints based in part on the analysis.
12. The apparatus of claim 1, further comprising a capability collection component that identifies information regarding media capabilities of the endpoint, the information employed to determine if the endpoint should be directly connected to the VTG.
13. A method, comprising:
 - receiving information associated with an endpoint;
 - identifying information associated with the adherence of the endpoint with a predefined floor control mechanism; and
 - analyzing the identified information to determine if the endpoint should be connected to a virtual talk group (VTG) *via* a proxy.
14. The method of claim 13, further comprising identifying at least one of media capability information or identity information associated with the endpoint.
15. The method of claim 13, further comprising identifying the endpoint as non-conforming with the floor control mechanism based in part on monitoring the endpoint.

16. The method of claim 15, further comprising dynamically inserting a proxy between the endpoint and the VTG if the endpoint is identified as non-conforming with the floor control mechanism.

17. A system, comprising:
means for receiving information associated with an endpoint;
means for identifying information associated with the adherence of the endpoint with a predefined floor control mechanism; and
means for analyzing the identified information to evaluate if the endpoint should be connected to a virtual talk group (VTG) *via* a proxy.

18. The system of claim 17, further comprising means for dynamically inserting a proxy between the endpoint and the VTG if the endpoint is identified as non-conforming with the floor control mechanism.

19. The system of claim 17, further comprising means for dynamically establishing a communication path between the devices based in part on the analysis.

20. An apparatus, comprising:
an information determination component that identifies information related to an endpoint; and
a negotiation component that negotiates a communication session with an interoperability server (IS) based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS.

21. The apparatus of claim 20, further comprising a capability determination component that identifies media capabilities associated with the endpoint, the media capabilities employed by the IS to dynamically determine if the endpoint should be connected to a virtual talk group (VTG) *via* a proxy.

22. The apparatus of claim 20, further comprising an identity determination component that determines an identity associated with the endpoint, the identity

employed by the IS to dynamically determine if the endpoint should be connected to a virtual talk group (VTG) *via* a proxy.

23. A method comprising:
initiating communication with a non-compatible communication device;
identifying information associated with an initiating device; and
negotiating a communication session with an interoperability server (IS) based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS.

24. The method of claim 23, wherein the information associated with the initiating device includes at least one of media capability information associated with the initiating device or an identity of the initiating device.

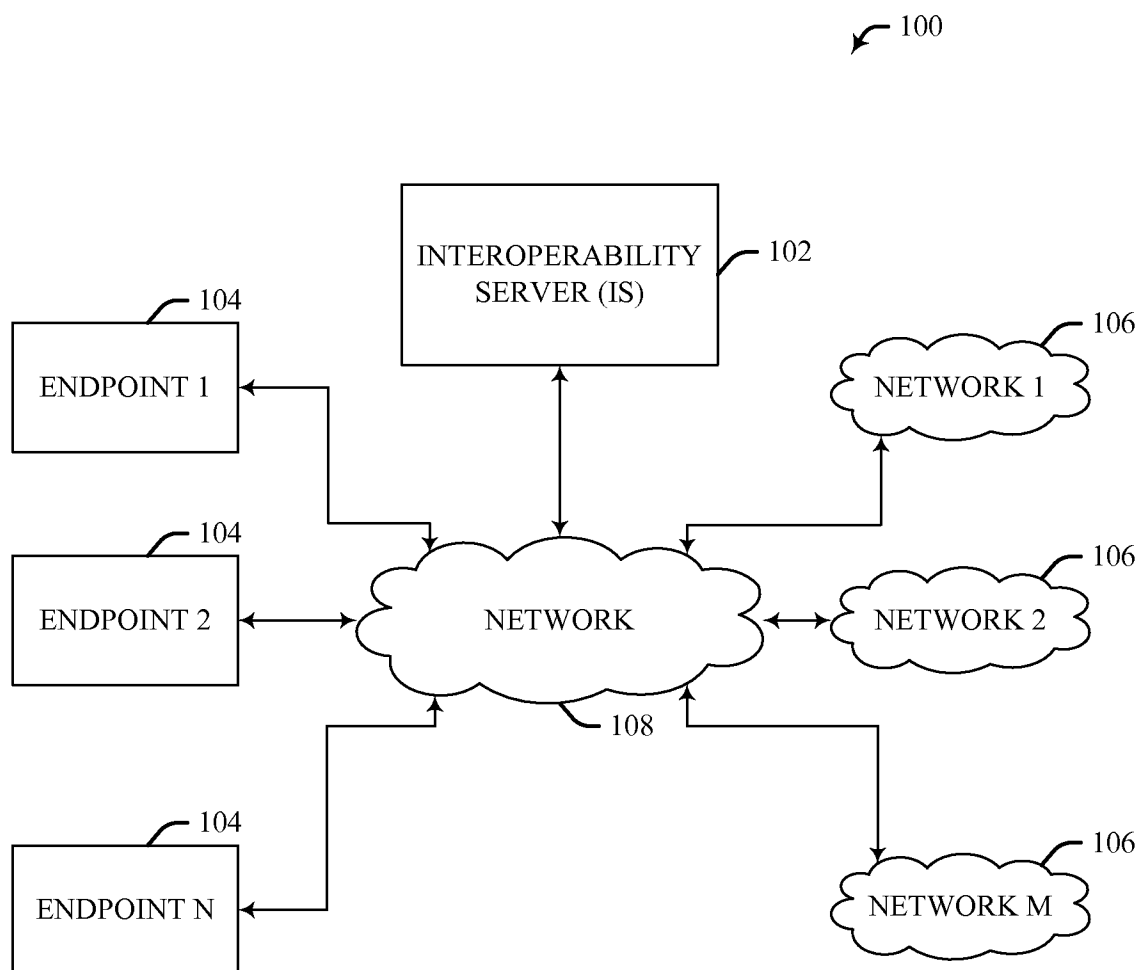
25. The method of claim 23, further comprising evaluating if a proxy is employed to attach the initiating device to a virtual talk group (VTG).

26. The method of claim 25, further comprising transmitting media to the proxy over a private network through custom messages if it is evaluated that a proxy is employed.

27. The method of claim 25, further comprising, attaching the initiating device directly to the VTG and transmitting media directly to the VTG if a proxy is not employed to attach the initiating device to the VTG.

ABSTRACT

A system and methodology to facilitate communication between non-compatible communication devices by utilization of a dynamic media proxy is provided. Information associated with an endpoint, such as, media capabilities, identity and system resource information is collected. Media proxy'ing is performed as part of capability negotiation. A dynamic media proxy is employed based on an analysis of the collected information. An analysis component can identify an endpoint that does not adhere to specific rules of transmission and can dynamically connect such an endpoint to a VTG (virtual talk group) *via* a proxy to prevent the endpoint from transmitting media into an active VTG that already has multiple talkers streaming media. Additionally, the location where media processing can occur can be dynamically determined based on the available system resources.

**FIG. 1**

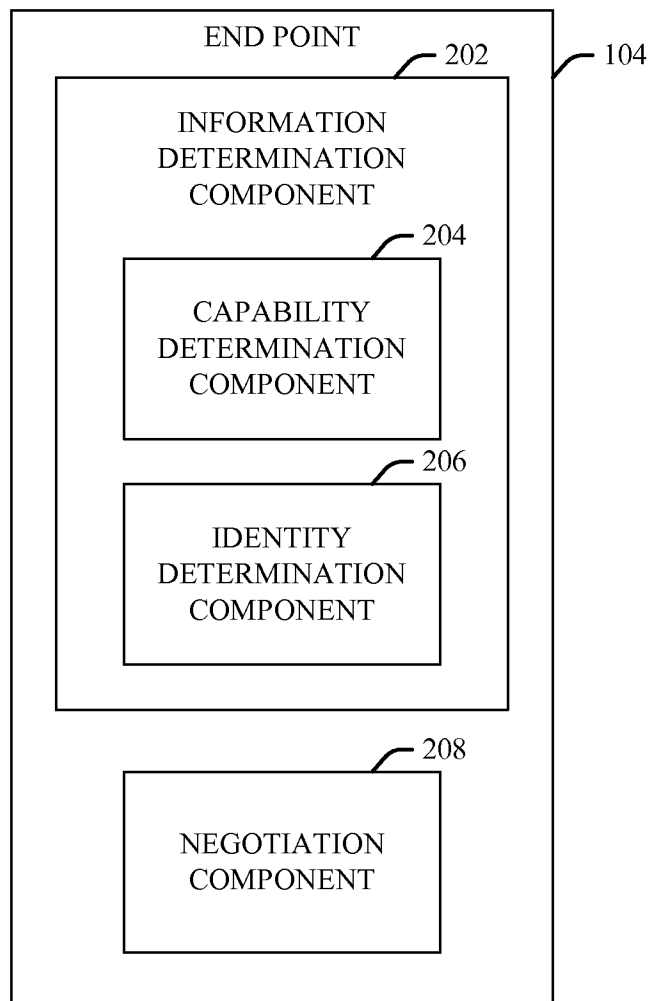
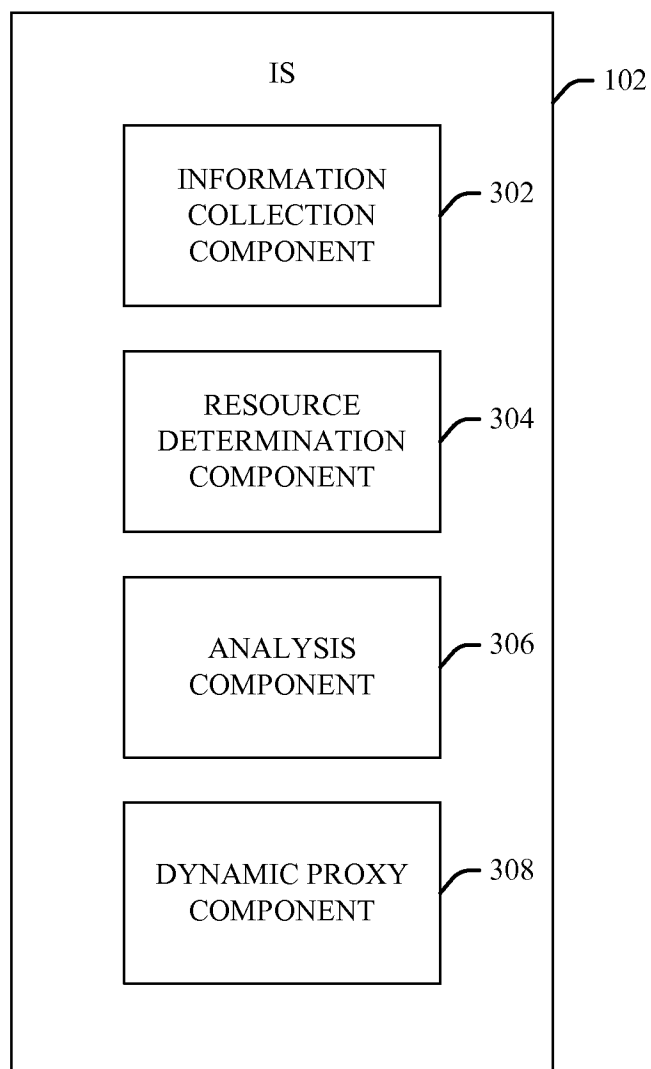


FIG. 2

**FIG. 3**

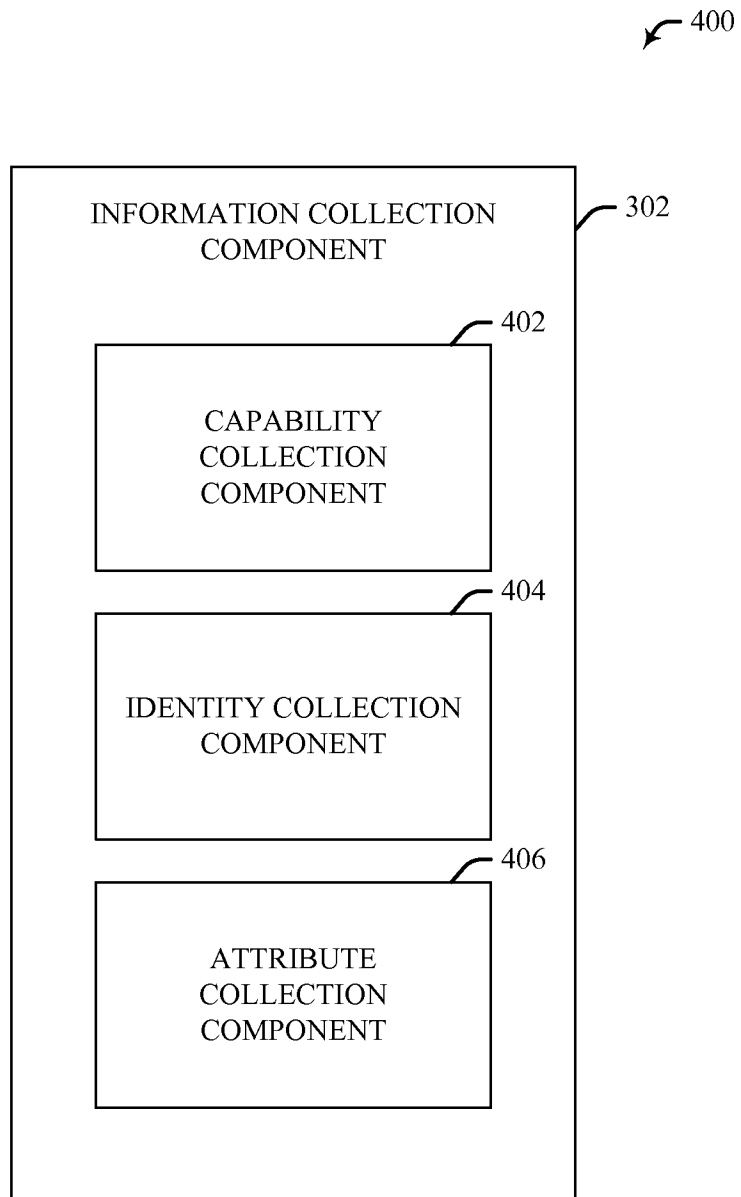


FIG. 4

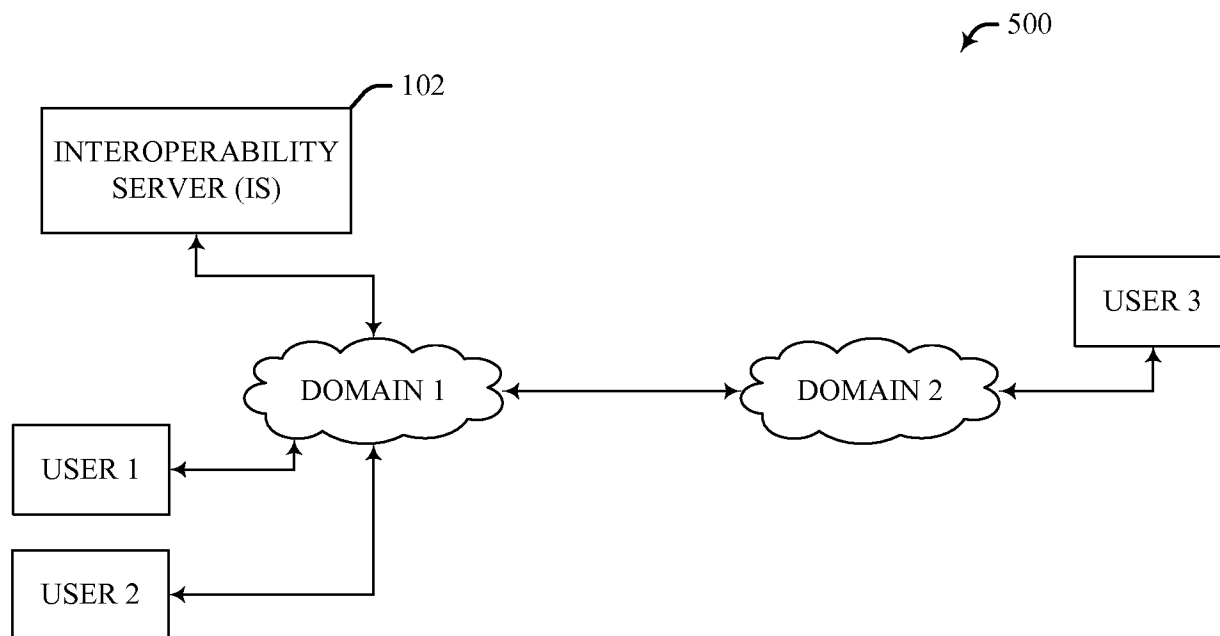


FIG. 5

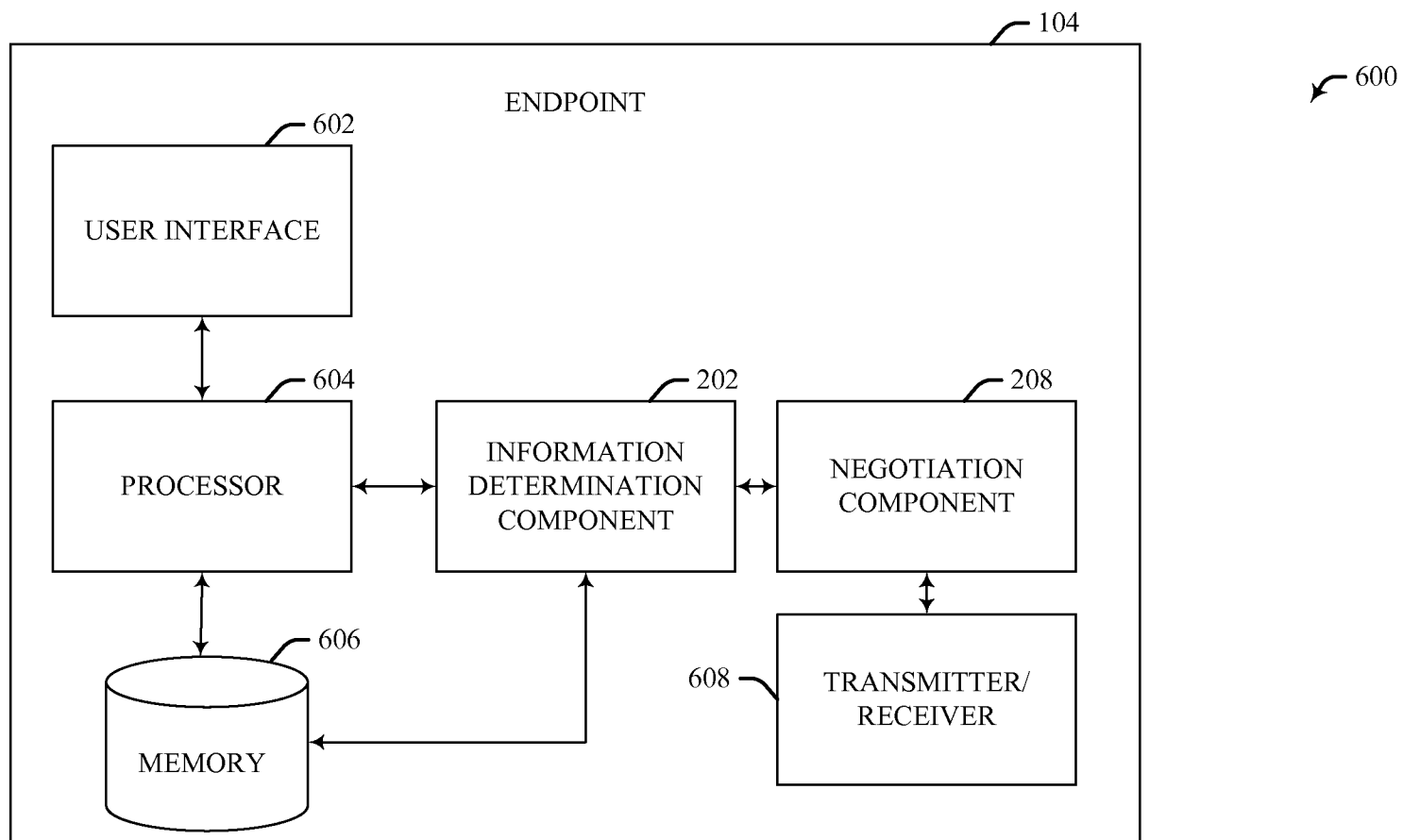
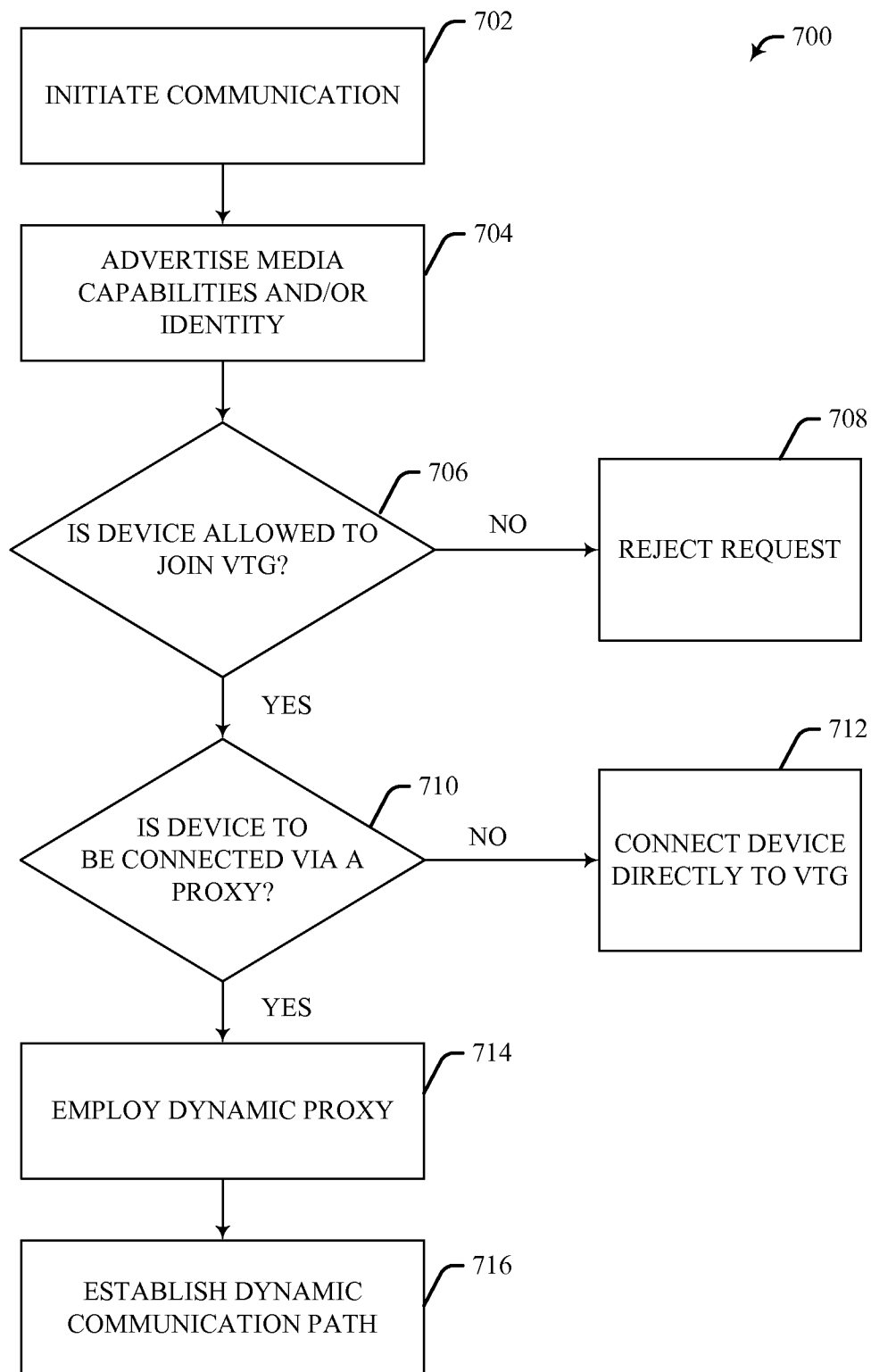
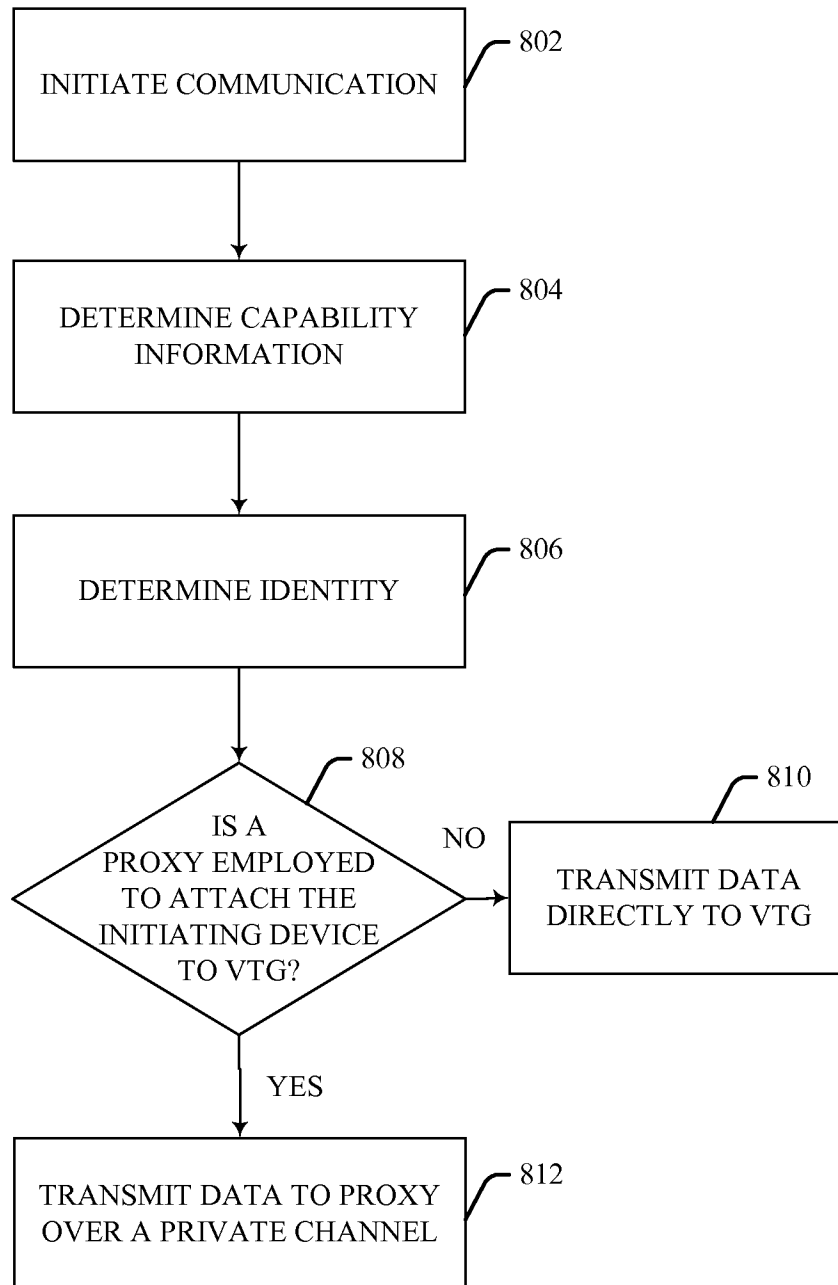


FIG. 6

**FIG. 7**

800

**FIG. 8**

9/11

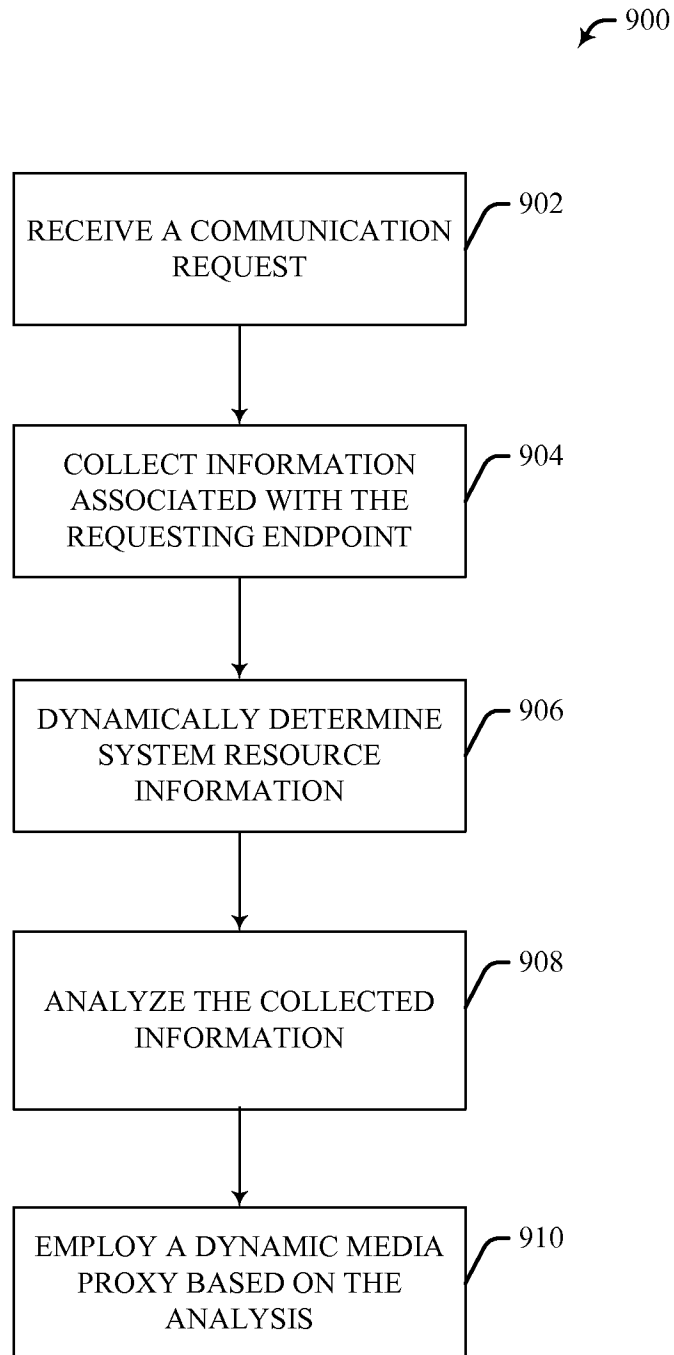
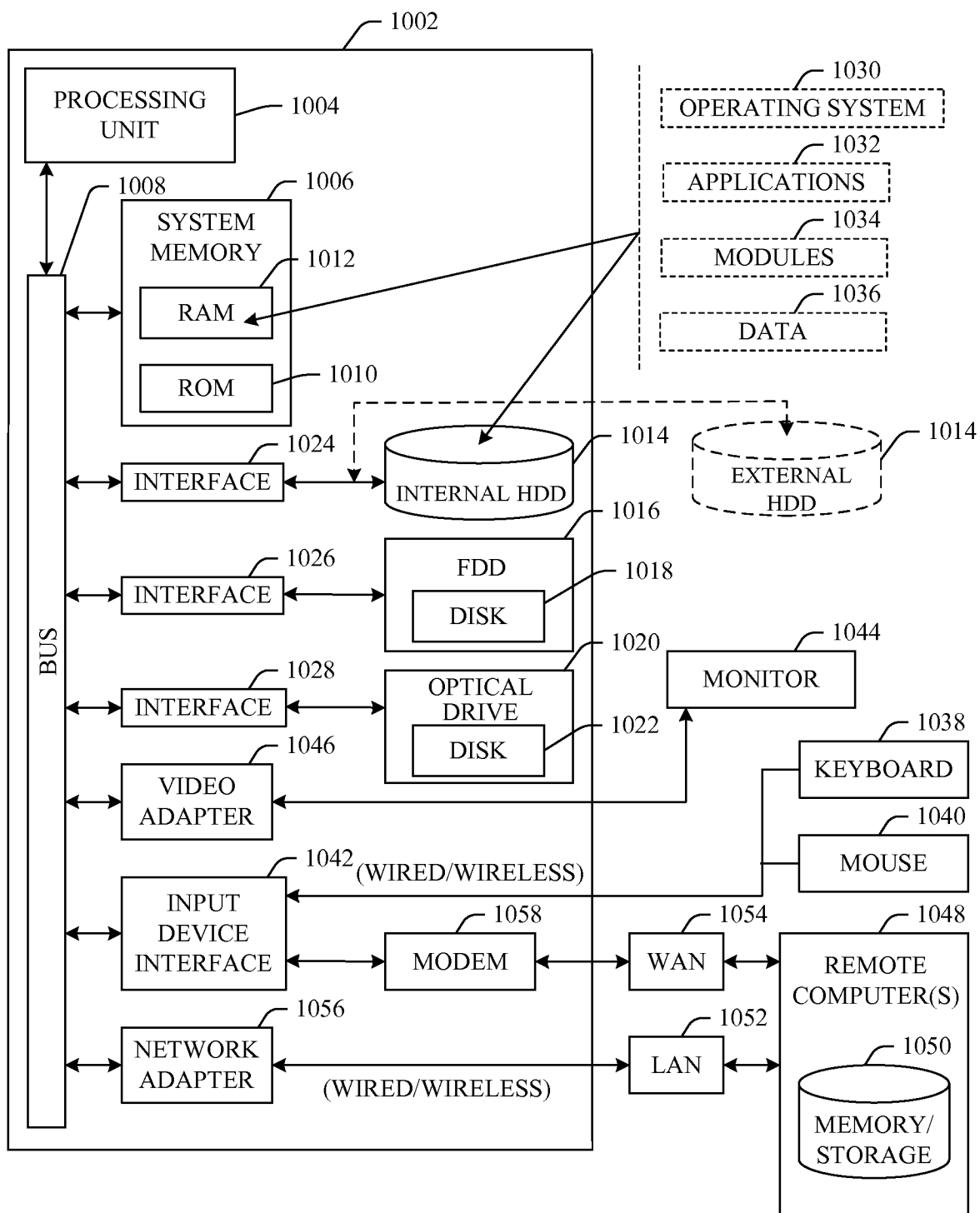
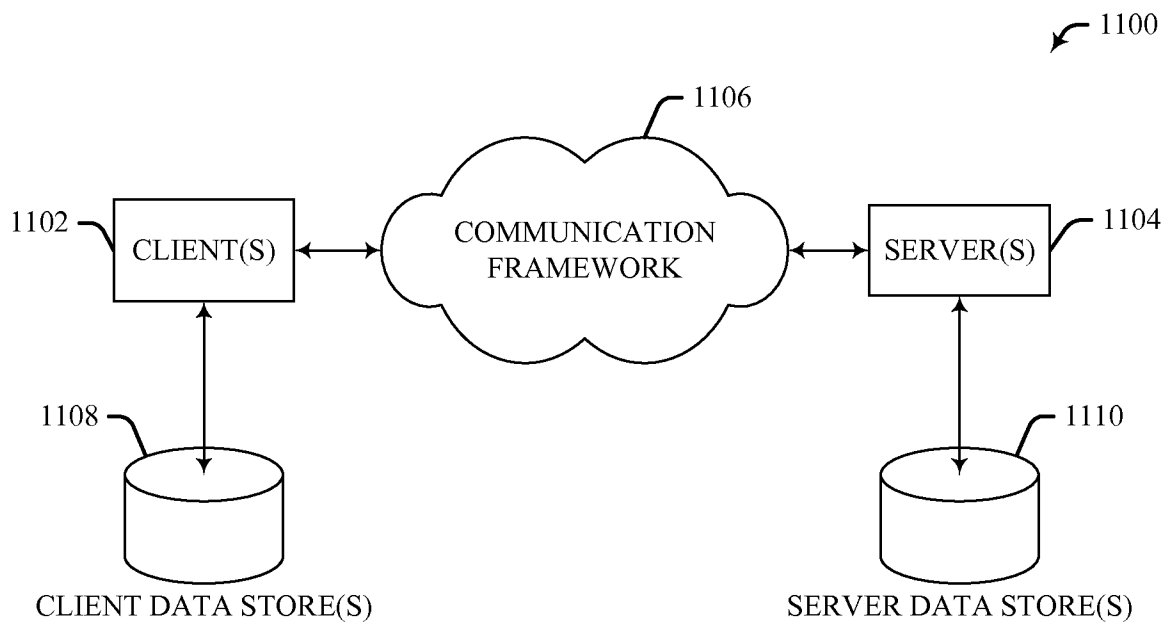


FIG. 9

**FIG. 10**

**FIG. 11**

Electronic Acknowledgement Receipt

EFS ID:	20923782
Application Number:	14523299
International Application Number:	
Confirmation Number:	1015
Title of Invention:	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation
First Named Inventor/Applicant Name:	Shmuel Shaffer
Customer Number:	99499
Filer:	D. Andrew Floam/Aja Turesko
Filer Authorized By:	D. Andrew Floam
Attorney Docket Number:	0370.2043DIV (996710)
Receipt Date:	10-DEC-2014
Filing Date:	24-OCT-2014
Time Stamp:	16:23:50
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	DeclarationTransmittal.pdf	88935 a2b8f41dda519fee44eada2415f1ef82174cf0f8	no	1

Warnings:

Information:

2	Oath or Declaration filed	Executed_Declaration.pdf	3141410 b38da1c8695e444bbe17fa5717bc049c65f8e324	no	43
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14/523,299	10/24/2014	2414	2160	0370.2043DIV (996710)	20	4

CONFIRMATION NO. 1015

99499

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9801 Washingtonian Blvd.
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FILING RECEIPT



Date Mailed: 11/05/2014

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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.

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Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation

Preliminary Class

370

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

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 14/523,299			
APPLICATION AS FILED - PART I									
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY			
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)		
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	280		
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	600		
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720		
TOTAL CLAIMS (37 CFR 1.16(j))	20	minus 20 = *			OR	x 80 =	0.00		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4	minus 3 = *	1			x 420 =	420		
APPLICATION SIZE FEE (37 CFR 1.16(s))			If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				0.00		
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00		
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL		TOTAL	2020		
APPLICATION AS AMENDED - PART II									
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OTHER THAN SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total (37 CFR 1.16(i))	*	Minus **	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))						OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						OR		
				TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OTHER THAN SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total (37 CFR 1.16(i))	*	Minus **	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))						OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						OR		
				TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.									



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/523,299	10/24/2014	Shmuel Shaffer	0370.2043DIV (996710)

CONFIRMATION NO. 1015

99499

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NOTICE



Date Mailed: 11/05/2014

INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):
Shmuel Shaffer
Amit Barave
Steven Christenson
Marcelo Oliveira

SCORE Placeholder Sheet for IFW Content

Application Number: 14523299

Document Date: 10/24/2014

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

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NEW CONTINUING PATENT APPLICATION UNDER 37 C.F.R. §1.53(b)

Application Title:

**Interoperability and Communications System Dynamic Media Proxy Based
on Capability Negotiation**

First Named Inventor:

Shmuel Shaffer

Attorney Docket No.:

0370.2043DIV (996710)

ENCLOSED ARE THE FOLLOWING **APPLICATION PARTS**:

- ☒ Specification (pages 1 to 23);
- ☒ Claims (pages 24 to 27)
20 total claims; 4 independent claims
- ☒ Abstract (page 28);
- ☒ 11 Sheets of Drawings including Figures 1-11
- ☒ Application Data Sheet (Form PTO/SB14)
- ☐ Executed Declaration
- ☒ Power of Attorney

ALSO ENCLOSED ARE THE FOLLOWING **APPLICATION PAPERS**:

- ☒ Information Disclosure Statement (Form PTO/SB08a) and IDS Transmittal Letter
- ☐ Foreign Patent Documents or Abstract
- ☐ Non-Patent Literature (NPL) Documents
- ☐ Nonpublished Application No.
- ☒ Preliminary Amendment
- ☐ Nonpublication Request and Certification under 35 U.S.C. 122(b)(2)(B)(i)
- ☐ Other:

INFORMATION RELATING TO DOMESTIC AND FOREIGN **PRIORITY**

- ☐ Domestic and/or Foreign Priority are provided on the Application Data Sheet or in the Specification.
- ☒ This application is a
 - ☐ Continuation
 - ☒ Divisional
 - ☐ Continuation-in-Partof pending Patent U.S. Nonprovisional Application No. 12/127,397

THE FEES HAVE BEEN CALCULATED AS FOLLOWS:

Basic Utility Application Fees:				
Filing Fee (\$280 LE; \$70 if SE filing electronically; \$70 if Micro Entity)				\$280.00
Examination Fee (\$720/\$360/\$180)				\$720.00
Search Fee (\$600/\$300/\$150)				\$600.00
Subtotal				\$1600.00
Number of Total Claims Over 20	→ 0	<u>\$80</u> for a large entity OR <u>\$40</u> for a small entity OR <u>\$20</u> for a micro entity	x \$ 80.00	\$0.00
Number of Independent Claims over 3	→ 1	<u>\$420</u> for a large entity OR <u>\$210</u> for a small entity OR <u>\$105</u> for a micro entity	x \$ 420.00	\$420.00
Surcharge for late filing fee, search fee, examination fee or Oath or Declaration (\$140/\$70/\$35)				\$140.00
Other fees (e.g., late filing of English translation; # of pages >100, etc.):				\$
Total Fee Due				\$2160.00

- ☐ **Applicant is entitled to Small Entity Status**
- ☐ **Applicant is entitled to Micro Entity Status**
- ☐ This application is being filed **without** a filing fee. Issuance of a Notice to File Missing Parts of Application is respectfully requested.
- ☒ Credit card payment has been submitted concurrently with the filing of this transmittal. The Director is hereby authorized to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. In addition, the Director is hereby authorized to charge any additional appropriate fees that may be required during the pendency of the above-identified application (e.g., in the concurrent or in any future reply), as well as to credit any overpayment, to Deposit Account No. **05-0460**.

Please direct all correspondence concerning this application to:

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Dated: October 24, 2014

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INTEROPERABILITY AND COMMUNICATIONS SYSTEM DYNAMIC MEDIA PROXY BASED ON CAPABILITY NEGOTIATION

BACKGROUND

[0001] Businesses around the world including public and private groups, such as security and safety personnel (*e.g.*, police, fire fighters and ambulance drivers) use communication networks that employ differing technologies and/or standards for communication. Many networks utilize land mobile radios communicating through push-to-talk technologies. However, communications among different endpoints of different networks such as endpoints that employ differing technologies and/or standards may be difficult. Collaboration between the different agencies and networks tends to be ad hoc and inefficient and involves laborious manual intervention.

[0002] Interoperability systems can employ an Internet protocol (IP) network collaboration platform that brings two-way radios into the realm of IP networking, offering all the benefits of this widely embraced, standards-based technology and extending the reach of two-way radios to other voice, video and data networks. Interoperability systems employ standards-based IP technologies to join various non-compatible communications systems into one, cohesive infrastructure. The interoperability system expects certain behavioral conformance from the end points in the system to maintain a consistent end user experience, such as, but not limited to, audio quality, number of active talkers in a group, or talk group features (*e.g.* floor control, priority, pre-emption, *etc.*). Endpoints developed and controlled by the interoperability system software can adhere to the expected behavioral characteristics. However, endpoints based on platforms external to the interoperability system cannot automatically conform to the expected characteristics. Further, endpoints that are not complying with the interoperability system behavior cannot respect floor control of the system. Such endpoints can lose out on talk group features, such as, talker-id. Furthermore, endpoints based on non- interoperability platforms can potentially abuse the system through intentional and/or unintentional rogue behavior.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] FIG. 1 illustrates a block diagram of an example system that can be employed to dynamically join various non-compatible communication systems into a cohesive infrastructure.

[0004] FIG. 2 illustrates an example endpoint that initiates a communication session according to an embodiment of the subject specification.

[0005] FIG. 3 illustrates an example interoperability system that can dynamically facilitate communication between non-compatible communication devices in accordance with embodiment of the specification.

[0006] FIG. 4 illustrates an example system that facilitates collection of information associated with an endpoint that initiates a communication session according to an embodiment of the subject specification.

[0007] FIG. 5 illustrates an example interoperability system that can dynamically determine where media processing can be performed in accordance with an embodiment of the specification.

[0008] FIG. 6 illustrates an example system that can be employed to communicate with an interoperability system according to an embodiment of the specification.

[0009] FIG. 7 illustrates an example flow chart of procedures that dynamically facilitate communication between non-compatible communication devices in accordance with embodiment of the specification.

[0010] FIG. 8 illustrates an example flow chart of procedures for dynamically communicating with a device in an interoperability communication system *via* a dynamic media proxy in accordance with the specification.

[0011] FIG. 9 illustrates an example flow chart of procedures that facilitate utilization of a dynamic media proxy, according to an embodiment of the subject specification.

[0012] FIG. 10 illustrates a block diagram of a computer operable to execute the disclosed architecture.

[0013] FIG. 11 illustrates a schematic block diagram of an exemplary computing environment in accordance with the subject specification.

DESCRIPTION OF EXAMPLE EMBODIMENTS

OVERVIEW

[0014] The following presents a simplified overview of the claimed subject matter in order to provide a basic understanding of some embodiments described herein. This is not an extensive overview of the claimed subject matter. It is intended to neither identify key or critical elements of the claimed subject matter nor to delineate the scope of that subject matter. Its sole purpose is to present some concepts of the claimed subject matter in a simplified form as a prelude to the more detailed description of example embodiments that is presented later.

[0015] The system disclosed and claimed herein, in one embodiment thereof, can dynamically facilitate communication between two or more non-compatible communication devices. The system can dynamically decide to act as a media proxy for a particular communication device and deliver full featured media services to the device. The decision to connect a device *via* a proxy can be made dynamically based on the capabilities of the communication devices and available system resources.

[0016] According to another embodiment of the system, an endpoint that initiates communication can include an information determination component that can determine media capabilities of the endpoint and/or the identity of the endpoint. Furthermore, a negotiation component can advertise the determined information and negotiate a session with an interoperability server (IS) over a private channel. The endpoint can communicate with the IS through custom messaging.

[0017] In accordance with another embodiment of the specification, an IS can include an information collection component that can collect information associated with an endpoint that initiates communication. The information can include media capabilities of the endpoint and/or its identity and/or attributes. A resource determination component can determine information associated with available system resources, for example, bandwidth and/or memory. The IS can further include an analysis component that can analyze the information associated with the endpoint and the system resources to determine if the endpoint can be connected to a VTG *via* a proxy. The analysis component can identify an endpoint that does not adhere to specific rules of transmission and can dynamically connect such an endpoint to a VTG *via* a proxy to prevent the endpoint from transmitting media into an active VTG that already has multiple talkers streaming media. A dynamic proxy component can

employ a proxy for the endpoint based on the analysis and dynamically establish a path for communication.

[0018] Another embodiment of the claimed subject matter relates to a system that can dynamically determine where media processing can be performed in an interoperability system. The determination can be based in part on the available system resources and/or the media capabilities of the endpoints that are joining a virtual talk group (VTG).

[0019] In accordance with yet another embodiment of the specification, the system can assess a security risk associated with allowing a particular endpoint to join a VTG directly. If the identity of the endpoint cannot be validated as trusted and/or secure, the system can either reject the communication request or act as a proxy for the endpoint and join the VTG on behalf of the endpoint. Thus, the system can access control over potential rogue endpoints. The parameters of the VTG can be dynamically altered to conceal the VTG from an identified rogue endpoint, preventing the endpoint from streaming media into the VTG.

[0020] The following description and the annexed drawings set forth in detail certain illustrative embodiments of the claimed subject matter. These embodiments may be indicative, however, of but a few of the various ways in which the principles of the claimed subject matter may be employed and the claimed subject matter is intended to include many and/or all such embodiments and their equivalents. Other advantages and novel features of the claimed subject matter will become apparent from the following description of example embodiments when considered in conjunction with the drawings.

[0021] The following terms are used throughout the description, the definitions of which are provided herein to assist in understanding various embodiments of the subject specification. The specification is now described with reference to the drawings, wherein like reference numerals are used to refer to like elements throughout. In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the subject specification. It may be evident, however, that the specification can be practiced without these specific details. In other instances, well-known structures and devices are shown in block diagram form in order to facilitate describing the specification.

[0022] As used in this application, the terms “component” and “system” are intended to refer to an entity capable of processing information (*e.g.*, computer-related entity), either hardware, a combination of hardware and software, software, or software in execution. For example, a component can be, but is not limited to being, a process running on a processor, a processor, an object, an executable, a thread of execution, a program, and/or a computer. By way of illustration, both an application running on a server and the server can be a component. One or more components can reside within a process and/or thread of execution, and a component can be localized on one computer and/or distributed between two or more computers.

[0023] As used herein, the term to “infer” or “inference” refer generally to the process of reasoning about or inferring states of the system, environment, and/or user from a set of observations as captured *via* events and/or data. Inference can be employed to identify a specific context or action, or can generate a probability distribution over states, for example. The inference can be probabilistic—that is, the computation of a probability distribution over states of interest based on a consideration of data and events. Inference can also refer to techniques employed for composing higher-level events from a set of events and/or data. Such inference results in the construction of new events or actions from a set of observed events and/or stored event data, whether or not the events are correlated in close temporal proximity, and whether the events and data come from one or several event and data sources.

[0024] Furthermore, the claimed subject matter may be implemented as a method, apparatus, or article of manufacture using standard programming and/or engineering techniques to produce software, firmware, hardware, or any combination thereof to control a computer to implement the disclosed subject matter. The term “article of manufacture” as used herein is intended to encompass a computer program accessible from any computer-readable device, carrier, or media. For example, computer readable media can include but are not limited to magnetic storage devices (*e.g.*, hard disk, floppy disk, magnetic strips...), optical disks (*e.g.*, compact disk (CD), digital versatile disk (DVD)...), smart cards, and flash memory devices (*e.g.*, card, stick, key drive...). Additionally it should be appreciated that a carrier wave can be employed to carry computer-readable electronic data such as those used in transmitting and receiving electronic mail or in accessing a network such as the Internet or a local area network (LAN). Of course, those skilled in the art will

recognize many modifications may be made to this configuration without departing from the scope or spirit of the claimed subject matter.

[0025] The system disclosed herein, relates to interoperability systems that can dynamically insert a media proxy based on capability negotiation, according to an embodiment of the invention. Conventional systems expect certain behavioral conformance from end points, such as but not limited to, RTCP (Real Time Transport Control Protocol) support, active stream selection, *etc.* and provide statically configured proxies to enable communication. Further, conventional systems cannot provide an access control over potential malicious endpoints.

[0026] The subject disclosure relates generally to communication networks and in particular to an interoperability system that facilitates a dynamic insertion of a media proxy based on capability negotiation. The subject specification provides a system and methodology that may support endpoints that are not compliant with an interoperability system behavior and can assess the security risk is allowing endpoints to join a talk group. Further, the system can dynamically proxy such endpoints and optimize system resource utilization.

[0027] Referring initially to the drawings, FIG. 1 illustrates a system 100 that can be employed to dynamically join various non-compatible communication systems into one, cohesive infrastructure. As an example, the system 100 can allow users of two-way radios, often called push-to-talk radios, and other voice devices, such as cell phones and regular telephones, to directly communicate and collaborate. In one embodiment, the system 100 can include an interoperability server (IS) 102, endpoints 104 and communication networks 106 that can be connected through a network 108.

[0028] The IS 102 can facilitate communication between different non-compatible communication devices, such as endpoints 104. As an example, IS 102 can facilitate communications between a two-way radio and a mobile device. Though two-way radios offer an excellent way for mobile workers within a limited geographic area to communicate, most two-way radio systems cannot interact with any other communications system since they use non-compatible technologies. In another example embodiment, IS 102 can facilitate communication between users of UHF radios and VHF radios or amongst users who use different channels on the same frequency band (*e.g.*, VHF). In other instances, radio signals cannot reach certain areas because of interference or physical barriers, cutting off radio users from the rest of the team or organization. IS 102 can connect two-way radios to other networks, for

example, by employing IP (internet protocol) technology standards, and help extend their reach. Thus, IS 102 can bring non-compatible communication devices, such as, push-to-talk (PTT) radios, into a dynamic, real-time, and information-rich collaboration environment and can allow an entity to communicate with a PPT radio with another communication device.

[0029] According to an embodiment, IS 102 can employ a system approach to offer a framework based on IP services to provide and maintain a consistent end user experience and data interoperability among endpoints 104 of networks 106 that employ different technologies. IS 102 can allow endpoints 104 to participate in one or more communication sessions based on capability negotiation. The endpoints 104 can initiate a communication session and advertise its capabilities to the IS 102. The IS 102 can then determine if the endpoint 104 can be allowed to join a talk group based on the information collected about the endpoint 104. Furthermore, the IS 102 determines if the endpoint 104 can directly connect to the talk group or if it should be connected *via* a proxy. The IS 102 can dynamically proxy the endpoint 104 based on information regarding the endpoint 104 and information regarding resources of the system (*e.g.* bandwidth, memory) and/or specific transmission rules based on the number of active media streams in a virtual talk group.

[0030] Endpoints 104 can include, but are not limited to, non-compatible communication devices that can participate in a communication session, such as, PTT radios, IP phones, personal digital assistants (PDAs), personal computers, land mobile radios (LMR), and the like. A communication session can be an active communication between two or more endpoints 104, for example, a communication session can occur between endpoint 1 and endpoint N. The data communicated during the communication session can be most any format of data, such as, but not limited to, voice, text, audio, video, multimedia, control, other information or a combination thereof. It can be appreciated that although N endpoints are illustrated in the figure, namely, endpoint 1 to endpoint N (where N is a natural number from 1 to infinity), most any number of endpoints can be connected to network 108 and/or to networks 106. Endpoints 104 that are not compliant with the communication networks 106 can employ IS 102 to leverage features of the networks 106.

[0031] System 100 can include one or more communication networks 106. The networks 106 can include, but are not limited to, IP, non-IP, wireless or wired networks and can be distributed locally or across multiple geographic locations. As

an example, networks 106 can include, a local area network (LAN), a wide area network (WAN), a metropolitan area network (MAN), a cellular network, a public switched telephone network (PSTN), a public or private network, a land mobile radios (LMR) network, a satellite network, an internet network or any combination thereof.

[0032] Referring now to Figure 2, there is illustrated an example endpoint 104 in accordance with an embodiment of the specification. As discussed *supra*, the endpoint 104 can be a non-compatible communication device, such as, but not limited to, a telephone, a cellular phone, an IP phone, a PDA, a fax machine, a PC, a camera, a camcorder, an LMR, a software radio, such as, Push-to-Talk Management Center (PMC) or the like. According to an embodiment of the subject specification, the endpoint 104 can include an information determination component 202 that can be employed to determine information related to the endpoint 104.

[0033] In one embodiment, the information determination component 202 can include a capability determination component 204 and/or an identity determination component 206. The capability determination component 204 can determine media capabilities associated with the endpoint 104, such as, but not limited to, the supported control protocol(s) or the number of incoming streams per talk group or channel supported by the endpoint 104. Further, the identity determination component 206 can determine an identity associated with the endpoint 104, such as a talker-id, or IP address. In another example embodiment, the identity of the endpoint can provide the name of the manufacturer and can indicate the capabilities of the said endpoint.

[0034] The endpoint 104 can further include a negotiation component 208 that can be employed to negotiate capabilities of the endpoint 104 with an IS 102 (FIG. 1). The negotiation component 208 can advertise media capabilities and/ or the identity associated with the endpoint 104 as determined by the information determination component 202. More specifically, the negotiation component 208 can determine if the endpoint 104 has initiated a communication and would like to participate in a virtual talk group (VTG). The negotiation component 208 can negotiate a session with an IS 102 (FIG. 1) over a private unicast and/or multicast channel. Further, the negotiation component 208 can present determined and/or identified capabilities and/or identity associated with the endpoint 104. Based on the information provided by the negotiation component 208, the IS 102 (FIG. 1) can determine if the endpoint 104 should be allowed to join the VTG and also determine if the endpoint should be

directly connected to the VTG or should be connected *via* a proxy based in part on the system's 100 (FIG. 1) floor control policy. Furthermore, the IS 102 (FIG. 1) can determine if the endpoint 104 adheres to the rules of transmission. If the endpoint 104 does not adhere to rules of transmission, it can be dynamically connected to the VTG *via* a proxy to prevent transmitting media into an active VTG that already has multiple talkers streaming media into it, and thus rendering the VTG useless. In an example embodiment, if the endpoint 104 is admitted into a VTG without proper credentials, it can be continuously monitored by other endpoints for its adherence with system's floor control policy. If another endpoint identifies the monitored endpoint as non-conforming with the floor control policy of the system, the IS 102 (FIG. 1) can dynamically insert a proxy between the endpoint 104 and the VTG. In addition, the parameters of the VTG can be dynamically altered to conceal the VTG from the identified endpoint and prevent it from streaming into the VTG.

[0035] As an example, the endpoint 104 can be an IP phone in accordance with an embodiment of the specification. The IP phone can initiate a communication with another endpoint, such as a cellular phone that is part of a VTG. The information determination component 202 can identify the capabilities associated with the IP phone, such as, built in media termination, multicast stack support, Extensible Markup Language (XML) services. Further, the information determination component 202 can determine that the IP phone does not support RCTP. The negotiation component 208 can negotiate a session with the IS (FIG. 1) over a private unicast/multicast channel and can present the identity and capability of the IP phone to the IS FIG. 1) over the private channel employing custom messages. The IS (FIG. 1) can then proxy for the IP phone since the IP phone does not support RTCP. The IP phone can transfer traffic over the private channel to the IS (FIG. 1), which can stream the traffic to the VTP and vice versa. Alternately or in addition, the information determination component 202 can determine that the IP phone does not adhere to the limit of a specified number of multicast streams per VTG and the IS FIG. 1) can connect the IP phone to the VTG *via* a proxy. Since the proxy is a trusted component, the proxy can refrain from streaming media into a VTG which already has a maximum number of active media streams as specified by the specific rules of transmission.

[0036] FIG. 3 illustrates an example IS 102 in accordance with embodiment of the specification. The IS 102 can be employed to facilitate communication between

different non-compatible communication devices. Additionally, the IS 102 can be employed to assess security risks associated with a particular endpoint and also be employed to optimize system resources during communication sessions.

[0037] In an embodiment, the IS 102 can include an information collection component 302 that can determine information regarding an endpoint that has initiated a communication session. The information collection component 302 can collect information from the endpoint through custom messages over a private channel. The information can include, but is not limited to, media capabilities of the endpoint, the identity of the endpoint and/or attributes of the endpoint.

[0038] The IS 102 can further include a resource determination component 304 that can determine available system resources, *e.g.* bandwidth, and/or memory. The system resource information can be employed to optimize resource utilization, for example, by load sharing. The resource determination component 304 can dynamically update the system resource information, such that the IS 102 has up-to-date information regarding the availability of system resources. The information regarding the available system resources can be employed to negotiate the dynamic utilization of a proxy for a particular endpoint and establish a communication path based on the resource information and/or the capability information.

[0039] The information collected by the information collection component 302 and the information determined by resource determination component 304 can be analyzed by an analysis component 306. The analysis component 306 can determine if the endpoint can provide the quality of service required in the VTG based on the analysis of the capabilities of the endpoint. In one embodiment, the analysis component 306 can detect an endpoint which may not adhere to the rules of transmission based on collected information. In one embodiment, the analysis component 306 can analyze the information to decide if the requesting endpoint can be allowed to join the VTG and further determine if the endpoint can join the VTG directly.

[0040] The analysis component 306 can validate the endpoint identity as secured and/or trusted and determine if the requesting endpoint is a trusted endpoint or potentially a rouge endpoint. It can be appreciated that the analysis component 306 can also identify a malicious endpoint by validating the endpoint identity as malicious. If the requesting endpoint is identified as malicious, the analysis component 306 can reject the request for communication from the endpoint. Further,

the analysis component 306 can determine if a non malicious endpoint can join a VTG directly.

[0041] The analysis component 306 can analyze the capabilities of the endpoint (determined by the information collecting component 302) to determine if the endpoint should be connected *via* a proxy. If the capabilities are analyzed to be non-conforming to the IS 102, a dynamic proxy component 308 is employed to proxy the endpoint. It can be appreciated that the dynamic proxy component 308 and the IS 102 can reside on the same or on different servers. Logically, the IS 102 can facilitate the creation and maintenance of the VTG as it is responsible for the control signals and the dynamic proxy component 308 can deal with a media component (not shown). Thus, although the dynamic proxy component 308 is depicted as a part of the IS 102, it can be appreciated that the dynamic proxy component can reside on a separate server. In one embodiment, the IS 102 can be attached to network 106 (or 108) while the dynamic proxy may be attached to another network 108 (or 106).

[0042] If the analyzed capabilities conform to the IS, the endpoint can be allowed to directly join the VTG. As an example, if the analysis component 306 determines that the requesting endpoint does not support RTCP, the IS 102 can proxy the endpoint. In an embodiment, if the analyzed capabilities cannot confirm that the endpoint would prevent media streaming into a multicast address, which already has a maximum number of active media streams, the IS 102 can connect the endpoint *via* a dynamic proxy. Furthermore, the analysis component 306 dynamically determines if a proxy can be utilized based on the system resource information provided by the resource determination component 304. The analysis component 306 can additionally employ machine learning to facilitate automating one or more features in accordance with the subject specification.

[0043] The subject specification (*e.g.*, in connection with validation of an endpoint to join a VTG) can employ various AI-based schemes for carrying out various embodiments thereof. For example, a process for determining if an endpoint can directly join a VTG can be facilitated *via* an automatic classifier system and process. Moreover, where the endpoint requests to join a particular VTG, the classifier can be employed to determine if the endpoint can be allowed to join the VTG and/or the endpoint can be allowed to join the VTG directly.

[0044] A classifier is a function that maps an input attribute vector, $x = (x_1, x_2, x_3, x_4, x_n)$, to a confidence that the input belongs to a class, that is, $f(x) =$

confidence(class). Such classification can employ a probabilistic and/or statistical-based analysis (*e.g.*, factoring into the analysis utilities and costs) to prognose or infer an action that a user desires to be automatically performed. In the case of interoperability systems, for example, attributes can be capabilities and/or identity of the endpoint or other data-specific attributes derived from the capabilities and/or identity, and the classes can be categories or areas of interest. In one example embodiment, the classification is made base on the sub-network to which the endpoint is attached.

[0045] A support vector machine (SVM) is an example of a classifier that can be employed. The SVM operates by finding a hypersurface in the space of possible inputs, which the hypersurface attempts to split the triggering criteria from the non-triggering events. Intuitively, this makes the classification correct for testing data that is near, but not identical to training data. Other directed and undirected model classification approaches include, *e.g.*, naïve Bayes, Bayesian networks, decision trees, neural networks, fuzzy logic models, and probabilistic classification models providing different patterns of independence can be employed. Classification as used herein also is inclusive of statistical regression that is utilized to develop models of priority.

[0046] As will be readily appreciated from the subject specification, the subject specification can employ classifiers that are explicitly trained (*e.g.*, *via* a generic training data) as well as implicitly trained (*e.g.*, *via* observing user behavior, receiving extrinsic information). For example, SVM's are configured *via* a learning or training phase within a classifier constructor and feature selection module. Thus, the classifier(s) can be used to automatically learn and perform a number of functions, including but not limited to determining according to a predetermined criteria. Referring back to FIG. 3, the IS 102 can include a dynamic proxy component 308 that can be dynamically employed to proxy the endpoint based on the analysis performed by the analysis component 306. The dynamic proxy component 308 can communicate with the endpoint through a private session and join the VTG on behalf of the endpoint. Thus, the dynamic proxy component 308 can establish a communication path based on capability negotiation. The dynamic proxy component 308 can behave as a fully-compliant endpoint and relay relevant information and/or features to the endpoint for which it serves as a proxy through custom messaging. Additionally, the dynamic proxy component 308 can provide talk group features, such

as, but not limited to, floor control, talker-id, priority and/or pre-emption on behalf of the endpoint. In one embodiment, if the endpoint is admitted into a VTG without proper credentials, it can be continuously monitored by other endpoints for its adherence with system's floor control policy. If another endpoint identifies that the monitored endpoint as non-conforming with the floor control policy of the system, the dynamic proxy component 308 can dynamically insert a proxy between the endpoint 104 and the VTG.

[0047] As an example, if an IP phone initiated a connection to a specific VTG, the information collection component 302 can collect information regarding the IP phone and determine that the IP phone cannot offer full featured RTCP support, talker-id, priority or pre-emption features. The analysis component 306 can determine that the IP phone should be connected to the VTG *via* a proxy based in part on the information associated with system resources. The dynamic proxy component 308 can then join the intended VTG on behalf of the IP phone. The audio traffic from the IP phone can be received by the dynamic proxy component 308 over a private channel and can be streamed to the intended VTG and vice versa. The dynamic proxy component 308 can preempt the IP phone and prevent the media stream from the IP phone to be streamed into the VTG based on an analysis by the IS 102.

[0048] Referring now to FIG. 4, there is illustrated an example system 400 that facilitates collection of information associated with an endpoint that initiates a communication session. The example information collection component 302 depicted in the system can be employed to gather, identify and/or determine information advertised by an endpoint. The information collection component 302 can generally include a capability collection component 402 that can be employed to determine information regarding media capabilities of a requesting endpoint. The media capabilities can include behavioral characteristics, such as, but are not limited to, RTCP support, the ability to detect that other members of the VTG are speaking and consequently not streaming media into the said VTG, active stream selection, and/or talk group features. The system 400 can dynamically employ a proxy for the endpoint if the capabilities of the said endpoint are determined to be non-conforming to IS standards.

[0049] The information collection component 302 can also include an identity collection component 404 that can be employed to determine the identity of the requesting endpoint. The identity of the endpoint can be employed to validate the

security of the endpoint. Further, an attribute collection component 406 can collect attributes associated with the endpoint from the packets sent by the endpoint. If the identity of the endpoint is not determined, the information from the attributes can be utilized to verify the security of the endpoint. As an example, the attribute can include security credentials of the endpoint.

[0050] FIG. 5 illustrates an example system 500 that can dynamically determine where media processing can be performed in an interoperability system. The system 500 can include an IS 102 that can facilitate communication between communication devices that employ non-compatible technologies for communication. For example, user 1 and user 2 can employ two-way radios while user 3 can employ a handheld device, such as a cellular phone. It can be appreciated that user 1, user 2 and user 3 can employ most any communication device including, but not limited to, a telephone, a mobile phone, a PMC, an IP phone, a PDA, a fax machine, a PC, a camera, a video camera, a LMR or a combination thereof. Furthermore, it can be appreciated that although only three users are illustrated in the figure, two or more users can employ the disclosed system.

[0051] As an example, a scenario wherein user 3 from domain 2 wants to communicate with two users from domain 1 (user 1 and user 2) can be described with respect to FIG. 5. The user 3 can initiate communication through a hand held device, such as an IP phone. The users in domain 1 employ different standards for communication as the user in domain 2. When a user joins a VTG, the location and resources on an endpoint employed by the user are considered. During communication, user 1 and user 2 from domain 1 can stream media from domain 1 to domain 2. This can be achieved in two ways, namely, transfer the two media streams from domain 1 to domain 2 & mix them in the endpoint (*e.g.* IP phone) or utilize a proxy in domain 1 that can process the media streams in domain 1 and transfer a single media stream to domain 2. The IS 102 can determine the location where media processing can occur, for example, by an analysis component 306 (FIG. 3). The IS 102 determines the available system resources (*e.g.* by a resource determination component shown in FIG. 3) and capabilities of the devices employed by the users (*e.g.* by an information collection component shown in FIG. 3) to determine an optimal location for media processing. For example, if current available bandwidth is low, the IS 102 can utilize a proxy to process the media streams from user 1 and user 2 in domain 1 and transfer a single media stream to user 3 in domain 2. Furthermore,

the dynamic proxy component 308 (FIG. 3), in the IS 102, can monitor the IP multicast address/port and determine if there are other active media streams on the multicast address. If the analysis component 306 (FIG. 3), in the IS 102, detects more than a maximum specified number of active media streams on the multicast address, the dynamic proxy component 308 (FIG. 3) can back up and refrain from transmitting media to the multicast address. If user 3 does not adhere to the specified transmission rule, it can transmit media into an already busy VTG. The analysis component 306(FIG. 3) can check if user 3 has the capability to adhere to the specified rule. If the IS 102 cannot ensure that the user 3 would adhere to the said rule, the IS 102 can connect the user 3 to the VTG *via* a proxy. Since the proxy is a trusted component, it would refrain from streaming media into an active VTG which already has a maximum number of active media streams.

[0052] Referring now to FIG. 6, there is illustrated an example system 600 that can be employed to communicate with an interoperability system. In an embodiment, the system 600 can include most any device or system, such as, endpoint 104 that can be employed for communication. The endpoint 104 can support half duplex and/or full duplex communication.

[0053] The endpoint 104 can generally include a user interface 602 that can be employed by an entity, such as a user to initiate or receive communication. The user interface can include a speaker, a microphone, a visual display, a keypad or a combination thereof. The keypad may include HW buttons and/or menu driven soft buttons. The endpoint 104 can further include a processor 604 that can perform operations within the endpoint 104 and a memory 606 that can store information within the endpoint 104. Furthermore, the endpoint 104 can include an information determination component 202 that can be employed to identify information associated with the endpoint 104, such as capability information and/or identity information. A negotiation component 208 can be employed to exchange capability information with an interoperability server (not shown) during communication. It is to be appreciated that information determination component 202 and negotiation component 208 can be the same or similar as, and/or can contain the same or similar functionality as illustrated in Figure 2 and other figures and described herein.

[0054] A transmitter/receiver 608 can be employed to transmit and receive data from/to the endpoint 104. It can be appreciated that the transmitter and receiver can be separate modules or integrated as a single module. The transmitter/ receiver

608 can transmit information determined by the information collection component 202 to an interoperability server (not shown) over a private channel to initiate communication. The transmitter/receiver 608 can employ wireless and/or wired communication to transmit/receive information.

[0055] FIG. 7 illustrates an example methodology 700 that can facilitate dynamic communication between non-compatible communication devices in accordance with embodiment of the specification. While, for purposes of simplicity of explanation, the one or more methodologies shown herein, *e.g.*, in the form of a flow chart, are shown and described as a series of acts, it is to be understood and appreciated that the subject specification is not limited by the order of acts, as some acts may, in accordance with the specification, occur in a different order and/or concurrently with other acts from that shown and described herein. For example, those skilled in the art will understand and appreciate that a methodology could alternatively be represented as a series of interrelated states or events, such as in a state diagram. Moreover, not all illustrated acts may be required to implement a methodology in accordance with the specification.

[0056] Referring back to FIG. 7, a communication between devices can be initiated at 702. The devices can employ non-compatible technologies and/or standards for communication. At 704, media capabilities and/or identity of the device that initiated communication can be advertised. At 706, a decision can be made if the device is allowed to join a VTG based on its identity. If the device identity is determined to be untrusted or malicious the device cannot be allowed to join the VTG and the request can be rejected at 708. If the device identity is determined to be trusted or safe, it can be determined if the device should join *via* proxy, as shown at 710. The determination at 710 can be based on the media capabilities of the device and the available system resources. If it is determined that the device does not need to join *via* proxy since the device can adhere to the behavioral characteristics of an interoperability system, such as but not limited to, transmission rules, the device can be directly connected to the VTG, as shown at 712. However, if the device demonstrates that it cannot comply with the behavioral characteristics of the interoperability system, the device can be attached to a VTG *via* a proxy. In one embodiment, if it cannot be determined that the endpoint can adhere to specified rules of transmission, the endpoint can be connected to the VTG *via* a proxy. At 714, a dynamic proxy can be employed for attaching the endpoint device to the VTG. In one

embodiment, if the endpoint is admitted into a VTG without proper credentials, it can be monitored for its adherence with a floor control policy, such as a specified rule of transmission. If it is identified that the monitored endpoint is non-conforming with the floor control policy, a proxy can dynamically be inserted between the endpoint and the VTG.

[0057] At 716, a dynamic path can be established for communication from the endpoint device to the dynamic proxy and the proxy to the intended device in the VTG. The dynamic path can be based on the available system resources, such as, but not limited to, memory and/or bandwidth.

[0058] Referring now to FIG. 8, there is illustrated an example methodology 800 of communicating with a device in an interoperability communication system *via* a dynamic media proxy in accordance with the specification. At 802, communication with a non-compatible communication device(s) can be initiated. At 804, media capability information associated with the initiating device can be determined. At 806, an identity of the initiating device can be determined. At 808, it can be determined if a proxy is employed to attach the initiating device to the given VTG. If a proxy is not employed to attach the endpoint device to the given VTG, media can be transmitted directly to a VTG at 810. Thus, the initiating device can directly communicate with an indented device in the VTG. If it is determined that the proxy is employed to attach the endpoint device to the given VTG, media can be transmitted to the proxy over a private network through custom messages at 812.

[0059] FIG. 9 illustrates an example methodology of utilizing a dynamic media proxy in accordance with the specification. At 902, a communication request can be received. The request can be from most any endpoint (*e.g.* PTT radio) to initiate communication with another endpoint (*e.g.* cellular phone). At 904, information associated with the requesting endpoint can be dynamically determined. The information can include, but is not limited to, media capabilities, device identity attributes associated with the device and/or the device's capability to adhere to a specified transmission rule. At 906, system resource information, such as, but not limited to, bandwidth, memory and/or number of active media streams can be collected. At 908, the collected information can be analyzed. At 910 a dynamic media proxy can be utilized to facilitate communication between non-compatible communication devices based on the collected information. In one embodiment, the VTG can be monitored for number of active media streams and media transmission

between the endpoint can be established *via* a proxy if a maximum number of active media streams are detected and it is determined that the endpoints do not adhere to the transmission rule.

[0060] Referring now to FIG. 10, there is illustrated a block diagram of a computer operable to execute the disclosed architecture that can be employed to join various non-compatible communications systems into a cohesive infrastructure by employing a dynamic media proxy based on capability negotiation. In order to provide additional context for various embodiments of the subject specification, FIG. 10 and the following discussion are intended to provide a brief, general description of a suitable computing environment 1000 in which the various embodiments of the specification can be implemented. While the specification has been described above in the general context of computer-executable instructions that may run on one or more computers, those skilled in the art will recognize that the specification also can be implemented in combination with other program modules and/or as a combination of hardware and software.

[0061] Generally, program modules include routines, programs, components, data structures, *etc.*, that perform particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the inventive methods can be practiced with other computer system configurations, including single-processor or multiprocessor computer systems, minicomputers, mainframe computers, as well as personal computers, hand-held computing devices, microprocessor-based or programmable consumer electronics, and the like, each of which can be operatively coupled to one or more associated devices.

[0062] The illustrated embodiments of the specification may also be practiced in distributed computing environments where certain tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules can be located in both local and remote memory storage devices.

[0063] A computer includes a variety of computer-readable media. Computer-readable media can be any available media that can be accessed by the computer and includes both volatile and nonvolatile media, removable and non-removable media. By way of example, and not limitation, computer-readable media can comprise computer storage media and communication media. Computer storage media includes both volatile and nonvolatile, removable and non-removable media

implemented in any method or technology for storage of information such as computer-readable instructions, data structures, program modules or other data. Computer storage media includes, but is not limited to, RAM, ROM, EEPROM, flash memory or other memory technology, CD-ROM, digital versatile disk (DVD) or other optical disk storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the desired information and which can be accessed by the computer.

[0064] Communication media embodies computer-readable instructions, data structures, program modules or other data in a modulated data signal such as a carrier wave or other transport mechanism, and includes any information delivery media. The term “modulated data signal” means a signal that has one or more of its characteristics set or changed in such a manner as to encode information in the signal. By way of example, and not limitation, communication media includes wired media such as a wired network or direct-wired connection, and wireless media such as acoustic, RF, infrared and other wireless media. Combinations of the any of the above should also be included within the scope of computer-readable media.

[0065] With reference again to FIG. 10, the example environment 1000 for implementing various embodiments of the specification includes a computer 1002, the computer 1002 including a processing unit 1004, a system memory 1006 and a system bus 1008. The system bus 1008 couples system components including, but not limited to, the system memory 1006 to the processing unit 1004. The processing unit 1004 can be any of various commercially available processors. Dual microprocessors and other multi-processor architectures may also be employed as the processing unit 1004. In some embodiments, the processor unit 1004 can include a digital signal processor (DSP).

[0066] The system bus 1008 can be any of several types of bus structure that may further interconnect to a memory bus (with or without a memory controller), a peripheral bus, and a local bus using any of a variety of commercially available bus architectures. In some embodiments, the bus can be a fast network resulting in a distributed components attached to the network. The system memory 1006 includes read-only memory (ROM) 1010 and random access memory (RAM) 1012. A basic input/output system (BIOS) is stored in a non-volatile memory 1010 such as ROM, EPROM, EEPROM, which BIOS contains the basic routines that help to transfer

information between elements within the computer 1002, such as during start-up. The RAM 1012 can also include a high-speed RAM such as static RAM for caching data.

[0067] The computer 1002 further includes an internal hard disk drive (HDD) 1014 (*e.g.*, EIDE, SATA), which internal hard disk drive 1014 may also be configured for external use in a suitable chassis (not shown), a magnetic floppy disk drive (FDD) 1016, (*e.g.*, to read from or write to a removable diskette 1018) and an optical disk drive 1020, (*e.g.*, reading a CD-ROM disk 1022 or, to read from or write to other high capacity optical media such as the DVD). The hard disk drive 1014, magnetic disk drive 1016 and optical disk drive 1020 can be connected to the system bus 1008 by a hard disk drive interface 1024, a magnetic disk drive interface 1026 and an optical drive interface 1028, respectively. The interface 1024 for external drive implementations includes at least one or both of Universal Serial Bus (USB) and IEEE 1394 interface technologies. Other external drive connection technologies are within contemplation of the subject specification.

[0068] The drives and their associated computer-readable media provide nonvolatile storage of data, data structures, computer-executable instructions, and so forth. For the computer 1002, the drives and media accommodate the storage of any data in a suitable digital format. Although the description of computer-readable media above refers to a HDD, a removable magnetic diskette, and a removable optical media such as a CD or DVD, it should be appreciated by those skilled in the art that other types of media which are readable by a computer, such as zip drives, magnetic cassettes, flash memory cards, cartridges, and the like, may also be used in the example operating environment, and further, that any such media may contain computer-executable instructions for performing the methods of the specification.

[0069] A number of program modules can be stored in the drives and RAM 1012, including an operating system 1030, one or more application programs 1032, other program modules 1034 and program data 1036. All or portions of the operating system, applications, modules, and/or data can also be cached in the RAM 1012. It is appreciated that the specification can be implemented with various commercially available operating systems or combinations of operating systems.

[0070] A user can enter commands and information into the computer 1002 through one or more wired/wireless input devices, *e.g.*, a keyboard 1038 and a pointing device, such as a mouse 1040. Other input devices (not shown) may include a microphone, an IR remote control, a joystick, a game pad, a stylus pen, touch

screen, or the like. These and other input devices are often connected to the processing unit 1004 through an input device interface 1042 that is coupled to the system bus 1008, but can be connected by other interfaces, such as a parallel port, an IEEE 1394 serial port, a game port, a USB port, an IR interface, *etc.*

[0071] A monitor 1044 or other type of display device is also connected to the system bus 1008 *via* an interface, such as a video adapter 1046. In addition to the monitor 1044, a computer includes other peripheral output devices (not shown), such as speakers, printers, *etc.*

[0072] The computer 1002 may operate in a networked environment using logical connections *via* wired and/or wireless communications to one or more remote computers, such as a remote computer(s) 1048. The remote computer(s) 1048 can be a workstation, a server computer, a router, a personal computer, endpoint device, portable computer, microprocessor-based entertainment appliance, a peer device or other common network node, and includes many or all of the elements described relative to the computer 1002, although, for purposes of brevity, only a memory/storage device 1050 is illustrated. The logical connections depicted include wired/wireless connectivity to a local area network (LAN) 1052 and/or larger networks, *e.g.*, a wide area network (WAN) 1054. Such LAN and WAN networking environments are commonplace in offices and companies, and facilitate enterprise-wide computer networks, such as intranets, all of which may connect to a global communications network, *e.g.*, the Internet.

[0073] When used in a LAN networking environment, the computer 1002 is connected to the local network 1052 through a wired and/or wireless communication network interface or adapter 1056. The adapter 1056 may facilitate wired or wireless communication to the LAN 1052, which may also include a wireless access point disposed thereon for communicating with the wireless adapter 1056.

[0074] When used in a WAN networking environment, the computer 1002 can include a modem 1058, or is connected to a communications server on the WAN 1054, or has other means for establishing communications over the WAN 1054, such as by way of the Internet. The modem 1058, which can be internal or external and a wired or wireless device, is connected to the system bus 1008 *via* the serial port interface 1042. In a networked environment, program modules depicted relative to the computer 1002, or portions thereof, can be stored in the remote memory/storage device 1050. It will be appreciated that the network connections shown are example

and other means of establishing a communications link between the computers can be used.

[0075] The computer 1002 is operable to communicate with any wireless devices or entities operatively disposed in wireless communication, *e.g.*, a printer, scanner, desktop and/or portable computer, portable data assistant, communications satellite, any piece of equipment or location associated with a wirelessly detectable tag (*e.g.*, a kiosk, news stand, restroom), and telephone. This includes at least Wi-Fi and Bluetooth™ wireless technologies. Thus, the communication can be a predefined structure as with a conventional network or simply an ad hoc communication between at least two devices.

[0076] Wi-Fi, or Wireless Fidelity, allows connection to the Internet from a couch at home, a bed in a hotel room, or a conference room at work, without wires. Wi-Fi is a wireless technology similar to that used in a cell phone that enables such devices, *e.g.*, computers, to send and receive data indoors and out; anywhere within the range of a base station. Wi-Fi networks use radio technologies called IEEE 802.11 (a, b, g, *etc.*) to provide secure, reliable, fast wireless connectivity. A Wi-Fi network can be used to connect computers to each other, to the Internet, and to wired networks (which use IEEE 802.3 or Ethernet). Wi-Fi networks operate in the unlicensed 2.4 and 5 GHz radio bands, at an 11 Mbps (802.11a) or 54 Mbps (802.11b) data rate, for example, or with products that contain both bands (dual band), so the networks can provide real-world performance similar to the basic 10BaseT wired Ethernet networks used in many offices.

[0077] Referring now to FIG. 11, there is illustrated a schematic block diagram of an exemplary computing environment 1100 that can facilitate communication between non-compatible communication devices in accordance with embodiment of the specification. The system 1100 includes one or more client(s) 1102. The client(s) 1102 can be hardware and/or software (*e.g.*, threads, processes, computing devices). The client(s) 1102 can house cookie(s) and/or associated contextual information by employing the subject specification, for example.

[0078] The system 1100 also includes one or more server(s) 1104. The server(s) 1104 can also be hardware and/or software (*e.g.*, threads, processes, computing devices). The servers 1104 can house threads to perform transformations by employing the specification, for example. One possible communication between a client 1102 and a server 1104 can be in the form of a data packet adapted to be

transmitted between two or more computer processes. The data packet may include a cookie and/or associated contextual information, for example. The system 1100 includes a communication framework 1106 (e.g., a global communication network such as the Internet) that can be employed to facilitate communications between the client(s) 1102 and the server(s) 1104.

[0079] Communications can be facilitated *via* a wired (including optical fiber) and/or wireless technology. The client(s) 1102 are operatively connected to one or more client data store(s) 1108 that can be employed to store information local to the client(s) 1102 (e.g., cookie(s) and/or associated contextual information). Similarly, the server(s) 1104 are operatively connected to one or more server data store(s) 1110 that can be employed to store information local to the servers 1104.

[0080] The aforementioned systems have been described with respect to interaction between several components. It should be appreciated that such systems and components can include those components or sub-components specified therein, some of the specified components or sub-components, and/or additional components. Sub-components could also be implemented as components communicatively coupled to other components rather than included within parent components. Further yet, one or more components and/or sub-components may be combined into a single component providing aggregate functionality. The components may also interact with one or more other components not specifically described herein for the sake of brevity, but known by those of skill in the art.

[0081] What has been described above includes examples of the specification. It is, of course, not possible to describe every conceivable combination of components or methodologies for purposes of describing the subject specification, but one of ordinary skill in the art may recognize that many further combinations and permutations of the specification are possible. Accordingly, the specification is intended to embrace all such alterations, modifications and variations that fall within the spirit and scope of the appended claims. Furthermore, to the extent that the term “includes” is used in either the detailed description or the claims, such term is intended to be inclusive in a manner similar to the term “comprising” as “comprising” is interpreted when employed as a transitional word in a claim.

CLAIMS

What is claimed is:

1. An apparatus, comprising:
an analysis component that dynamically determines if an endpoint should be connected to a virtual talk group (VTG) based in part on an analysis of at least one of information associated with the endpoint or information determined based on the adherence of the endpoint with a predefined floor control mechanism; and
a dynamic proxy component that is employed to dynamically proxy the endpoint based on the determination.
2. The apparatus of claim 1, wherein the floor control mechanism specifies that the endpoint does not transmit into a given VTG that has more than a specified number of active media streams.
3. The apparatus of claim 1, further comprising a resource determination component that identifies a plurality of available system resources to optimize resource utilization.
4. The apparatus of claim 1, further comprising an identity collection component that receives an identity of the endpoint to assess a security risk associated with the endpoint.
5. The apparatus of claim 4 wherein the identity collection component employs credentials resident on the endpoint.
6. The apparatus of claim 5, wherein the security risk associated with the endpoint is that the endpoint transmits into a given VTG without adhering with the floor control policy of the system.
7. The apparatus of claim 1, further comprising an attribute collection component that receives attributes associated with the endpoint to at least one of determine a security risk associated with the endpoint or facilitate the analysis.

8. The apparatus of claim 1 wherein one or more disparate endpoints identify the endpoint as non-conforming with the floor control mechanism based in part on monitoring the endpoint.
9. The apparatus of claim 8, wherein a proxy is dynamically inserted between the endpoint and the VTG if the endpoint is identified as non-conforming with the floor control mechanism.
10. The apparatus of claim 8 wherein the parameters of the VTG are dynamically altered to conceal the VTG from the identified endpoint and prevent the endpoint from streaming into the VTG.
11. The apparatus of claim 1, wherein the dynamic proxy component dynamically establishes a communication path between the endpoint and one or more disparate endpoints based in part on the analysis.
12. The apparatus of claim 1, further comprising a capability collection component that identifies information regarding media capabilities of the endpoint, the information employed to determine if the endpoint should be directly connected to the VTG.
13. A method, comprising:
 - receiving information associated with an endpoint;
 - identifying information associated with the adherence of the endpoint with a predefined floor control mechanism; and
 - analyzing the identified information to determine if the endpoint should be connected to a virtual talk group (VTG) *via* a proxy.
14. The method of claim 13, further comprising identifying at least one of media capability information or identity information associated with the endpoint.
15. The method of claim 13, further comprising identifying the endpoint as non-conforming with the floor control mechanism based in part on monitoring the endpoint.

16. The method of claim 15, further comprising dynamically inserting a proxy between the endpoint and the VTG if the endpoint is identified as non-conforming with the floor control mechanism.

17. A system, comprising:
means for receiving information associated with an endpoint;
means for identifying information associated with the adherence of the endpoint with a predefined floor control mechanism; and
means for analyzing the identified information to evaluate if the endpoint should be connected to a virtual talk group (VTG) *via* a proxy.

18. The system of claim 17, further comprising means for dynamically inserting a proxy between the endpoint and the VTG if the endpoint is identified as non-conforming with the floor control mechanism.

19. The system of claim 17, further comprising means for dynamically establishing a communication path between the devices based in part on the analysis.

20. An apparatus, comprising:
an information determination component that identifies information related to an endpoint; and
a negotiation component that negotiates a communication session with an interoperability server (IS) based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS.

21. The apparatus of claim 20, further comprising a capability determination component that identifies media capabilities associated with the endpoint, the media capabilities employed by the IS to dynamically determine if the endpoint should be connected to a virtual talk group (VTG) *via* a proxy.

22. The apparatus of claim 20, further comprising an identity determination component that determines an identity associated with the endpoint, the identity

employed by the IS to dynamically determine if the endpoint should be connected to a virtual talk group (VTG) *via* a proxy.

23. A method comprising:
initiating communication with a non-compatible communication device;
identifying information associated with an initiating device; and
negotiating a communication session with an interoperability server (IS) based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS.

24. The method of claim 23, wherein the information associated with the initiating device includes at least one of media capability information associated with the initiating device or an identity of the initiating device.

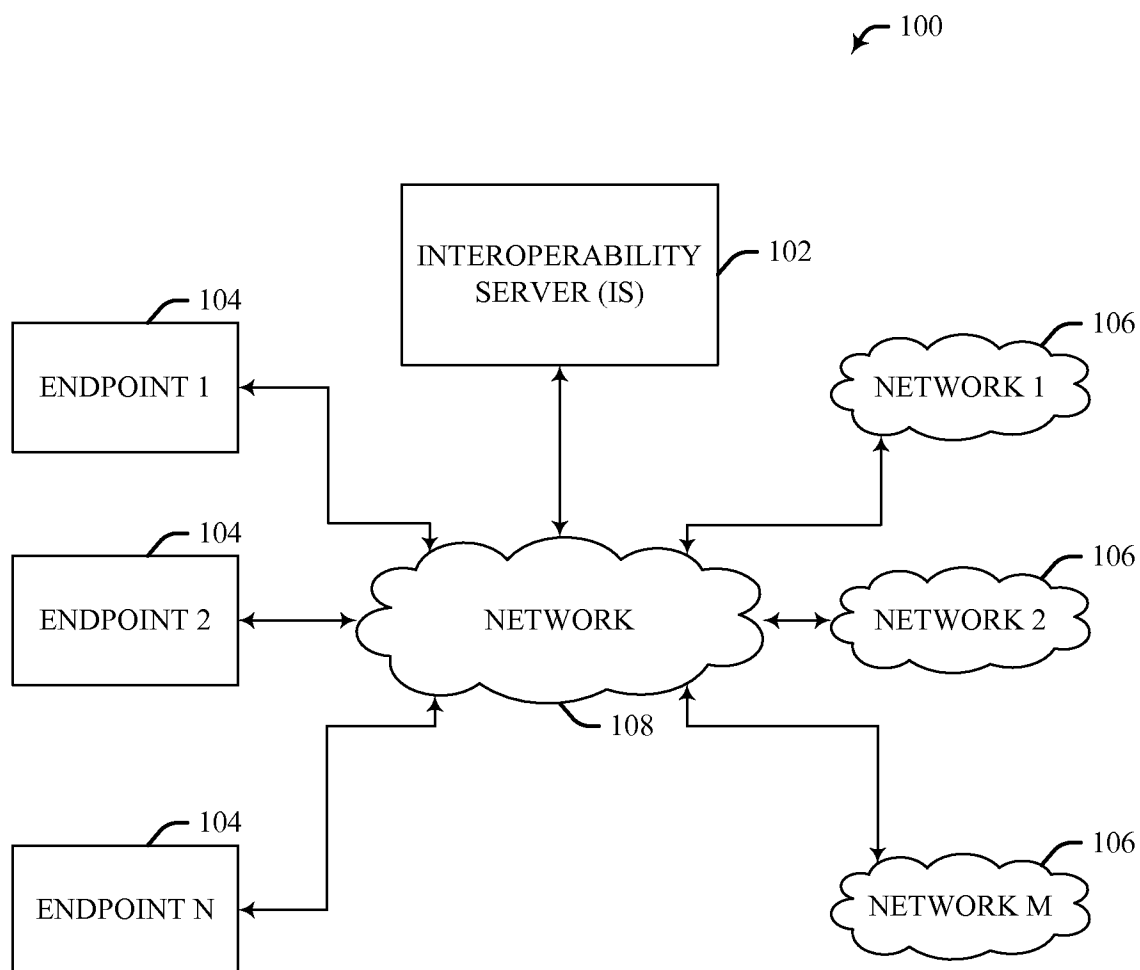
25. The method of claim 23, further comprising evaluating if a proxy is employed to attach the initiating device to a virtual talk group (VTG).

26. The method of claim 25, further comprising transmitting media to the proxy over a private network through custom messages if it is evaluated that a proxy is employed.

27. The method of claim 25, further comprising, attaching the initiating device directly to the VTG and transmitting media directly to the VTG if a proxy is not employed to attach the initiating device to the VTG.

ABSTRACT

A system and methodology to facilitate communication between non-compatible communication devices by utilization of a dynamic media proxy is provided. Information associated with an endpoint, such as, media capabilities, identity and system resource information is collected. Media proxy'ing is performed as part of capability negotiation. A dynamic media proxy is employed based on an analysis of the collected information. An analysis component can identify an endpoint that does not adhere to specific rules of transmission and can dynamically connect such an endpoint to a VTG (virtual talk group) *via* a proxy to prevent the endpoint from transmitting media into an active VTG that already has multiple talkers streaming media. Additionally, the location where media processing can occur can be dynamically determined based on the available system resources.

**FIG. 1**

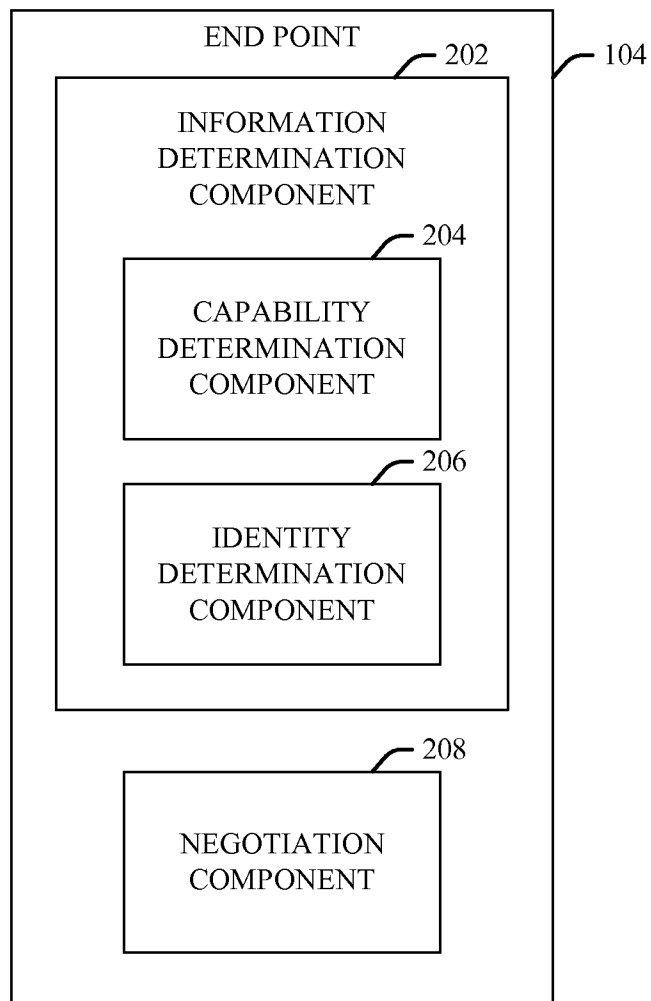


FIG. 2

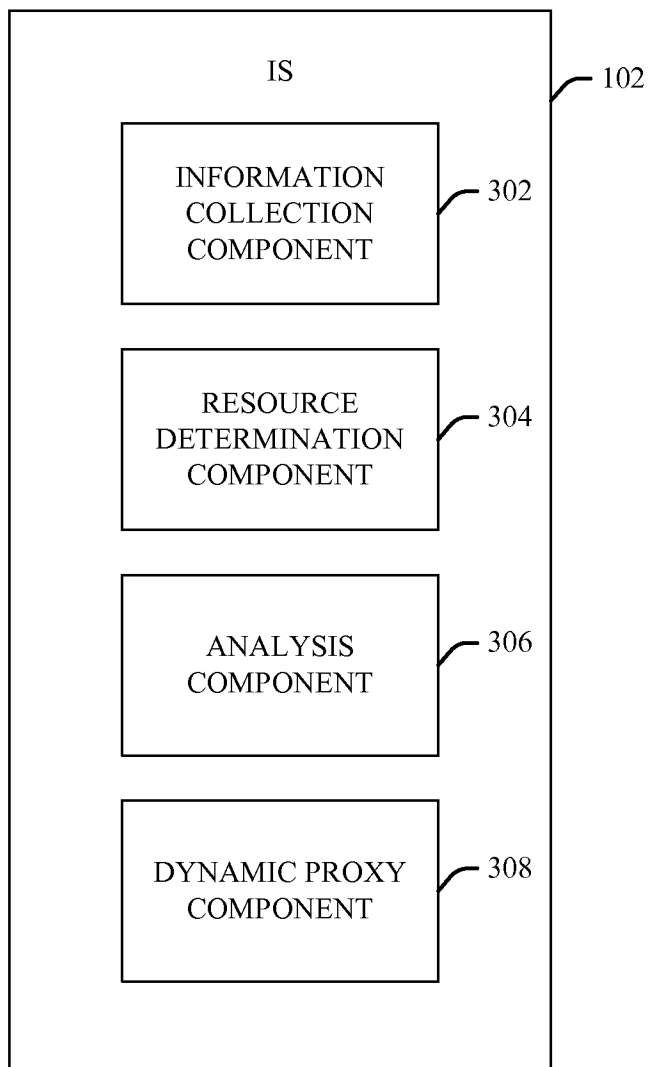


FIG. 3

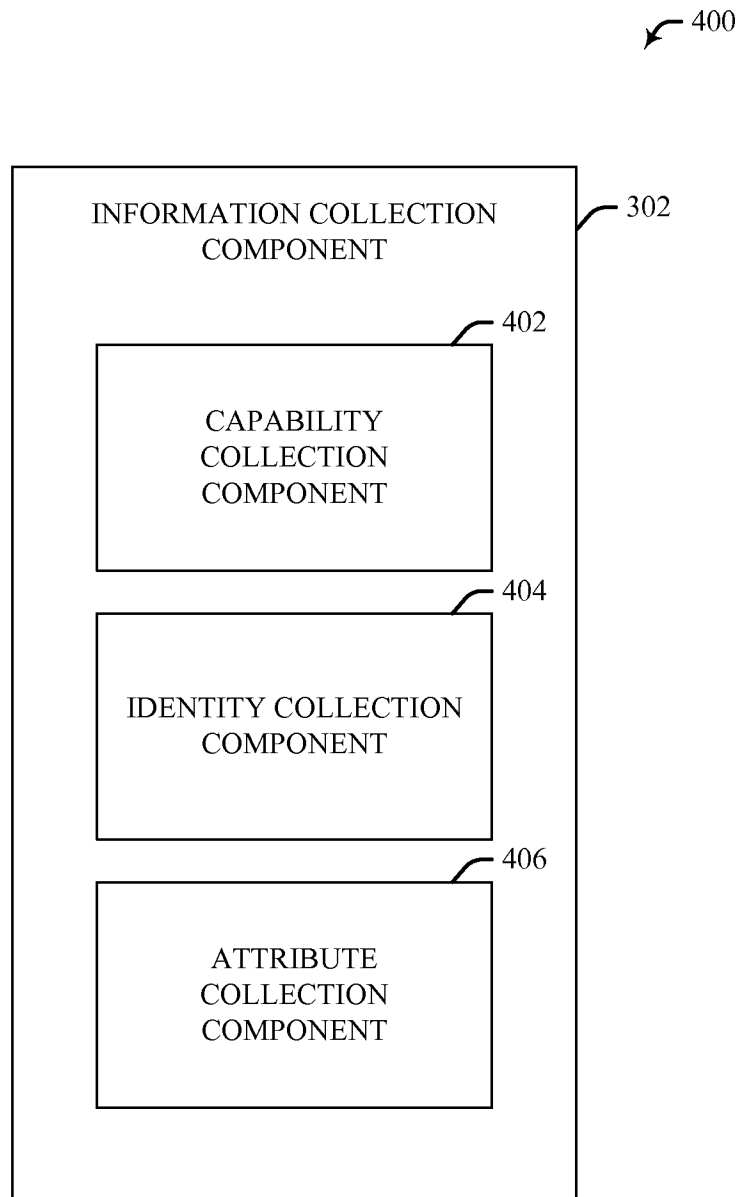


FIG. 4

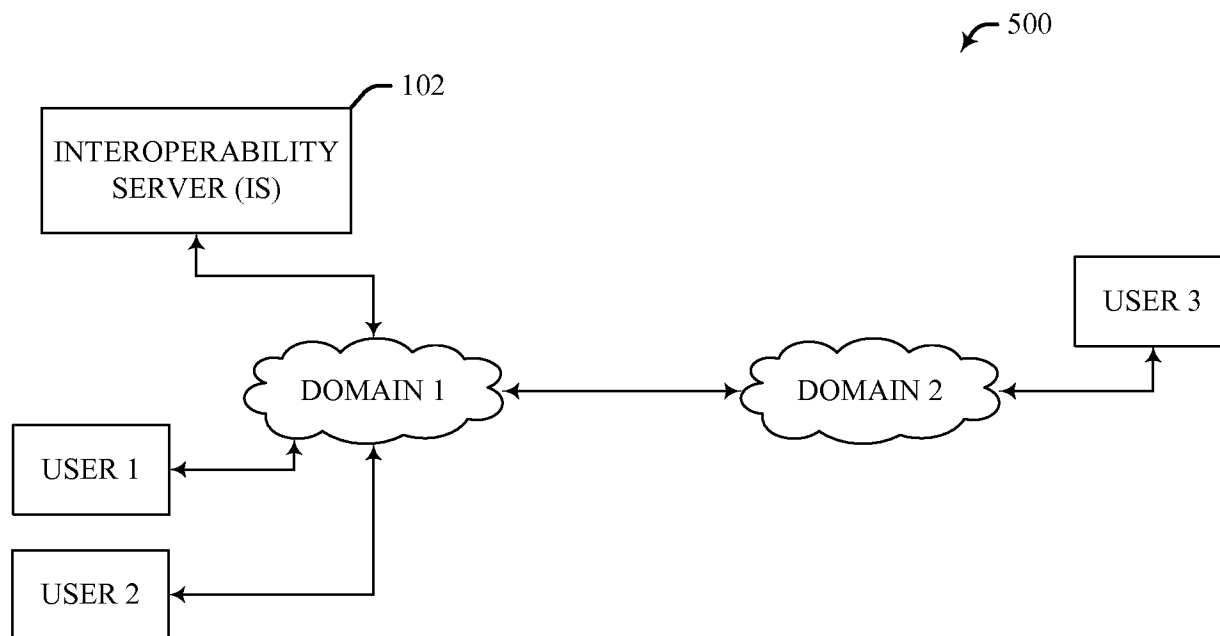


FIG. 5

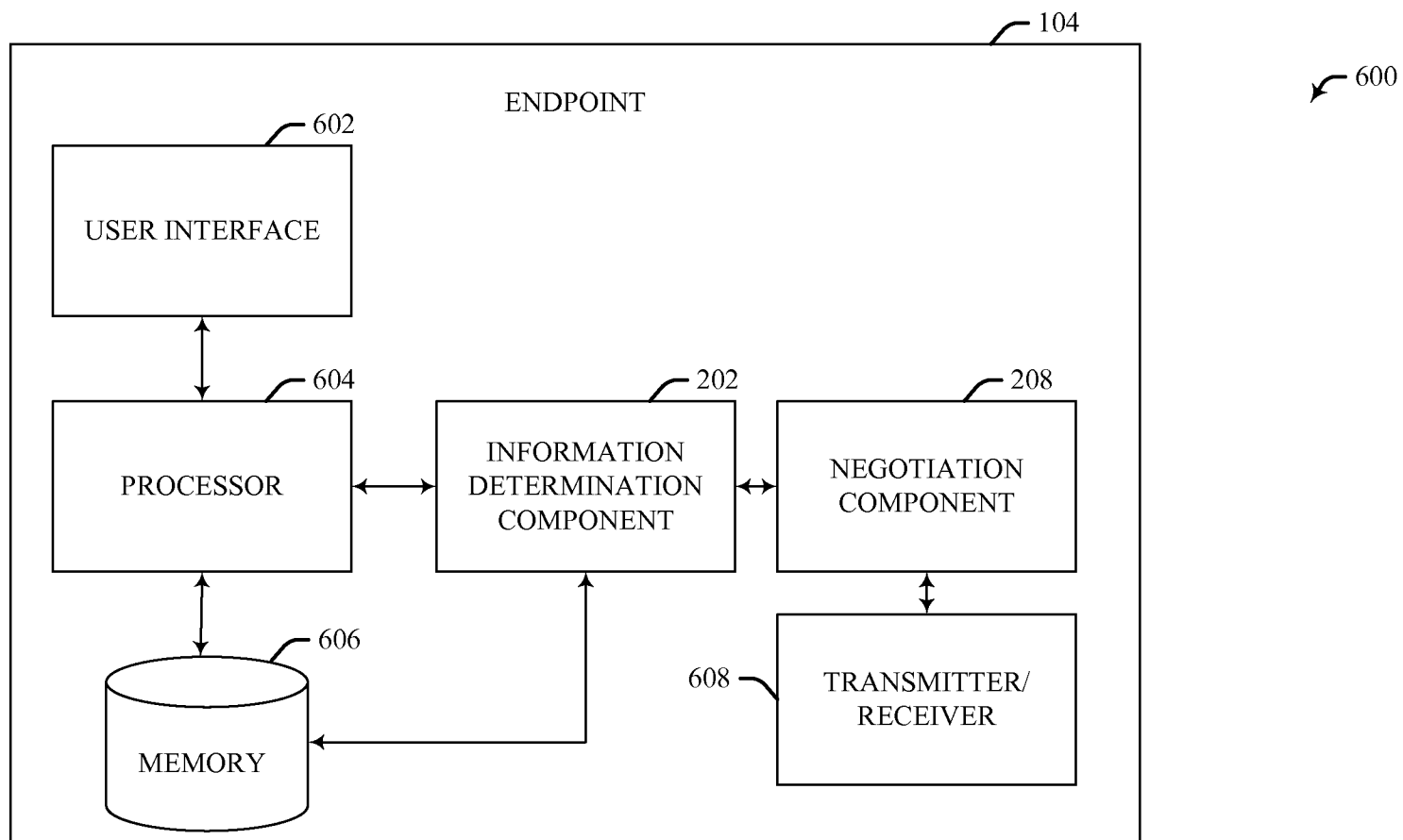
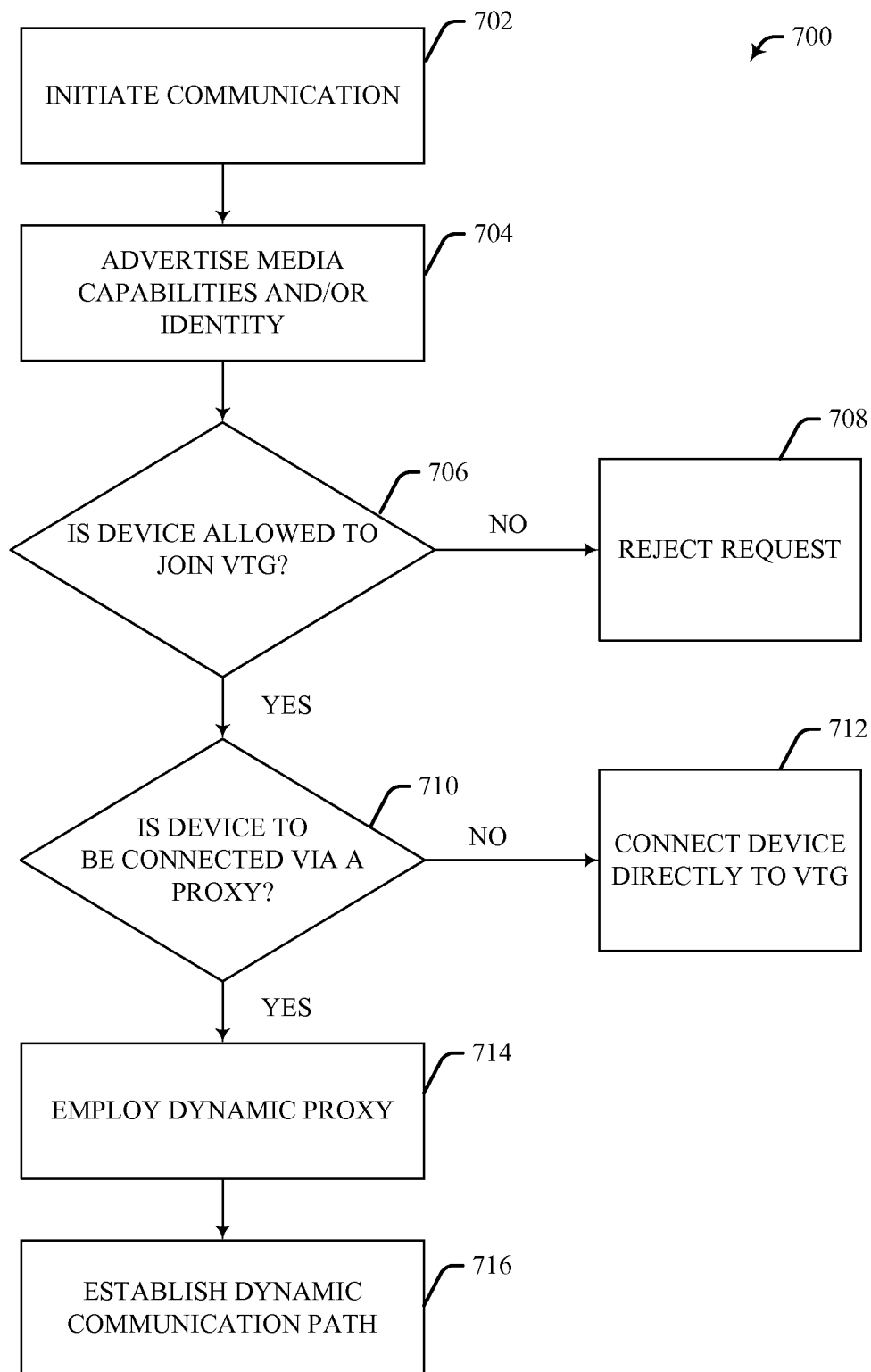
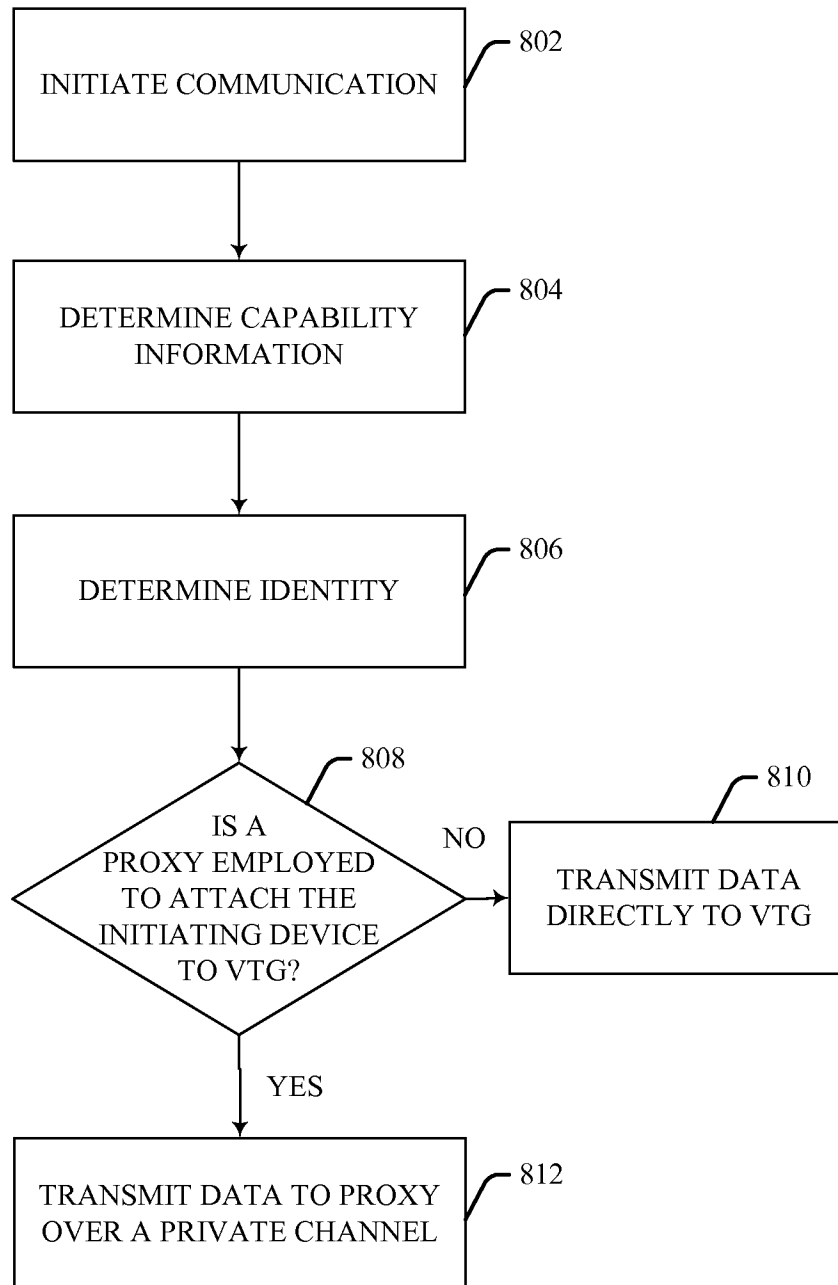


FIG. 6

**FIG. 7**

800

**FIG. 8**

9/11

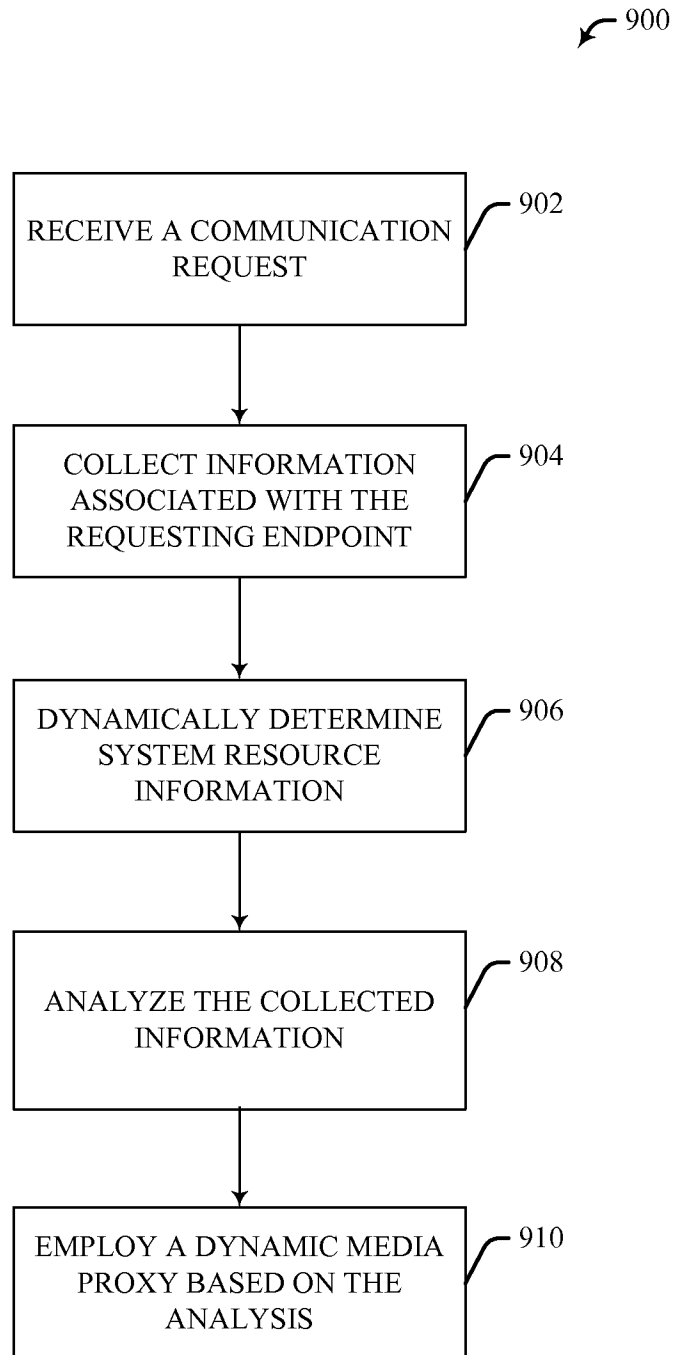
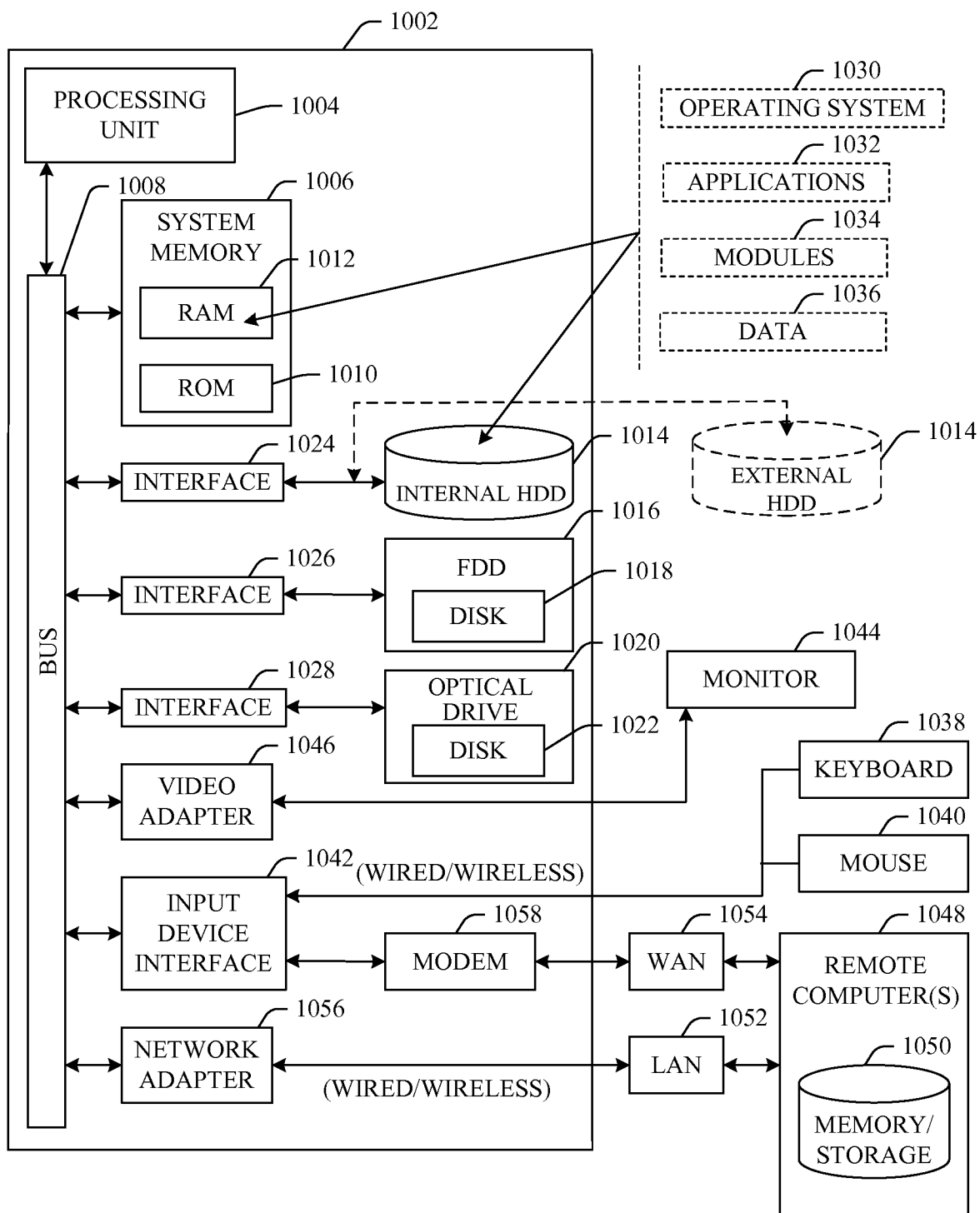
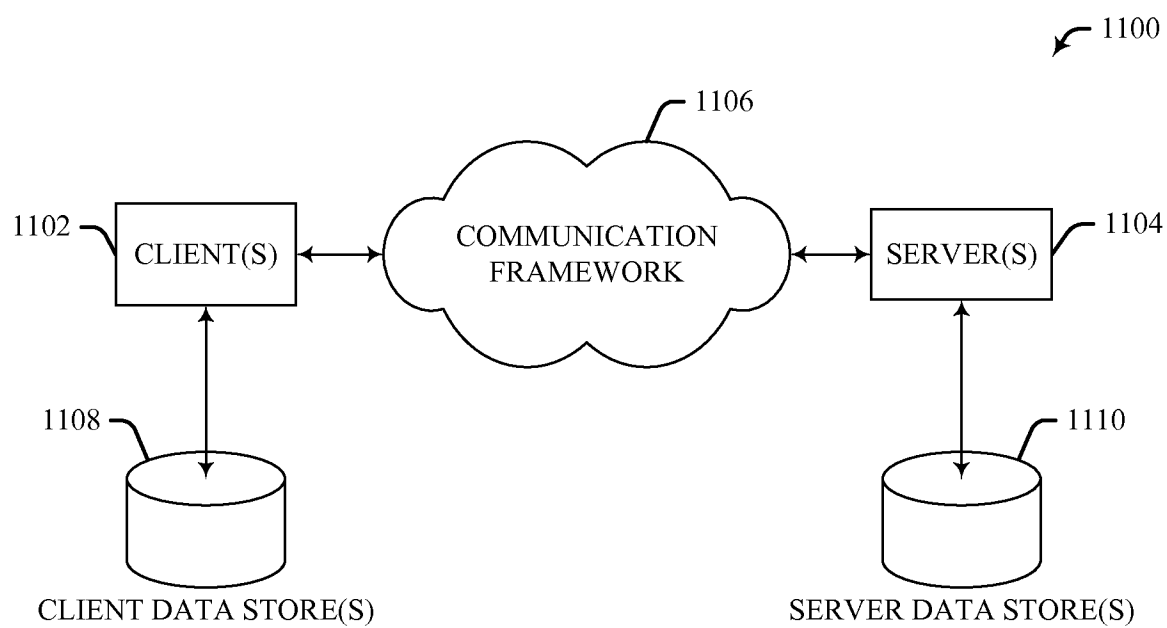


FIG. 9

**FIG. 10**

**FIG. 11**

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	0370.2043DIV (996710)
		Application Number	
Title of Invention	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation		
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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	Shmuel		Shaffer		
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City	Palo Alto	State/Province	CA		
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Inventor 2					Remove
Legal Name					
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Inventor 3					Remove
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Prefix	Given Name	Middle Name	Family Name	Suffix	
	Steven		Christenson		
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0370.2043DIV (996710)	
		Application Number		
Title of Invention	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation			

City	Campbell	State/Province	CA	Country of Residence i	US
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City	Campbell	State/Province	CA		
Postal Code	95008	Country i	US		

Inventor 4

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Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
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Mailing Address of Inventor:

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Customer Number	99499		
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Title of the Invention	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation		
Attorney Docket Number	0370.2043DIV (996710)	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	11	Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0370.2043DIV (996710)
		Application Number	
Title of Invention	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation		

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☐	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.

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This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.			
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Division of	12127397	2008-05-27
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

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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(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(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).			
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0370.2043DIV (996710)
		Application Number	
Title of Invention	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation		

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

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices
If 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 World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application. In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application. In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0370.2043DIV (996710)
		Application Number	
Title of Invention	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation		

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					
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0370.2043DIV (996710)
		Application Number	
Title of Invention	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation		

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First Name	D. Andrew	Last Name	Floam	Registration Number
			34597	

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99499

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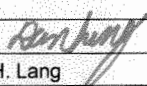
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- ☐ Inventor or Joint Inventor
☐ Legal Representative of a Deceased or Legally Incapacitated Inventor
☒ Assignee or Person to Whom the Inventor is Under an Obligation to Assign
☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document)

SIGNATURE of Applicant for Patent

Signature		Date	9/19/2012
Name	Dan H. Lang	Telephone	408-526-4000
Title and Company	Vice President and Assistant Secretary, Cisco Technology, Inc.		

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	Unknown
First Named Inventor	:	Shmuel Shaffer
Confirmation No.	:	Unknown
Filed	:	Herewith
TC/A.U.	:	Unknown
Examiner	:	Unknown
Customer No.	:	99499
Docket No.	:	0370.2043DIV (996710)
Title	:	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation

INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §§ 1.97 & 1.98

Pursuant to the duty imposed by 37 C.F.R. §1.56 to disclose information which may be material to the patentability of the above-identified patent application, the Applicant would like to direct the Examiner's attention to the documents listed on the enclosed Information Disclosure Citation Form (PTO/SB/08A).

Applicant hereby submits the attached IDS under:

☒ 37 C.F.R. 1.97(b) (i.e., within three months of the filing date of the application; within three months of the date of entry of the national stage application; before the mailing of a first Office action; or before the mailing of a first Office action after the filing of a request for continued examination).

☐ 37 C.F.R. 1.97(c) (i.e., after the mailing of a first Office action, but before the close of prosecution). The IDS is accompanied by *one* of: The appropriate statement (indicated on Form PTO/SB08a) or (2) the fee set forth in § 1.17(p).

☐ 37 C.F.R. 1.97 (d) (i.e., after the close of prosecution, but on or before payment of the issue fee). The IDS is accompanied by *both* of (1) the appropriate statement (indicated on Form PTO/SB08a) and the fee set forth in § 1.17(p).

- ☐ The IDS cites foreign documents not in English. Pursuant to 37 C.F.R. 1.98(a)(3), a concise explanation of the relevance is provided as indicated below:
- ☐ Enclosed is a copy of a non-English publication(s) _____. Applicant submits an English-language version of the search report or action, which cites such non-English language publication(s) and indicates the degree of relevance found by the foreign office.
- ☐ Enclosed is a copy of a non-English publication(s) _____. Applicant submits an English language abstract of the non-English publication(s).
- ☐ Other:
- ☐ The IDS cites foreign patent documents in English and/or Non-Patent Literature (NPL) Documents. Applicant submits a copy of the Abstract or of the complete publication.
- ☐ Pursuant to 37 C.F.R. 1.98(a)(2)(iii), enclosed is a copy of pending patent Application Serial No. _____.
- ☒ No copies of the non-English or non-patent publications listed on the attached Form PTO/SB/08A are being provided pursuant to 37 C.F.R. §1.98(d) because the publications were previously cited by or submitted to the Office in prior Application Serial No. 12/127,397, to which the above-identified application claims priority under 35 U.S.C. §120.

The submission of the listed documents is not intended as an admission that any such document constitutes prior art against the claims of the present application. Applicant does not waive any right to take any action that would be appropriate to antedate or otherwise remove any listed document as a competent reference against the claims of the present application.

The Director is hereby authorized to charge any additional appropriate fees that may be required for the above-identified application, and to credit any overpayment, to Deposit Account No. **05-0460**.

Dated: October 24, 2014

Respectfully submitted by:

EDELL, SHAPIRO & FINNAN, LLC
Customer No. 99499
9801 Washingtonian Blvd., Suite 750
Gaithersburg, MD 20878
(301) 424-3640

/D. Andrew Floam/
D. Andrew Floam
Reg. No. 34597

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		
	First Named Inventor	Shmuel Shaffer	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	0370.2043DIV	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20110004636	A1	2011-01-06	Parkkinen et al.	
	2	20040224668	A1	2004-11-11	Shell et al.	
	3	20070105579	A1	2007-05-10	Shaffer et al.	
	4	20090093235	A1	2009-04-09	Grealish et al.	
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**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number		
Filing Date		
First Named Inventor	Shmuel Shaffer	
Art Unit		
Examiner Name		
Attorney Docket Number	0370.2043DIV	

Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² i	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
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NON-PATENT LITERATURE DOCUMENTS

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	Cisco Systems. Cisco Brings IP Networking to World of Two-Way Radios. http://newsroom.cisco.com/dlls/2005/ts_102405.html . Last accessed June 3, 2008.	☐
	2	Cisco Systems. Enable Communication Interoperability. http://www.cisco.com/en/US/products/ps6712/products_announcement0900aecd803498d8.html . Last accessed June 3, 2008.	☐

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EXAMINER SIGNATURE

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

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

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

Application Number	
Filing Date	
First Named Inventor	Shmuel Shaffer
Art Unit	
Examiner Name	
Attorney Docket Number	0370.2043DIV

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

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

Signature	/D. Andrew Floam/	Date (YYYY-MM-DD)	2014-10-24
Name/Print	D. Andrew Floam	Registration Number	34597

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

Privacy Act Statement

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : Divisional Application of U.S. Application No. 12/127,397
First Named Inventor : Shmuel Shaffer
Confirmation No. : Unknown
Filed : Concurrently Herewith
TC/A.U. : Unknown
Examiner : Unknown
Customer No. : 99499
Docket No. : 0370.2043DIV (996710)
Title : INTEROPERABILITY AND COMMUNICATIONS SYSTEM
DYNAMIC MEDIA PROXY BASED ON CAPABILITY
NEGOTIATION

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

PRELIMINARY AMENDMENT

Sir:

Prior to examination of the above-identified patent application, please amend the above-identified application as follows:

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

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

Remarks begin on page 7 of this paper.

Amendments to the Specification:

On Page 1, after the title, please insert the following paragraph and header:

--RELATED APPLICATIONS

This application is a divisional application of U.S. Patent Application No. 12/127,397, filed on May 27, 2008, the entirety of which is incorporated herein by reference.--

Amendments to the Claims:

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

1.-19. (Canceled)

20. (Currently Amended) An apparatus comprising:

an information determination component that identifies information related to an endpoint to obtain identified information; and

a negotiation component that negotiates a communication session with an interoperability server (IS) based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS.

21. (Original) The apparatus of claim 20, further comprising a capability determination component that identifies media capabilities associated with the endpoint, the media capabilities employed by the IS to dynamically determine if the endpoint should be connected to a virtual talk group (VTG) *via* a proxy.

22. (Original) The apparatus of claim 20, further comprising an identity determination component that determines an identity associated with the endpoint, the identity employed by the IS to dynamically determine if the endpoint should be connected to a virtual talk group (VTG) *via* a proxy.

23. (Original) A method comprising:

initiating communication with a non-compatible communication device;
identifying information associated with an initiating device; and
negotiating a communication session with an interoperability server (IS) based in part on at least one of the identified information or a predefined floor control mechanism associated with the IS.

24. (Original) The method of claim 23, wherein the information associated with the initiating device includes at least one of media capability information associated with the initiating device or an identity of the initiating device.

25. (Original) The method of claim 23, further comprising evaluating if a proxy is employed to attach the initiating device to a virtual talk group (VTG).

26. (Original) The method of claim 25, further comprising transmitting media to the proxy over a private network through custom messages if it is evaluated that a proxy is employed.

27. (Original) The method of claim 25, further comprising, attaching the initiating device directly to the VTG and transmitting media directly to the VTG if a proxy is not employed to attach the initiating device to the VTG.

28. (New) The apparatus of claim 21, further comprising a transmitter, wherein the transmitter transmits data to the virtual talk group if it is determined that a proxy is not employed to connect the endpoint to the virtual talk group.

29. (New) The apparatus of claim 21, further comprising a transmitter, wherein the transmitter transmits data to the proxy over a private channel if it is determined that the proxy is employed to connect the endpoint to the virtual talk group.

30. (New) An endpoint comprising:

a transmitter and a receiver;

a user interface;

a processor coupled to the user interface, wherein the processor:

identifies information related to the endpoint; and

negotiates a communication session with an interoperability server based in part on at least one of the identified information or a predefined floor control mechanism associated with the interoperability server.

31. (New) The endpoint of claim 30, wherein the processor identifies media capabilities associated with the endpoint, the media capabilities employed by the interoperability server to dynamically determine if the endpoint should be connected to a virtual talk group via a proxy.

32. (New) The endpoint of claim 30, wherein the processor determines an identity associated with the endpoint, the identity employed by the interoperability server to dynamically determine if the endpoint should be connected to a virtual talk group via a proxy.

33. (New) The endpoint of claim 30, wherein the processor causes the transmitter to transmit data to the virtual talk group if it is determined that a proxy is not employed to connect the endpoint to the virtual talk group.

34. (New) The endpoint of claim 30, wherein the processor causes the transmitter to transmit data to the proxy over a private channel if it is determined that the proxy is employed to connect the endpoint to the virtual talk group.

35. (New) A non-transitory computer readable storage media comprising instructions that, when executed by a processor, cause the processor to perform operations comprising:

- initiating communication with a non-compatible communication device;
- identifying information associated with an initiating device; and
- negotiating a communication session with an interoperability server based in part on at least one of the identified information or a predefined floor control mechanism associated with the interoperability server.

36. (New) The non-transitory computer readable storage media of claim 35, wherein the information associated with the initiating device includes at least one of media capability information associated with the initiating device or an identity of the initiating device.

37. (New) The non-transitory computer readable storage media of claim 36, further comprising instructions operable to cause the processor to evaluate if a proxy is employed to attach the initiating device to a virtual talk group.

38. (New) The non-transitory computer readable storage media of claim 36, further comprising instructions operable to cause the processor to transmit media to the proxy over a private network through messages if it is evaluated that a proxy is employed.

39. (New) The non-transitory computer readable storage media of claim 36, further comprising instructions operable to cause the processor to connect the initiating device directly to the virtual talk group and to transmit media directly to the virtual talk group if a proxy is not employed to attach the initiating device to the virtual talk group.

REMARKS

The foregoing amendments to the specification are made in order to insert a reference to the parent application for purposes of claiming priority in this divisional application to the parent application. Furthermore, claims 1-19 originally filed in the parent application are canceled, claim 20 is amended, and new claims 28-39 are added. Thus, claims 20-39 are pending in this application. No new matter has been added.

Early and favorable action on the merits is respectfully solicited.

Applicants hereby petition for any extension of time that may be necessary to maintain the pendency of this application. The Commissioner is hereby authorized to charge payment of any additional fees required for the above-identified application or credit any overpayment to Deposit Account No. 05-0460.

Dated: October 24, 2014

Respectfully submitted by:

EDELL, SHAPIRO & FINNAN, LLC
CUSTOMER NO. 99499
9801 Washingtonian Blvd., Suite 750
Gaithersburg, MD 20878
(301) 424-3640

/D. Andrew Floam/
D. Andrew Floam
Reg. No. 34,597

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation			
First Named Inventor/Applicant Name:	Shmuel Shaffer			
Filer:	D. Andrew Floam/Aja Turesko			
Attorney Docket Number:	0370.2043DIV (996710)			
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	280	280
Utility Search Fee	1111	1	600	600
Utility Examination Fee	1311	1	720	720
Pages:				
Claims:				
Independent claims in excess of 3	1201	1	420	420
Miscellaneous-Filing:				
Late Filing Fee for Oath or Declaration	1051	1	140	140

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2160

Electronic Acknowledgement Receipt

EFS ID:	20512156
Application Number:	14523299
International Application Number:	
Confirmation Number:	1015
Title of Invention:	Interoperability and Communications System Dynamic Media Proxy Based on Capability Negotiation
First Named Inventor/Applicant Name:	Shmuel Shaffer
Customer Number:	99499
Filer:	D. Andrew Floam/Aja Turesko
Filer Authorized By:	D. Andrew Floam
Attorney Docket Number:	0370.2043DIV (996710)
Receipt Date:	24-OCT-2014
Filing Date:	
Time Stamp:	16:02:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$2160
RAM confirmation Number	2463
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part / zip	Pages (if appl.)
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1	Transmittal of New Application	ConAppXml.pdf	127575	no	2
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Warnings:					
Information:					
2		ApplicationTextCPOL996710.pdf	355089	yes	28
			cb4f1b2a0b065af61d6ea2f2be65632c4cc2831f		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	23	
	Claims		24	27	
	Abstract		28	28	
Warnings:					
Information:					
3	Drawings-other than black and white line drawings	FiguresCPOL996710.pdf	86781	no	11
			f9e196af584aac971954afab857a3731e8267a0e		
Warnings:					
Information:					
4	Application Data Sheet	ApplicationDataSheet.pdf	1509661	no	7
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Warnings:					
Information:					
5	Power of Attorney	SignedCiscoPOA.PDF	89781	no	1
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Warnings:					
Information:					
6	Transmittal Letter	IDSxml.pdf	189881	no	2
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Warnings:					
Information:					
7	Information Disclosure Statement (IDS) Form (SB08)	IDSSB08a.pdf	612302	no	4
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Warnings:					
Information:					

8		PreliminaryAmendment.pdf	143334 e26648d12320e6dc0c196b57772d54ec99e f564e	yes	7
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	Document Description		Start	End	
	Preliminary Amendment		1	1	
	Specification		2	2	
	Claims		3	6	
	Applicant Arguments/Remarks Made in an Amendment		7	7	
Warnings:					
Information:					
9	Fee Worksheet (SB06)	fee-info.pdf	38400 c49b57ff4dd26f45ab45fb3f3847a2949e8f4 c2b	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			3152804		
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/523,299	Filing Date 10/24/2014	☐ To be Mailed
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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), (i), 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(i))	minus 20 =	*		X \$ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		X \$ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$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)

	10/24/2014	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0		X \$80 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0		X \$420 =	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)

		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)	ADDITIONAL FEE (\$)
AMENDMENT	Total (37 CFR 1.16(i))	*	Minus	**	=		X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		X \$ =	
	☐ 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.

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

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

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

LIE
/CORALIA BETANCOURT/

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