



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/513,510	05/05/2009	Avi Oron	GLIA -027US

CONFIRMATION NO. 3332

POA ACCEPTANCE LETTER

98618
BrainSpark Associates, LLC
528 South Meadows Drive
Chandler, AZ 85224



Date Mailed: 08/24/2018

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/07/2018.

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

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

/deelliott/



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Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/513,510	05/05/2009	Avi Oron	46203

67801
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

CONFIRMATION NO. 3332 POWER OF ATTORNEY NOTICE



OC000000101805066

Date Mailed: 08/24/2018

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/07/2018.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71.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

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

/deelliott/

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	12/513,510
Filing Date	05-05-2009
First Named Inventor	Avi Oron
Title	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS
Art Unit	2472
Examiner Name	LEE, CHI HO A
Attorney Docket Number	GLIA-027US

SIGNATURE of Applicant or Patent Practitioner

Signature	/Joseph J. Basista/	Date (Optional)	
Name	Joseph J. Basista	Registration Number	42301
Title (if Applicant is a juristic entity)	Attorney of Record		
Applicant Name (if Applicant is a juristic entity)	SELECTIVE SIGNALS, LLC		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐

*Total of _____ forms are submitted.

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

GENERAL POWER OF ATTORNEY

I/WE hereby appoint the practitioners associated with the Customer Number: **98618**

with the firm: **BRAINSPARK ASSOCIATES, LLC**
528 S. Meadows Drive
Chandler, AZ 85224
United States

As attorneys to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications where the assignee is named as an applicant or where the applications are assigned to the undersigned according to the USPTO assignment records or assignment documents, in which case the details will be listed on an attached form in accordance with 37 C.F.R. 3.73(c).

Address all correspondence to: **Customer Number 98618**

Direct all Telephone Calls to: **650-924-9270**

Direct all Facsimiles to: **480-535-9269**

Direct all emails to: **info@brainsparkassociates.com**

Full Name and
Registered Address
of Assignee

Selective Signals, LLC
1055 E. Colorado Boulevard, Suite 500
Pasadena, CA 91106

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Date

Dated this 17th day of July 2018

Signature of
Assignee



Printed Name of
Signatory

Katherine Huen

Title of Signatory

Chief Financial Officer

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)Applicant/Patent Owner: Avi OronApplication No./Patent No.: 12/513,510Filed/Issue Date: 05-05-2009Titled: MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKSSELECTIVE SIGNALS, LLC, a Corporation

(Name of Assignee)

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

states that, for the patent application/patent identified above, it is (choose one of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose one of options A or B below):

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Inventor To: I-SPADE TECHNOLOGIES LTD.The document was recorded in the United States Patent and Trademark Office at
Reel 022729, Frame 0973, or for which a copy thereof is attached.2. From: I-SPADE TECHNOLOGIES LTD. To: InventorThe document was recorded in the United States Patent and Trademark Office at
Reel 036234, Frame 0744, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

IPR2018-00594
Exhibit 2015

STATEMENT UNDER 37 CFR 3.73(c)3. From: Inventor To: SELECTIVE SIGNALS, LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 042494, Frame 0021, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

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

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

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

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

/Joseph J. Basista/

7 August 2018

Signature

Date

Joseph J. Basista

42301

Printed or Typed Name

Title or Registration 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.

Electronic Acknowledgement Receipt

EFS ID:	33392439
Application Number:	12513510
International Application Number:	
Confirmation Number:	3332
Title of Invention:	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS
First Named Inventor/Applicant Name:	Avi Oron
Customer Number:	67801
Filer:	Joseph John Basista
Filer Authorized By:	
Attorney Docket Number:	46203
Receipt Date:	07-AUG-2018
Filing Date:	05-MAY-2009
Time Stamp:	10:08:06
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	GLIA-027US-Form82A-aia0082.pdf	174233 b152df794a99326f9afc00e993a01a44eae2e324	no	1

Warnings:

IPR2018-00594

Exhibit 2015

Information:					
2	Power of Attorney	GLIA-027US-GPOA-SelectiveSignalsLLC-executed-embedded.pdf	144716	no	1
			384b5e63839e867c09a7d4807535184d59d7c060		
Warnings:					
Information:					
3	Assignee showing of ownership per 37 CFR 3.73	GLIA-027US-373Statement-aia0096.pdf	122310	no	3
			cba86a6e98da3c0c7c707f5b21ae8deb5511e3d2		
Warnings:					
Information:					
Total Files Size (in bytes):			441259		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
---	---

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Tyler Division on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 6:17-cv-66	DATE FILED 1/31/2017	U.S. DISTRICT COURT Eastern District of Texas, Tyler Division
PLAINTIFF SELECTIVE SIGNALS, LLC		DEFENDANT ROHDE & SCHWARZ USA, INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,111,629	2/7/2012	SELECTIVE SIGNALS, LLC
2		
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT		
CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

IPR2018-00594
Exhibit 2015

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Tyler Division on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 6:17-cv-67	DATE FILED 1/31/2017	U.S. DISTRICT COURT Eastern District of Texas, Tyler Division
PLAINTIFF SELECTIVE SIGNALS, LLC		DEFENDANT WATCHGUARD TECHNOLOGIES, INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,111,629	2/7/2012	SELECTIVE SIGNALS, LLC
2		
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

IPR2018-00594
Exhibit 2015

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Tyler Division on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 6:17-cv-64	DATE FILED 1/31/2017	U.S. DISTRICT COURT Eastern District of Texas, Tyler Division
PLAINTIFF SELECTIVE SIGNALS, LLC		DEFENDANT FORTINET, INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,111,629	2/7/2012	SELECTIVE SIGNALS, LLC
2		
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

IPR2018-00594
Exhibit 2015

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Tyler Division on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 6:17-cv-65	DATE FILED 1/31/2017	U.S. DISTRICT COURT Eastern District of Texas, Tyler Division
PLAINTIFF SELECTIVE SIGNALS, LLC		DEFENDANT PALO ALTO NETWORKS, INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,111,629	2/7/2012	SELECTIVE SIGNALS, LLC
2		
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

IPR2018-00594
Exhibit 2015

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Tyler Division on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 6:17-cv-66	DATE FILED 1/31/2017	U.S. DISTRICT COURT Eastern District of Texas, Tyler Division
PLAINTIFF SELECTIVE SIGNALS, LLC		DEFENDANT ROHDE & SCHWARZ USA, INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,111,629	2/7/2012	SELECTIVE SIGNALS, LLC
2		
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

IPR2018-00594
 Exhibit 2015

CERTIFICATION OF MICRO ENTITY STATUS (GROSS INCOME BASIS)				
Application Number or Control Number (if applicable): 12/513,510		Patent Number (if applicable): 8,111,629		
First Named Inventor: Avi ORON		Title of Invention: MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS		
The applicant hereby certifies the following—				
<p>(1) SMALL ENTITY REQUIREMENT – The applicant qualifies as a small entity as defined in 37 CFR 1.27.</p> <p>(2) APPLICATION FILING LIMIT – Neither the applicant nor the inventor nor a joint inventor has been named as the inventor or a joint inventor on more than four previously filed U.S. patent applications, excluding provisional applications and international applications under the Patent Cooperation Treaty (PCT) for which the basic national fee under 37 CFR 1.492(a) was not paid, and also excluding patent applications for which the applicant has assigned all ownership rights, or is obligated to assign all ownership rights, as a result of the applicant's previous employment.</p> <p>(3) GROSS INCOME LIMIT ON APPLICANTS AND INVENTORS – Neither the applicant nor the inventor nor a joint inventor, in the calendar year preceding the calendar year in which the applicable fee is being paid, had a gross income, as defined in section 61(a) of the Internal Revenue Code of 1986 (26 U.S.C. 61(a)), exceeding the "Maximum Qualifying Gross Income" reported on the USPTO Web site at http://www.uspto.gov/patents/law/micro_entity.jsp which is equal to three times the median household income for that preceding calendar year, as most recently reported by the Bureau of the Census.</p> <p>(4) GROSS INCOME LIMIT ON PARTIES WITH AN "OWNERSHIP INTEREST" – Neither the applicant nor the inventor nor a joint inventor has assigned, granted, or conveyed, nor is under an obligation by contract or law to assign, grant, or convey, a license or other ownership interest in the application concerned to an entity that, in the calendar year preceding the calendar year in which the applicable fee is being paid, had a gross income, as defined in section 61(a) of the Internal Revenue Code of 1986, exceeding the "Maximum Qualifying Gross Income" reported on the USPTO Web site at http://www.uspto.gov/patents/law/micro_entity.jsp which is equal to three times the median household income for that preceding calendar year, as most recently reported by the Bureau of the Census.</p>				
SIGNATURE by an <u>authorized party</u> set forth in 37 CFR 1.33(b)				
Signature		/Jason H. Rosenblum/		
Name		Jason H. Rosenblum		
Date	July 26, 2015	Telephone	718.930.5399	Registration No. 56437
<input type="checkbox"/>	There is more than one inventor and I am one of the inventors who are jointly identified as the applicant. The required additional certification form(s) signed by the other joint inventor(s) are included with this form.			

Privacy Act Statement

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

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

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

Electronic Acknowledgement Receipt

EFS ID:	23023980
Application Number:	12513510
International Application Number:	
Confirmation Number:	3332
Title of Invention:	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS
First Named Inventor/Applicant Name:	Avi Oron
Customer Number:	67801
Filer:	Jason Harris Rosenblum/Robert Shein
Filer Authorized By:	Jason Harris Rosenblum
Attorney Docket Number:	46203
Receipt Date:	26-JUL-2015
Filing Date:	05-MAY-2009
Time Stamp:	03:43:07
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Certification of Micro Entity (Gross Income Basis)	46203AssertMicroEntitystatusForm.pdf	101108 14a11b2a81cf2dc6fb8be1b7ea81fdfed729ac6b	no	2

Warnings:

Information:

IPR2018-00594

Exhibit 2015

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/513,510	02/07/2012	8111629	46203	3332

67801 7590 01/18/2012
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

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 155 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):

Avi Oron, Moshav Yahad - Doar Na Misgav, ISRAEL;

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)

67801 7590 11/09/2011
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

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

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being 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.
12/513,510	05/05/2009	Avi Oron	46203	3332

TITLE OF INVENTION: MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$870	\$300	\$0	\$1170	02/09/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
LEE, CHI HO A	2472	370-252000

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

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 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 _____

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)

I-Spade Technologies Ltd.

Bat-Yam, Israel

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 credit any overpayment, to Deposit Account Number 50-1407 (enclose an extra copy of this form).

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

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Jason H. Rosenblum/

Date January 4, 2012

Typed or printed name Jason H. Rosenblum

Registration No. 56,437

This collection of information 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.

Electronic Patent Application Fee Transmittal

Application Number:	12513510			
Filing Date:	05-May-2009			
Title of Invention:	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS			
First Named Inventor/Applicant Name:	Avi Oron			
Filer:	Jason Harris Rosenblum/Dorit Handrus			
Attorney Docket Number:	46203			
Filed as Small Entity				
U.S. National Stage under 35 USC 371 Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	2501	1	870	870
Publ. Fee- early, voluntary, or normal	1504	1	300	300

IPR2018-00594

Exhibit 2015

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1170

Electronic Acknowledgement Receipt

EFS ID:	11752830
Application Number:	12513510
International Application Number:	
Confirmation Number:	3332
Title of Invention:	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS
First Named Inventor/Applicant Name:	Avi Oron
Customer Number:	67801
Filer:	Jason Harris Rosenblum/Dorit Handrus
Filer Authorized By:	Jason Harris Rosenblum
Attorney Docket Number:	46203
Receipt Date:	04-JAN-2012
Filing Date:	05-MAY-2009
Time Stamp:	09:19:45
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$1170
RAM confirmation Number	8963
Deposit Account	501407
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part / Zip (if appl.)	Pages (if appl.)
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IPR2018-00594
Exhibit 2015

1	Issue Fee Payment (PTO-85B)	46203_Issue_Fee_Transmittal_i n_res_to_Notice_of_Allowance _dated_09-Nov-2011.pdf	75496 ce00bb7826f46a486773f9cd0d31a357852 71db4	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	31688 d34b9425d8452ada1b46ccb3c281b157b2 9d84d8	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			107184		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					



UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

67801 7590 11/09/2011
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

EXAMINER

LEE, CHI HO A

ART UNIT

PAPER NUMBER

2472

DATE MAILED: 11/09/2011

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

12/513,510

05/05/2009

Avi Oron

46203

3332

TITLE OF INVENTION: MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$870	\$300	\$0	\$1170	02/09/2012

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 SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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.

67801 7590 11/09/2011
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

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.
-----------------	-------------	----------------------	---------------------	------------------

12/513,510

05/05/2009

Avi Oron

46203

3332

TITLE OF INVENTION: MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$870	\$300	\$0	\$1170	02/09/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
LEE, CHI HO A	2472	370-252000

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

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 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 credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information 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.

IPR2018-00594



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/513,510	05/05/2009	Avi Oron	46203	3332
67801 7590 11/09/2011 MARTIN D. MOYNIHAN d/b/a PRTSI, INC. P.O. BOX 16446 ARLINGTON, VA 22215			EXAMINER LEE, CHI HO A	
			ART UNIT 2472	PAPER NUMBER
DATE MAILED: 11/09/2011				

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

The Patent Term Adjustment to date is 155 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 155 day(s).

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 Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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.	Applicant(s)	
	12/513,510	ORON, AVI	
	Examiner	Art Unit	
	ANDREW LEE	2472	

-- 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 914/11.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are 1-24.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of 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. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
 - (b) ☐ 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).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date ____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date ____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other ____. |

/ANDREW LEE/
Primary Examiner, Art Unit 2472

Issue Classification 	Application/Control No.		Applicant(s)/Patent under Reexamination	
	12/513,510		ORON, AVI	
	Examiner		Art Unit	
	ANDREW LEE		2472	

ISSUE CLASSIFICATION											
ORIGINAL					CROSS REFERENCE(S)						
CLASS		SUBCLASS			CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					
370		252			370	392					
INTERNATIONAL CLASSIFICATION					709	228					
H	0	4	J	1/16							
H	0	4	L	12/28							
				/							
				/							
				/							
(Assistant Examiner) (Date)					/ANDREW LEE/ Primary Examiner, Art Unit 2472 11/5/11					Total Claims Allowed: 24	
(Legal Instruments Examiner) (Date)					(Primary Examiner) (Date)					O.G. Print Claim(s) 1	O.G. Print Fig. 1

<input checked="" type="checkbox"/> Claims renumbered in the same order as presented by applicant										<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47		
Final	Original		Final	Original		Final	Original		Final	Original		Final	Original		Final	Original
	1			31			61			121			151			181
	2			32			62			122			152			182
	3			33			63			123			153			183
	4			34			64			124			154			184
	5			35			65			125			155			185
	6			36			66			126			156			186
	7			37			67			127			157			187
	8			38			68			128			158			188
	9			39			69			129			159			189
	10			40			70			130			160			190
	11			41			71			131			161			191
	12			42			72			132			162			192
	13			43			73			133			163			193
	14			44			74			134			164			194
	15			45			75			135			165			195
	16			46			76			136			166			196
	17			47			77			137			167			197
	18			48			78			138			168			198
	19			49			79			139			169			199
	20			50			80			140			170			200
	21			51			81			141			171			201
	22			52			82			142			172			202
	23			53			83			143			173			203
	24			54			84			144			174			204
	25			55			85			145			175			205
	26			56			86			146			176			206
	27			57			87			147			177			207
	28			58			88			148			178			208
	29			59			89			149			179			209
	30			60			90			150			180			210

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Application Number	12/513,510
Filing Date	May 05, 2009
First Named Inventor	ORON Avi
Art Unit	2472
Examiner Name	LEE Chi Ho A.
Attorney Docket Number	46203

Sheet	1	of	2	Attorney Docket Number	46203
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[illegible]

Examiner Initials*	Cite No. ¹	Foreign Patent Documents	Publication Date DD-MMM-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	Other
		Country Code ² Number ⁴ Kind Code ⁵ (if known)				

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

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

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Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>				Complete if Known	
				Application Number	12/513,510
				Filing Date	May 05, 2009
				First Named Inventor	ORON Avi
				Group Art Unit	2472
				Examiner Name	LEE Chi Ho A.
Sheet	2	Of	2	Attorney Docket Number	46203
OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS					
Examiner Initials	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.			T ²
/A.L./	1	Response Dated 08 August 2011 to Communication Pursuant to Rules 70(2) and 70a(2) EPC of 08 February 2011 From the European Patent Office Re. Application No. 07827310.9.			

Examiner Signature	/Andrew Lee/	Date Considered	11/06/2011
-----------------------	--------------	--------------------	------------

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

¹ Applicant's unique citation designation number (optional).

² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

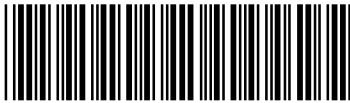
⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

⁶ Applicant is to place a check mark here if English language translation is attached.

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

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

Search Notes

Application/Control No.

12/513,510

Examiner

ANDREW LEE

Applicant(s)/Patent under
Reexamination

ORON, AVI

Art Unit

2472

SEARCHED

Class	Subclass	Date	Examiner

INTERFERENCE SEARCHED

Class	Subclass	Date	Examiner
See EAST		11/5/2011	AL

**SEARCH NOTES
(INCLUDING SEARCH STRATEGY)**

	DATE	EXMR
Updated Search Inventor and Interference Search See EAST	11/5/2011	AL

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	7	ORON adj AVI. in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/06 15:41
L2	19331	370/252	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/06 15:41
L3	10578	709/228	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/06 15:42
L4	15710	370/392	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/06 15:42
L5	7	(session with (compar\$4 determin\$4 extract\$4) with (packet cell frame) with (similar probab \$7 neural common) with group\$4).clm.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/06 15:45
L6	39	(session with (compar\$4 determin\$4 extract\$4) with (packet cell frame) with (similar probab \$7 neural common)).clm.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/06 15:45

L7	1	6 and 1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/06 15:45
L8	9	6 and (2 3 4)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/11/06 15:45

11/ 6/ 2011 3:49:31 PM

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[illegible]

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

¹ Applicant's unique citation designation number (optional).

² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04, 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

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Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>				Complete if Known	
				Application Number	12/513,510
				Filing Date	May 05, 2009
				First Named Inventor	ORON Avi
				Group Art Unit	2472
				Examiner Name	LEE Chi Ho A.
Sheet	2	Of	2	Attorney Docket Number	46203
OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS					
Examiner Initials	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.			T ²
	1	Response Dated 08 August 2011 to Communication Pursuant to Rules 70(2) and 70a(2) EPC of 08 February 2011 From the European Patent Office Re. Application No. 07827310.9.			

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

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

¹ Applicant's unique citation designation number (optional).

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§	
	§	
ORON Avi	§	
	§	Confirmation No.: 3332
Serial No.: 12/513,510	§	
	§	
Filed: May 05, 2009	§	Group Art Unit: 2472
	§	
For: MEDIA SESSION	§	
IDENTIFICATION METHOD	§	
FOR IP NETWORKS	§	
	§	Attorney Docket: 46203
Examiner: LEE Chi Ho A.	§	

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

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Sir:

Enclosed is a PTO Form 1449 which lists citations which may be material to the patentability and examination of the above identified application. Also enclosed are copies of the references cited, other than U.S. Patents and U.S. patent applications. These are submitted in compliance with the duty of disclosure defined in 37 CFR 1.56, 37 CFR 1.97 and 37 CFR 1.98. The Examiner is requested to make these citations of official record in this application.

The undersigned states:

A. NO CERTIFICATION OR FEE DUE

☒ This Information disclosure Statement is being filed within three months of filing a national application or entry of a national phase of an international application; or before the mailing date of a first Office action on the merits of the above-identified application. Accordingly, no fee or Certification is believed due. However, if a fee is due, authorization to deduct such fee from the Deposit Account 501407 of the undersigned is hereby provided.

B. CERTIFICATION

☐ 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; 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.

C. FEE

☐ Please charge the fee of \$180 set forth in 37 CFR 1.17(p) to Deposit Account 501407.

This Information Disclosure Statement under 37 CFR 1.56 is not to be construed as a representation that a search has been made, that additional matter which is material to the examination of this application does not exist, or that any one or more of the citations listed constitutes prior art as defined by 35 U.S.C. 102.

It is respectfully requested that the Examiner consider the cited information, along with any other information, in reaching a determination concerning the patentability of the present claims, and sign the enclosed form PTO-1449 to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application. Notwithstanding any statements by the Applicant, the Examiner is urged to form his/her own conclusion regarding the relevance of the cited information.

Respectfully submitted,

/Jason H. Rosenblum/

Jason H. Rosenblum
Registration No. 56,437

Date: 16 September 2011

Electronic Acknowledgement Receipt

EFS ID:	10973419
Application Number:	12513510
International Application Number:	
Confirmation Number:	3332
Title of Invention:	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS
First Named Inventor/Applicant Name:	Avi Oron
Customer Number:	67801
Filer:	Jason Harris Rosenblum/Dorit Handrus
Filer Authorized By:	Jason Harris Rosenblum
Attorney Docket Number:	46203
Receipt Date:	19-SEP-2011
Filing Date:	05-MAY-2009
Time Stamp:	07:59:23
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
------------------------	----

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	_FORM1449.PDF	68036 3638e586a2ecb1245cf7102c91b2e0cfee81169	no	2

Warnings:

Information:

IPR2018-00594

Exhibit 2015

This is not an USPTO supplied IDS fillable form					
2	Transmittal Letter	_usptoLTR.PDF	20259	no	2
			3f028d426e6f483b22acea50c6604c31edd08014		
Warnings:					
Information:					
3	Non Patent Literature	1-141186.PDF	193738	no	13
			55a8f51ddf06b2b3e2d91304a889fd9ad9ac84a6		
Warnings:					
Information:					
			Total Files Size (in bytes):	282033	
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

REQUEST FOR CONTINUED EXAMINATION (RCE) TRANSMITTAL Subsection (b) of 35 U.S.C. § 132, effective on May 29, 2000, provides for continued examination of an utility or plant application filed on or after June 8, 1995. See The American Inventors Protection Act of 1999 (AIPA).	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Application Number</td> <td style="padding: 2px;">12/513,510</td> </tr> <tr> <td style="padding: 2px;">Filing Date</td> <td style="padding: 2px;">May 5, 2009</td> </tr> <tr> <td style="padding: 2px;">Examiner Name</td> <td style="padding: 2px;">Chi Ho A. LEE</td> </tr> <tr> <td style="padding: 2px;">First Named Inventor</td> <td style="padding: 2px;">Avi ORON</td> </tr> <tr> <td style="padding: 2px;">Group Art Unit</td> <td style="padding: 2px;">2472</td> </tr> <tr> <td style="padding: 2px;">Confirmation No.:</td> <td style="padding: 2px;">3332</td> </tr> <tr> <td style="padding: 2px;">Attorney Docket Number</td> <td style="padding: 2px;">46203</td> </tr> </table>	Application Number	12/513,510	Filing Date	May 5, 2009	Examiner Name	Chi Ho A. LEE	First Named Inventor	Avi ORON	Group Art Unit	2472	Confirmation No.:	3332	Attorney Docket Number	46203
Application Number	12/513,510														
Filing Date	May 5, 2009														
Examiner Name	Chi Ho A. LEE														
First Named Inventor	Avi ORON														
Group Art Unit	2472														
Confirmation No.:	3332														
Attorney Docket Number	46203														

This is a Request for Continued Examination (RCE) under 37 C.F.R. § 1.114 of the above-identified application.
NOTE: 37 C.F.R. § 1.114 is effective on May 29, 2000. If the above-identified application was filed prior to May 29, 2000, applicant may wish to consider filing a continued prosecution application (CPA) under 37 C.F.R. § 1.53 (d) (PTO/SB/29) instead of a RCE to be eligible for the patent term adjustment provisions of the AIPA. See *Changes to Application Examination and Provisional Application Practice*, Final Rule, 65 Fed. Reg. 50092 (Aug. 16, 2000); Interim Rule, 65 Fed. Reg. 14865 (Mar. 20, 2000), 1233 Off. Gaz. Pat. Office 47 (Apr. 11, 2000), which established RCE practice.

1. **Submission required under 37 C.F.R. § 1.114**
 - a. ☐ Previously submitted
 - i. ☐ Consider the amendment(s)/reply under 37 C.F.R. § 1.116 previously filed on _____
 (Any unentered amendment(s) referred to above will be entered).
 - ii. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
 - b. ☒ **Enclosed**
 - i. ☒ **Amendment/Reply**
 - ii. ☐ Affidavit(s)/Declaration(s)
 - iii. ☐ Information Disclosure Statement (IDS)
 - iv. ☐ Other
 2. **Miscellaneous**
 - a. ☐ Suspension of action on the above-identified application is requested under 37 C.F.R. § 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 C.F.R. § 1.17(i) **required**)
 - b. ☐ Other _____
 3. **Fees** The RCE fee under 37 C.F.R. § 1.17(e) is required by 37 C.F.R. § 1.114 when the RCE is filed.
 4. ☒ **Provisional extension of time if needed.** Applicants authorize any charge of additional fees (except issue fee) that may be required in connection with this application to Deposit Account No. 50-1407.
- ☒ **Applicant is entitled to Small Entity Status under 37 CFR 1.9 and 37 CFR 1.27**

<i>For:</i>	<i>Claims after Amendment</i>	<i>Highest Claims Previously Paid</i>	<i>SMALL ENTITY RATE</i>	<i>FEE</i>	<i>OTHER THAN A SMALL ENTITY RATE</i>	<i>FEE</i>
Request for Continued Examination (RCE)			1	\$ 405		\$
Multiple Dependent Claims			0 x \$ 195	\$ 0		\$
Total Claims*	24	24	0 x \$ 26	\$ 0		\$
Independent Claims*	2	3	0 x \$ 110	\$ 0		\$
* (If the difference in Column 1 is less than "0", enter "0" in Column 2)			TOTAL	\$405.	TOTAL	\$

☒ The Commissioner is hereby authorized to charge \$405.- filing fees to Deposit Account No. 50-1407. In the event additional fees are required, please charge these additional fees to Deposit Account No. 50-1407. In the event of overpayment, please credit Deposit Account No. 50-1407.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED			
Name (Print/Type)	Jason H. Rosenblum	Registration No. (Attorney/Agent)	56437
Signature	/Jason H. Rosenblum/	Date	September 14, 2011

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of.:	§		
	§		
Avi ORON	§	Confirmation	3332
	§		
Serial No.: 12/513,510	§		
	§		
Filed: May 5, 2009	§	Group Art Unit:	2472
	§		
For: MEDIA SESSION	§		
IDENTIFICATION METHOD	§		
FOR IP NETWORKS	§		
	§	Attorney Docket:	46203
	§		
Examiner: Chi Ho A. LEE	§		

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

RESPONSE TO FINAL FILED IN CONJUNCTION WITH RCE

Sir:

This is in response to the United States Patent and Trademark Final Office Action mailed June 15, 2011, which response is being made on or before September 15, 2011, and for which no extension of time fees are due.

A Request for Continued Examination (RCE) is also enclosed herewith.

Applicant submits this response for entry into the record, in which:

Amendments to the Claims begin on page 2.

Remarks begin on page 9.

Please amend the above-identified application as follows:

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Serial No.: 12/513,510
Filed: May 5, 2009
Office Action Mailing Date: June 15, 2011

Examiner: Chi Ho A. LEE
Group Art Unit: 2472
Attorney Docket: **46203**
Confirmation No.: 3332

In the Claims:

1. (Currently Amended) Electronic network apparatus for identifying media sessions over IP and network packets as belonging or not belonging to a media session, comprising:

a packet characteristic extraction unit configured for obtaining ~~session-traffic~~ packet characteristics from a succession of packets, said packets respectively belonging to various unknown sessions, said characteristics comprising packet traffic characteristics;

a grouping unit associated with said packet characteristic extraction unit, configured to compare packets with other packets according to said extracted traffic characteristics to group together those packets whose extracted packet traffic characteristics are similar as probably belonging to a common session, and

a session analyzer configured for analyzing said grouped packets for session characteristics, therewith to identify a session type of said probable common session.

2. (Original) The apparatus of claim 1, further comprising a resource allocator for allocating at least one member of the group consisting of resources, provisioning features and control features to said session.

3. (Original) The apparatus of claim 1, wherein said session type identification comprises identifying a session managing entity generating or managing said session.

4. (Original) The apparatus of claim 1, wherein said session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase.

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5. (Original) Apparatus according to claim 1, further comprising a thresholder for thresholding said traffic characteristics, and a packet session identifier configured to identify those packets whose characteristics are mutually within said thresholds for said grouping unit to group said packets as belonging to said common session.

6. (Original) The apparatus of claim 1, wherein said traffic characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

7. (Original) The apparatus of claim 1, wherein said grouping unit comprises a packet marker, associated with said packet session identifier, configured for inserting into a header of a respective packet an indication of said common session with which said respective packet has been identified.

8. (Original) The apparatus of claim 7, further comprising a session analyzer associated with said packet marker, configured to obtain packets marked as belonging to said common session and to determine, from said packets, characteristics belonging to said common session, therefrom to identify a session type.

9. (Original) The apparatus of claim 8, wherein said session analyzer is configured to obtain said characteristics belonging to said common session from parameter patterns common to said packets.

10. (Previously Presented) The apparatus of claim 8, wherein said session analyzer is configured to use at least one member of the group consisting of:

- packet length
- inter-arrival period

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- variance of inter-arrival period
- variance of length
- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period.

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11. (Original) The apparatus of claim 8, wherein said session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase.

12. (Original) The apparatus of claim 1, further comprising a resource allocator configured to allocate resources on a network according to said identified common session.

13. (Previously Presented) The apparatus of claim 8, further comprising a resource allocator, configured to allocate resources on a network according to said identified session type.

14. (Original) The apparatus of claim 1, wherein at least one of said packet session analyzer, said extraction unit and said grouping unit comprises a neural network.

15. (Currently Amended) A method of identifying session type, comprising ~~categorizing-obtaining~~ passing packets of respectively unknown sessions and unknown session types;

~~using-obtaining~~ traffic packet characteristics of said passing packets of respectively unknown session types;

comparing said obtained packets with each other using respectively obtained traffic packet characteristics;

grouping together those packets having similar values of said traffic packet characteristics into a presumed session; and

analyzing said grouped packets of said presumed session for session characteristics;

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~~thereby to~~ using said session characteristics to identify a session type of said presumed session.

16. (Original) The method of claim 15 wherein said identifying a session type comprises identifying a session managing entity generating or managing said session.

17. (Original) The method of claim 15 wherein said identifying a session type is followed by at least one of the group comprising: providing provisioning and providing control actions to the session.

18. (Original) Method according to claim 15, further comprising thresholding said traffic characteristics, and identifying those packets whose characteristics are mutually within said thresholds for said grouping.

19. (Original) The method of claim 15, wherein said characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

20. (Previously Presented) The method of claim 15, further comprising inserting into a header of a respective packet an indication of said presumed session with which said respective packet has been identified.

21. (Previously Presented) The method of claim 15, comprising obtaining said characteristics belonging to said presumed session from parameter patterns common to said packets.

22. (Original) The method of claim 15, comprising using at least one member of the group consisting of:

- packet length

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- inter-arrival period
- variance of inter-arrival period
- variance of length
- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length

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viii. a statistical derivative obtained from multi records of inter-arrival period.

23. (Original) The method of claim 15, comprising using a neural network and characteristics automatically built into said neural network during a neural network training phase.

24. (Original) The method of claim 16, further comprising using a neural network and characteristics automatically built into said neural network during a neural network training phase.

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REMARKS

Reconsideration of the above-identified application in view of the amendments above and the remarks following is respectfully requested.

Claims 1 -24 are in this Application. Claims 1 - 24 have been rejected under 35 U.S.C. § 103. Claims 1, and 18 have been amended herewith.

Amendments To The Claims

Informalities

35 U.S.C. § 103 Rejections

Examiner rejects the independent claims over Tayyar et al.

In considering the claims, Examiner is required to give a meaning to each of the claim limitations.

In the rejection of claim 1 in section 2 of the Office Action the Examiner does not relate to the claimed feature (quote taken from the version of claim 1 prior to the current amendment) of:

a grouping unit associated with said packet characteristic extraction unit, configured to group together those packets whose extracted packet traffic characteristics are similar as probably belonging to a common session

As the Examiner *neither* points out where this feature is found, *nor* does he argue how it is rendered obvious, it is respectfully submitted that claim 1 is *allowable irrespective of the present amendment*.

Specifically, in the Examiner's rejection of claim 1, the Examiner relates only to the classifier of Tier teaching the packet extraction (it does not – as will be explained below) and the session type identification. However the feature of grouping is not related to.

In the response to arguments, Examiner states:

In re Application of: Avi ORON
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"nor does group together packets with similar transport characteristics. This limitation not claimed".

Yet as stated above, the claim does define:

"a grouping unit associated with said packet characteristic extraction unit, configured to group together those packets whose extracted packet traffic characteristics are similar as probably belonging to a common session".

Therefore applicant, with all due respect, has some difficulty with Examiner's argument.

Regarding claim 15 the same applies. Specifically, in the rejection of claim 15 in section 2 of the Office Action the Examiner does not relate to the claimed feature of:

"grouping together those packets having similar values of said traffic characteristics into a presumed session".

As the Examiner neither points out where this feature is found and nor does he argue how it is rendered obvious, it is respectfully submitted that claim 15 is allowable irrespective of the present amendment.

Specifically, in the Examiner's rejection of claim 1, the Examiner relates only to the classifier of Tier teaching the packet extraction (it does not – as will be explained below) and the session type identification. However the feature of grouping is not related to.

In the response to arguments, Examiner states:

"nor does group together packets with similar transport characteristics. This limitation not claimed".

Yet as stated above, the claim (version prior to present amendment) *does* define:

" grouping together those packets having similar values of said traffic characteristics into a presumed session ".

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Therefore applicant, with all due respect, has some difficulty with Examiner's argument, and believes that claims 1 and 15 are allowable, even without the current amendments.

Nevertheless, in order to facilitate prosecution, applicant further amends the claims to define that the initial packets are of unknown sessions, and that the grouping is carried out by comparing packets with other packets.

The claims include *inter alia* the following integers, that the packets are of *unknown* session, that the *traffic* characteristics are extracted *from the packets*, and that the packets are grouped into *presumed sessions* based on *similarity* of the *traffic* characteristics. Following the grouping, the characteristics of the presumed session are then studied to find out a *type* of this presumed group. The session characteristics and the transport characteristics are *not* the same.

Tayyar fails to teach *any* of the above integers.

On the contrary, Tayyar has packets of known sessions and the sessions are of known types. No packets are grouped together and there is no teaching of presumed sessions. Although he mentions QoS, he does not mention extraction of characteristics *of a first type* from the *packets themselves* and *then* determine a session type from a characteristic extracted from a *presumed session*. As will be explained below, the QoS in Tayyar is not extracted *from the packets*. Tayyar never groups packets at all since they are *already grouped in sessions* – he merely adds the packets, according to the *already known* grouping, to the respective session queue, and he never teaches probable or presumed sessions or extracts characteristics from such a *presumed session*.

Examiner is required to give due weight *to each feature* pointed out in the claims and to either state where the feature is found, or why it is obvious, and if he cannot do so then he is required to allow the claim.

Tayyar relates to a situation in which packets are already grouped into queues of previously known sessions. Once the known sessions are queued *then* it is decided how to schedule the packets of the session queue to be sent forward. He uses the QoS

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of the known session in order to decide how to schedule that queue. He does not teach *presumed* sessions and therefore it is not obvious for Tayyar to use QoS to find the session type of a *presumed* session.

That is to say applicant is arguing that while it may or may not be obvious to use QoS to find a session type of a *known* session, it is *not* obvious to use QoS to determine a session type of a *presumed* session, and this could not be learned from Tayyar since Tayyar does not teach a *presumed* session.

In this respect Examiner's attention is directed to Tayyar paragraph 37, where it states (lines 3 – 5) that "a classifier classifies each of the incoming packets as being associated with one of a plurality of sessions". The sessions of Tayyar's plurality are *known* (note the implication from the term "plurality" that the number of these sessions is known) and it is simply a matter of placing the packet in the queue of the known session to which it belongs.

In the following sentence (Tayyar Paragraph 37 from line 5) it is mentioned that the sessions may correspond to a certain level of quality of service. At no point does paragraph 37 of Tayyar contain the information that the *quality of service* information is used to *identify which session* the packet belongs to, *or to group the packets*, contrary to the requirement of the present claims. Neither is there any information that the packets are compared with *other packets or that characteristics of traffic of the packets are analyzed*. Rather the traffic characteristics are simply *obtained*.

That is to say, it appears from the disclosure as a whole that the sessions are *already known about* and that Tayyar simply *adds* a new packet to an *existing* session. Note in particular component 22 in Figure 1 of Tayyar where the session queues appear to be present and known about. Also note Tayyar paragraph 20, where information about entities and sessions is *provided* to the scheduler.

Tayyar does not teach *grouping of packets of unknown session into groups which are then taken as presumed sessions, followed by obtaining characteristics of the presumed session in order to determine a session type*.

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In addition, at numerous locations in Tayyar, there is reference to packets arriving that belong to an *idle* session. See for example Paragraphs 45, and 48. A single packet belonging to an idle session can *only* be considered as part of a *known* session.

In addition, Examiner's attention is drawn to paragraph 70 where it is explained that only two non-trivial calculations need to be carried out by the method, namely the calculation of the virtual time and the finish time. If indeed Tayyar had been grouping packets according to transport characteristics then the grouping itself would be an *additional* non-trivial calculation.

Therefore Tayyar teaches away from the *clearly and definitively* claimed feature that the system of the present claims *groups packets together into presumed sessions*.

Tayyar therefore fails to teach the claimed feature of:

"a grouping unit associated with said packet characteristic extraction unit, configured to *compare packets with other packets according to said extracted traffic characteristics* to group together *those packets whose extracted packet traffic characteristics are similar as probably* belonging to a common session, "

since this teaches grouping according to traffic characteristics to form a presumed session. The claim defines comparing packet with packet and groups together packets whose extracted traffic characteristics look similar into a presumed session – note use of the term "probably" to indicate a probabilistic grouping, not a deterministic grouping. Tayyar merely identifies a packet as part of a *known* session – that is a *deterministic* identification. Tayyar places packets having a common session *identifier* into the corresponding session queue, the session already being known about.

Tayyar fails to teach *probabilistic* identification of a presumed session, only *absolute* determination of a known session.

Tayyar further fails to teach:

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"a session analyzer configured for analyzing said grouped packets for session characteristics, therewith to identify a session type of said probable common session"

since the session type already seems to be known. Although Examiner argues that it would be obvious considering Tayyar to use QoS to identify a session type, applicant argues as discussed above, that it is at most obvious to use QoS to identify a type of a known session. There is no teaching of a probable session and therefore it is not obvious based on a reading of Tayyar combined with the skilled person's general knowledge, to extend the use of QoS to find the session type of a session which has only been probabilistically identified in the first place. Probabilistic determinations and definitive determinations are different fields of endeavor with different mathematics and different textbooks and the claim definitively recites the probability aspect.

As a further point, Tayyar clearly had no intention of using QoS as a method of identifying a session. Using several Queues, wherein each queue has different priority and is used by a group or pre-defined protocols / sessions, is common practice in maintaining required Quality-of-Server (QoS) for specific and known -e.g. by UDP or TCP Port number - or settable rule services, thus ensuring user-experience and performance for those sessions. Tayyar is referring to QoS-assurance per session, rather than identifying sessions according to QoS, which would make little sense in any event.

Examiner argues that the QoS corresponds to the claimed feature of *transport characteristics extracted from the packets*. However, Examiner's attention is drawn to the last three lines of Tayyar paragraph 37 where it is stated that the sessions may correspond to a group of packets for which *it is desired to provide* a certain level of QoS. There is no indication in this paragraph as to how the desire referred to comes about, however the Examiner's attention is again drawn to Tayyar paragraph 20 where it is quite clear that the scheduler receives entities to be scheduled and that the entities include sessions. This would be interpreted by the skilled person as meaning that the scheduler is *told* about the sessions, and the QoS characteristics are *provided* along

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with the scheduling information, as *opposed* to being gleaned from the grouped packets.

In other words the QoS characteristics are not taught by Tayyar to be extracted from the packets and thus Tayyar fails to teach the claimed feature of

"a packet characteristic extraction unit configured for obtaining traffic packet characteristics from a succession of packets, said packets respectively belonging to various unknown sessions".

For the above reasons it is believed that claim 1 as amended is new and inventive over the prior art.

Independent claim 15 has been amended to include the same features and is believed to be allowable for the same reasons.

Claims 2 – 14 and 16 – 24 are dependent claims and are believed to be allowable for at least the reason that they are dependent on allowable main claims.

In view of the above amendments and remarks it is respectfully submitted that claims 1 - 24 are now in condition for allowance. A prompt notice of allowance is respectfully and earnestly solicited.

Respectfully submitted,

/Jason H. Rosenblum/

Jason H. Rosenblum
 Registration No. 56,437
 Telephone: 718.246.8482

Date: September 14, 2011

Enclosures:

- Request for Continued Examination (RCE)

Electronic Patent Application Fee Transmittal

Application Number:	12513510			
Filing Date:	05-May-2009			
Title of Invention:	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS			
First Named Inventor/Applicant Name:	Avi Oron			
Filer:	Jason Harris Rosenblum			
Attorney Docket Number:	46203			
Filed as Small Entity				
U.S. National Stage under 35 USC 371 Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Request for continued examination	2801	1	405	405
Total in USD (\$)				405

Electronic Acknowledgement Receipt

EFS ID:	10942674
Application Number:	12513510
International Application Number:	
Confirmation Number:	3332
Title of Invention:	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS
First Named Inventor/Applicant Name:	Avi Oron
Customer Number:	67801
Filer:	Jason Harris Rosenblum
Filer Authorized By:	
Attorney Docket Number:	46203
Receipt Date:	14-SEP-2011
Filing Date:	05-MAY-2009
Time Stamp:	09:29:33
Application Type:	U.S. National Stage under 35 USC 371

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Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 405
RAM confirmation Number	7386
Deposit Account	501407
Authorized User	

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		46203RestoFinalOAof15-Jun-2011.pdf	128139 4419b5a12101ace3b45a97d9550faa8d8307b14f	yes	16
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Request for Continued Examination (RCE)		1	1	
	Amendment After Final		2	2	
	Claims		3	9	
	Applicant Arguments/Remarks Made in an Amendment		10	16	

Warnings:**Information:**

2	Fee Worksheet (SB06)	fee-info.pdf	30246 0e5d433b85d7092e0218bb1bbcb2ce2d8a7321dd	no	2
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Warnings:**Information:**

Total Files Size (in bytes):	158385
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 12/513,510		Filing Date 05/05/2009		<input type="checkbox"/> To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)			SMALL ENTITY <input checked="" type="checkbox"/> OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)			
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A				
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$	=	OR	X \$	=			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		X \$	=			
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
			TOTAL			TOTAL				
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	09/14/2011	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 24	Minus	** 24	=	0	OR	X \$	=	
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	=	0	OR	X \$	=	
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))										
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR			
					TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE		
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=		OR	X \$	=	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		OR	X \$	=	
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))										
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR			
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p>										

Legal Instrument Examiner:
/VIOLA ROGERS/

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.
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12/513,510

05/05/2009

Avi Oron

46203

3332

67801 7590 06/15/2011
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

EXAMINER

LEE, CHI HO A

ART UNIT

PAPER NUMBER

2472

MAIL DATE

DELIVERY MODE

06/15/2011

PAPER

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

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

Office Action Summary	Application No. 12/513,510	Applicant(s) ORON, AVI	
	Examiner ANDREW LEE	Art Unit 2472	

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

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

Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. 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.

2. Claims 1-3, 5-10, 12, 13, 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tayyar et al PG PUB 2007/0050773.

Re Claims 1, 15, Tayyar teaches a classifier¹⁴ (a packet characteristic extraction unit; a grouping unit) that classifies each of the received packets in accordance to the QoS (packet traffic characteristics) and its associated session (a common session) [0037+]. Tayyar fails to explicitly teach “a session analyzer....to identify a session type.”. However, one skilled in the art recognizes that the session type is typically associated with service profile or the QoS requirement, i.e., delay tolerance for voice type or data type sessions. One skilled in the art would have been motivated to determine the session type in Tayyar to prioritize the flow in accordance to the QoS requirement of the session. Therefore it would have been obvious to one skilled in the art to do so.

Re Claim 2, refer to Claim 1, wherein the Scheduler 23 allocates resources for the plurality of sessions.

Re Claim 3, refer to Claim 1, wherein by identifying the session type the session can be manage in accordance to the QoS.

Re Claims 5, 6, 10, 18, 19, 22, refer to Claim 1, wherein the Time Stamper (a threshold) for determine the arrival time (inter-arrival period) between successive packets within the same session [0047].

Re Claims 7, 8, 9, 20, refer to Claim 1, examiner takes notice that packet can include session IDs (packet marker) for grouping the packets associated with the common session.

Re Claims 12, 13, refer to Claim 1, wherein the Scheduler allocates resource for each session and type.

Re Claims 16, 17, refer to Claim 15, wherein once the session type is known i.e., voice or data, the session can be managed in accordance with QoS requirement.

Re Claim 21, refer to Claim 15, wherein the packets are grouped with common QoS parameters (parameter patterns common)

3. Claims 4, 11, 14, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tayyar et al PG PUB 2007/0050773 in view of Freedman et al PG PUB 2004/0249650.

Re Claims 4, 11, 14, 23 and 24, Tayyar fails to explicitly teaches the neural network for the session analyzer. However, Freedman et al teaches learning function by the neural network to analyzing the session [0055]. One skilled in the art would have been motivated to use the known learning function for analyzing the session. Therefore, it would have been obvious to one ordinary skilled to have combined the teachings.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

Art Unit: 2472

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re Claims 1 and 14, it is unclear what is meant by "similar as probably belonging to a common session".

Response to Arguments

6. Applicant's arguments filed 3/7/11 have been fully considered but they are not persuasive.

In page 1, applicant argues "...packets are compared with other packets" . This limitation is not claimed. Further argues "...or that characteristics of traffic of the packets are analyzed". Examiner disagrees, each packet QoS is analyzed.

In page 2, applicant argues Tayyar does not characteristics of the packet, nor does group together packets with similar transport characteristics. This limitation not claimed.

In page 3, applicant argues Tayyar does not teach "extraction unit....a succession of packets". Examiner disagrees. The classifier classifies each packet. Each packet is a succession of packets. Furthermore, whether Tayyar only referring to QoS of the known session is irrelevant to the "a succession of packets". What is relevant is whether a series of packets are classified in succession. In this case, the classifier does receive a flow/session of packets wherein each flow includes a succession of packets.

Conclusion

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

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

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANDREW LEE whose telephone number is (571)272-3130. The examiner can normally be reached on Monday to Friday from 8:30AM to 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, HASSAN KIZOU can be reached on 571-272-3088. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2472

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.

/ANDREW LEE/
Primary Examiner, Art Unit 2472

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Application Number	12/513,510
Filing Date	May 05, 2009
First Named Inventor	ORON Avi
Art Unit	2472
Examiner Name	LEE Chi Ho A.
Attorney Docket Number	46203

2[illegible][illegible]Date
Considered

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

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[illegible]

Examiner Signature	/Andrew Lee/	Date Considered	06/10/2011
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^a EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional).

² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

⁶ Applicant is to place a check mark here if English language translation is attached.

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 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

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EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered.

Include copy of copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional).

² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

⁶ Applicant is to place a check mark here if English language translation is attached.

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 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

IPR2018-00594

IPR2018-00594
Exhibit 2015

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[illegible]

Examiner Signature	/Andrew Lee/	Date Considered	05/21/2011
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² EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional).

² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

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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 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of.:	§		
	§		
Avi ORON	§	Confirmation	3332
	§		
Serial No.: 12/513,510	§		
	§		
Filed: May 5, 2009	§	Group Art Unit:	2472
	§		
For: MEDIA SESSION	§		
IDENTIFICATION METHOD	§		
FOR IP NETWORKS	§		
	§	Attorney Docket:	46203
	§		
Examiner: Chi Ho A. LEE	§		
Mail Stop Amendment			
Commissioner for Patents			
P.O. Box 1450			
Alexandria, VA 22313-1450			

RESPONSE

Sir:

This is in response to the United States Patent and Trademark Office Action mailed December 7, 2010, which response is being made before March 7, 2011, and for which no extension of time fees are due.

Applicant submits this response for entry into the record, in which:

Amendments to the Claims begin on page 2.

Remarks begin on page 8.

Please amend the above-identified application as follows:

In re Application of: Avi ORON et al
 Serial No.: 12/513,510
 Filed: May 5, 2009
 Office Action Mailing Date: December 7, 2010

Examiner: Chi Ho A. LEE
 Group Art Unit: 2472
 Attorney Docket: 46203
 Confirmation No.: 3332

WHAT IS CLAIMED IS:

1. (Currently Amended) Electronic network apparatus for identifying media sessions over IP and network packets as belonging or not belonging to a media session, comprising:

a packet characteristic extraction unit configured for obtaining ~~packet-session~~ characteristics from ~~each of~~ a succession of packets, said characteristics comprising packet traffic characteristics;

a grouping unit associated with said packet characteristic extraction unit, configured to group together those packets ~~having similar~~ whose extracted packet traffic characteristics are similar as probably belonging to a common session, and

a session analyzer configured for analyzing said grouped packets for session characteristics, therewith to identify a session type of said probable common session.

2. (Original) The apparatus of claim 1 further comprising a resource allocator for allocating at least one member of the group consisting of resources, provisioning features and control features to said session.

3. (Original) The apparatus of claim 1, wherein said session type identification comprises identifying a session managing entity generating or managing said session.

4. (Original) The apparatus of claim 1, wherein said session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase.

5. (Original) Apparatus according to claim 1, further comprising a thresholder for thresholding said traffic characteristics, and a packet session identifier configured to identify those packets whose characteristics are mutually within said

In re Application of: Avi ORON et al
Serial No.: 12/513,510
Filed: May 5, 2009
Office Action Mailing Date: December 7, 2010

Examiner: Chi Ho A. LEE
Group Art Unit: 2472
Attorney Docket: 46203
Confirmation No.: 3332

thresholds for said grouping unit to group said packets as belonging to said common session.

6. (Original) The apparatus of claim 1, wherein said traffic characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

7. (Original) The apparatus of claim 1, wherein said grouping unit comprises a packet marker, associated with said packet session identifier, configured for inserting into a header of a respective packet an indication of said common session with which said respective packet has been identified.

8. (Original) The apparatus of claim 7, further comprising a session analyzer associated with said packet marker, configured to obtain packets marked as belonging to said common session and to determine, from said packets, characteristics belonging to said common session, therefrom to identify a session type.

9. (Original) The apparatus of claim 8, wherein said session analyzer is configured to obtain said characteristics belonging to said common session from parameter patterns common to said packets.

10. (Currently Amended) The apparatus of claim 8, wherein said session analyzer is configured to use at least one member of the group consisting of:

- packet length
- inter-arrival period
- variance of inter-arrival period
- variance of length
- covariance of inter-arrival period
- covariance of length

In re Application of: Avi ORON et al
 Serial No.: 12/513,510
 Filed: May 5, 2009
 Office Action Mailing Date: December 7, 2010

Examiner: Chi Ho A. LEE
 Group Art Unit: 2472
 Attorney Docket: 46203
 Confirmation No.: 3332

- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period.

11. (Original) The apparatus of claim 8, wherein said session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase.

In re Application of: Avi ORON et al
Serial No.: 12/513,510
Filed: May 5, 2009
Office Action Mailing Date: December 7, 2010

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Attorney Docket: 46203
Confirmation No.: 3332

12. (Original) The apparatus of claim 1, further comprising a resource allocator configured to allocate resources on a network according to said identified common session.

13. (Currently Amended) The apparatus of claim 8, further comprising a resource allocator, configured to allocate resources on a network according to said identified session type.

14. (Original) The apparatus of claim 1, wherein at least one of said packet session analyzer, said extraction unit and said grouping unit comprises a neural network.

15. (Currently Amended) A method of identifying session type, comprising categorizing passing packets using traffic packet characteristics of said passing packets;

grouping together those packets having similar values of said traffic characteristics into a presumed session, and

analyzing said grouped packets of said presumed session for session characteristics,

thereby to identify a session type of said presumed session.

16. (Original) The method of claim 15 wherein said identifying a session type comprises identifying a session managing entity generating or managing said session.

17. (Original) The method of claim 15 wherein said identifying a session type is followed by at least one of the group comprising: providing provisioning and providing control actions to the session.

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18. (Original) Method according to claim 15, further comprising thresholding said traffic characteristics, and identifying those packets whose characteristics are mutually within said thresholds for said grouping.

19. (Original) The method of claim 15, wherein said characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

20. (Currently Amended) The method of claim 15, further comprising inserting into a header of a respective packet an indication of said ~~common~~-presumed session with which said respective packet has been identified.

21. (Currently Amended) The method of claim 15, comprising obtaining said characteristics belonging to said ~~common~~-presumed session from parameter patterns common to said packets.

22. (Original) The method of claim 15, comprising using at least one member of the group consisting of:

- packet length
- inter-arrival period
- variance of inter-arrival period
- variance of length
- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length

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- ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period.

23. (Original) The method of claim 15, comprising using a neural network and characteristics automatically built into said neural network during a neural network training phase.

24. (Original) The method of claim 16, further comprising using a neural network and characteristics automatically built into said neural network during a neural network training phase.

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REMARKS

Reconsideration of the above-identified application in view of the amendments above and the remarks following is respectfully requested.

Claims 1 -24 are in this Application. Claims 1 - 24 have been rejected under 35 U.S.C. § 103. Claims 1, 10, 13, 15, 20 and 21 have been amended herewith.

Amendments To The Claims

Informalities

Claims 10 and 13 are amended to correct informalities that came to applicant's attention.

35 U.S.C. § 103 Rejections

Examiner rejects the independent claims over Tayyar et al.

Tayyar teaches that packets are grouped into -queues of already known sessions. Once the packets are grouped into sessions *then* it is decided how to schedule the packets of the session to be sent forward.

In this respect Examiner's attention is directed to Tayyar paragraph 37, where it states (lines 3 – 5) that "a classifier classifies each of the incoming packets as being associated with one of a plurality of sessions". The implication is that *individual packets* are simply associated with a specific *session*.

In the following sentence (Tayyar Paragraph 37 from line 5) it is mentioned that the sessions may correspond to a certain level of quality of service. At no point does paragraph 37 of Tayyar contain the information that the *quality of service* information is used to *identify which session* the packet belongs to. Neither is there any information that the packets are compared with *other packets or that characteristics of traffic of the packets are analyzed*. Rather the traffic characteristics are simply *obtained*.

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That is to say, it appears from the disclosure as a whole that the sessions are *already known about* and that Tayyar simply *adds* a new packet to an *existing* session. Note in particular component 22 in Figure 1 of Tayyar where the session queues appear to be present and known about. Also note Tayyar paragraph 20, where information about entities and sessions is *provided* to the scheduler.

In addition, at numerous locations in Tayyar, there is reference to packets arriving that belong to an *idle* session. See for example Paragraphs 45, and 48. A single packet belonging to an idle session can *only* be considered as part of a *known* session.

In addition, Examiner's attention is drawn to paragraph 70 where it is explained that only two non-trivial calculations need to be carried out by the method, namely the calculation of the virtual time and the finish time. If indeed Tayyar had been grouping packets according to transport characteristics then the grouping itself would be an *additional* non-trivial calculation.

It is therefore submitted that Tayyar trivially uses an identification in the packet header (usually port number) to add a packet to a known session queue, the identification being a session name or a session title.

It is pointed out that the Classifier unit is not described by Tayyar as it is not relevant to his scheduling mechanism patent – while in the present application, classification is the core issue.

Tayyar does *not* look at the transport characteristics of the packet, nor does he group together packets with similar transport characteristics and nor does he infer the existence of a session from the grouped packets.

Tayyar therefore fails to teach the claimed feature of:

a grouping unit associated with said packet characteristic extraction unit, configured to group together those packets whose *extracted* packet traffic characteristics are *similar as probably* belonging to a *common* session, '

since this teaches comparing packet with packet, and Tayyar collects a packet as part of a known session. Tayyar groups together packets having a common session

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identifier into the corresponding session queue, the session already being known about. Tayyar does *not* have extracted packet traffic characteristics since there is no evidence that the classifier ever extracts such data, and Tayyar therefore never compares transport characteristics of different packets.

Furthermore Tayyar fails to teach

'a packet characteristic extraction unit configured for obtaining packet characteristics from *a succession of packets*, said characteristics comprising packet traffic characteristics'

since Tayyar only refers to quality of service as a property of the known sessions.

Tayyar further fails to teach:

"a session analyzer configured for analyzing said grouped packets for session characteristics, therewith to identify a session type of said probable common session"

since the session type already seems to be known. See for example the last three lines of Tayyar paragraph 37 where it is stated that the sessions may correspond to a group of packets for which *it is desired to provide* a certain level of QoS. There is no indication in this paragraph as to how the desire referred to comes about, however the Examiner's attention is again drawn to Tayyar paragraph 20 where it is quite clear that the scheduler receives entities to be scheduled and that the entities include sessions. This would be interpreted by the skilled person as meaning that the scheduler is *told* about the sessions, and the QoS characteristics are *provided* along with the scheduling information, as opposed to being gleaned from the grouped packets.

Furthermore, as mentioned, Tayyar refers at several locations to packets arriving that belong to an idle session. Single packets of idle sessions *cannot be grouped*, since there are no other packets to group them *with*. Single packets of idle sessions *can* however be *added to sessions that are already known about* and for which queues *exist*. This is thus regarded as further evidence that Tayyar is *not* talking about grouping of packets according to their individually extracted transport

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characteristics but rather about *adding* packets to *session* queues according to *session identifiers*.

For the above reasons it is believed that claim 1 as amended is new and inventive over the prior art.

Independent claim 15 has been amended to include the same features and is believed to be allowable for the same reasons.

Claims 20 and 21 are amended to accord with amendments to claim 15.

Claims 2 – 14 and 16 – 24 are dependent claims and are believed to be allowable for at least the reason that they are dependent on allowable main claims.

In view of the above amendments and remarks it is respectfully submitted that claims 1 - 24 are now in condition for allowance. A prompt notice of allowance is respectfully and earnestly solicited.

Respectfully submitted,

/Jason H. Rosenblum/

Jason H. Rosenblum
 Registration No. 56,437
 Telephone: 718.246.8482

Date: March 7, 2011

Electronic Acknowledgement Receipt

EFS ID:	9594973
Application Number:	12513510
International Application Number:	
Confirmation Number:	3332
Title of Invention:	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS
First Named Inventor/Applicant Name:	Avi Oron
Customer Number:	67801
Filer:	Jason Harris Rosenblum
Filer Authorized By:	
Attorney Docket Number:	46203
Receipt Date:	07-MAR-2011
Filing Date:	05-MAY-2009
Time Stamp:	09:24:46
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		46203_Response_to_OA_of_7_December_2010.pdf	68334 30677426ee57728b733dc07585ce12839d2ae329	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	7
	Applicant Arguments/Remarks Made in an Amendment	8	11

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 12/513,510		Filing Date 05/05/2009		<input type="checkbox"/> To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)			SMALL ENTITY <input checked="" type="checkbox"/> OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)			
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A				
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$	=		X \$	=			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		X \$	=			
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
			TOTAL			TOTAL				
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	03/07/2011	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 24	Minus	** 24	=	0		X \$	=	
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	=	0		X \$	=	
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))										
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE	0		TOTAL ADD'L FEE		
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=			X \$	=	
	Independent (37 CFR 1.16(h))	*	Minus	***	=			X \$	=	
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))										
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE			TOTAL ADD'L FEE		
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p>										

Legal Instrument Examiner:
/ROSA HOLLAND/

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

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

¹ Applicant's unique citation designation number (optional).

² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

⁶ Applicant is to place a check mark here if English language translation is attached.

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IPR2018-00594

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

¹ Applicant's unique citation designation number (optional).

² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

⁶ Applicant is to place a check mark here if English language translation is attached.

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 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§	
	§	
ORON Avi	§	
	§	Confirmation No.: 3332
Serial No.: 12/513,510	§	
	§	
Filed: May 05, 2009	§	Group Art Unit: 2472
	§	
For: MEDIA SESSION	§	
IDENTIFICATION METHOD	§	
FOR IP NETWORKS	§	
	§	Attorney Docket: 46203
Examiner: LEE Chi Ho A.	§	

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

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Sir:

Enclosed is a PTO Form 1449 which lists citations which may be material to the patentability and examination of the above identified application. Also enclosed are copies of the references cited, other than U.S. Patents and U.S. patent applications. These are submitted in compliance with the duty of disclosure defined in 37 CFR 1.56, 37 CFR 1.97 and 37 CFR 1.98. The Examiner is requested to make these citations of official record in this application.

The undersigned states:

A. NO CERTIFICATION OR FEE DUE

☐ This Information disclosure Statement is being filed within three months of filing a national application or entry of a national phase of an international application; or before the mailing date of a first Office action on the merits of the above-identified application. Accordingly, no fee or Certification is believed due. However, if a fee is due, authorization to deduct such fee from the Deposit Account 501407 of the undersigned is hereby provided.

B. CERTIFICATION

☒ 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; 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.

C. FEE

☐ Please charge the fee of \$180 set forth in 37 CFR 1.17(p) to Deposit Account 501407.

This Information Disclosure Statement under 37 CFR 1.56 is not to be construed as a representation that a search has been made, that additional matter which is material to the examination of this application does not exist, or that any one or more of the citations listed constitutes prior art as defined by 35 U.S.C. 102.

It is respectfully requested that the Examiner consider the cited information, along with any other information, in reaching a determination concerning the patentability of the present claims, and sign the enclosed form PTO-1449 to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application. Notwithstanding any statements by the Applicant, the Examiner is urged to form his/her own conclusion regarding the relevance of the cited information.

Respectfully submitted,

/Jason H. Rosenblum/

Jason H. Rosenblum
Registration No. 56,437

Date: 18 February, 2011

Electronic Acknowledgement Receipt

EFS ID:	9487423
Application Number:	12513510
International Application Number:	
Confirmation Number:	3332
Title of Invention:	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS
First Named Inventor/Applicant Name:	Avi Oron
Customer Number:	67801
Filer:	Jason Harris Rosenblum/Dorit Handrus
Filer Authorized By:	Jason Harris Rosenblum
Attorney Docket Number:	46203
Receipt Date:	22-FEB-2011
Filing Date:	05-MAY-2009
Time Stamp:	06:46:42
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	_form1449.pdf	188776 e856f345a451f0332bf7e336e50c72f0b99e3874	no	2

Warnings:

Information:

IPR2018-00594

Exhibit 2015

This is not an USPTO supplied IDS fillable form					
2	Transmittal Letter	_USPTOltr.pdf	145547	no	2
			8a5797938c42f248f605832b6cdcb02a9fb02e17		
Warnings:					
Information:					
3	NPL Documents	1-129832.pdf	63160	no	1
			1a6596f48ab5afba77688d3d0c0761e3240fdbba7		
Warnings:					
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<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

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

¹ Applicant's unique citation designation number (optional).

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³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

⁶ Applicant is to place a check mark here if English language translation is attached.

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

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.

[illegible]

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

¹ Applicant's unique citation designation number (optional).

² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

⁶ Applicant is to place a check mark here if English language translation is attached.

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§	
	§	
ORON Avi	§	
	§	Confirmation No.: 3332
Serial No.: 12/513,510	§	
	§	
Filed: May 05, 2009	§	Group Art Unit: 2472
	§	
For: MEDIA SESSION	§	
IDENTIFICATION METHOD	§	
FOR IP NETWORKS	§	
	§	Attorney Docket: 46203
Examiner: LEE Chi Ho A.	§	

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

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Sir:

Enclosed is a PTO Form 1449 which lists citations which may be material to the patentability and examination of the above identified application. Also enclosed are copies of the references cited, other than U.S. Patents and U.S. patent applications. These are submitted in compliance with the duty of disclosure defined in 37 CFR 1.56, 37 CFR 1.97 and 37 CFR 1.98. The Examiner is requested to make these citations of official record in this application.

The undersigned states:

A. NO CERTIFICATION OR FEE DUE

☐ This Information disclosure Statement is being filed within three months of filing a national application or entry of a national phase of an international application; or before the mailing date of a first Office action on the merits of the above-identified application. Accordingly, no fee or Certification is believed due. However, if a fee is due, authorization to deduct such fee from the Deposit Account 501407 of the undersigned is hereby provided.

B. CERTIFICATION

☒ 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; 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.

C. FEE

☐ Please charge the fee of \$180 set forth in 37 CFR 1.17(p) to Deposit Account 501407.

This Information Disclosure Statement under 37 CFR 1.56 is not to be construed as a representation that a search has been made, that additional matter which is material to the examination of this application does not exist, or that any one or more of the citations listed constitutes prior art as defined by 35 U.S.C. 102.

It is respectfully requested that the Examiner consider the cited information, along with any other information, in reaching a determination concerning the patentability of the present claims, and sign the enclosed form PTO-1449 to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application. Notwithstanding any statements by the Applicant, the Examiner is urged to form his/her own conclusion regarding the relevance of the cited information.

Respectfully submitted,

/Jason H. Rosenblum/

Jason H. Rosenblum
Registration No. 56,437

Date: 28 January, 2011

Electronic Acknowledgement Receipt

EFS ID:	9358676
Application Number:	12513510
International Application Number:	
Confirmation Number:	3332
Title of Invention:	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS
First Named Inventor/Applicant Name:	Avi Oron
Customer Number:	67801
Filer:	Jason Harris Rosenblum/Dorit Handrus
Filer Authorized By:	Jason Harris Rosenblum
Attorney Docket Number:	46203
Receipt Date:	02-FEB-2011
Filing Date:	05-MAY-2009
Time Stamp:	10:12:24
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	_form1449.pdf	189464 c5299289fc7eb65432010af3127b4bb8e9c34046	no	2

Warnings:

Information:

IPR2018-00594

Exhibit 2015

This is not an USPTO supplied IDS fillable form					
2	Transmittal Letter	_USPTOltr.pdf	145533 e77aeae40ae3849a6b4700909c6fcd6294d0f31	no	2
Warnings:					
Information:					
3	NPL Documents	1-128919.pdf	226701 01ab645544c34a7c5705a1da85cb586c26a592ee	no	6
Warnings:					
Information:					
Total Files Size (in bytes):			561698		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					



UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/513,510	05/05/2009	2472	429	46203	24	3

CONFIRMATION NO. 3332

CORRECTED FILING RECEIPT

67801

MARTIN D. MOYNIHAN d/b/a PRTSI, INC.

P.O. BOX 16446

ARLINGTON, VA 22215



Date Mailed: 12/27/2010

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Avi Oron, Moshav Yahad - Doar Na Misgav, ISRAEL;

Power of Attorney: The patent practitioners associated with Customer Number 67801

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/IL07/01336 11/01/2007
which claims benefit of 60/856,795 11/06/2006

Foreign Applications

If Required, Foreign Filing License Granted: 12/16/2009

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/513,510**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

Preliminary Class

370

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

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

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER**Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

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set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§	Confirmation No.:	3332
	§		
Avi ORON	§		
	§		
Serial No.: 12/513,510	§	Group Art Unit:	2472
	§		
Filed: May 5, 2009	§		
	§		
For: Media Session Identification	§	Attorney Docket:	46203
Method For IP Networks	§		
	§		
Examiner: Chi Ho A. LEE	§		

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

REQUEST FOR CORRECTED FILING RECEIPT

Attached is an annotated copy of the Official Filing Receipt dated December 22, 2009 for the above-referenced Application for which issuance of a Corrected Filing Receipt is respectfully requested.

1. There is an error with respect to *Applicant(s)* field, please correct as follows:

Applicant(s)

Avi Oron, **Moshav Yahad** - Doar Na Misgav, ISRAEL;

2. There is an omission with respect to *Domestic Priority data as claimed by applicant* field, please correct as follows:

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/IL2007/001336 11/01/2007

which claims benefit of 60/856,795 11/06/2006

REMARKS

This application is a National Phase Application of PCT Application No. PCT/IL2007/001336 having International Filing Date of November 1, 2007, which claims benefit of US Provisional Patent Application No. 60/856,795, filed on November 6, 2006. Earlier US Provisional Patent Application No. 60/856,795 should be added to the *Domestic Priority data* field. See attached copies of the Preliminary Amendment and Executed Declaration and Power of Attorney, both as originally-filed with the present Application as well as Supplemental Application Data Sheet, copy of which is being filed herewith. For your easy reference, attached also is a copy of the cover sheet of PCT Patent Application No. PCT/IL2007/001336, published as WO2008/056349, indicating earlier US Provisional Patent Application No. 60/856,795 as claiming priority therefrom.

Applicant also wishes to point out that there is an error with respect to *Applicant(s)* field. The correct City Name of the Inventor Avi ORON should read: "Moshav Yahad – Doar Na Misgav" (and not "Doar Na Misgav"). See attached copy of the Supplemental Application Data Sheet, copy of which is being filed herewith.

Attached is also an annotated copy of the Filing Receipt dated December 22, 2009.

Applicant respectfully requests issuance of a Corrected Filing Receipt in compliance with the Preliminary Amendment and Executed Declaration and Power of Attorney as originally-filed with the Application, Supplemental Application Data Sheet as filed as well as copy of the cover sheet of PCT Patent Application No. PCT/IL2007/001336, published as WO2008/056349.

Issuance of a Corrected Filing Receipt to reflect the items as mentioned above is respectfully requested.

Respectfully submitted,

/Jason H. Rosenblum/

Jason H. Rosenblum
Registration No. 56,437
Telephone: 718.246.8482

Date: December 25, 2010



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/513,510	05/05/2009	2465	429	46203	24	3

CONFIRMATION NO. 3332

67801
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

FILING RECEIPT



OC000000039274982

Date Mailed: 12/22/2009

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

← Moshav Yahad - Doar Na Misgav
Avi Oron, ~~Doar Na Misgav~~, ISRAEL;

Power of Attorney: The patent practitioners associated with Customer Number 67801

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/IL07/01336 11/01/2007

Foreign Applications

← which claims benefit of 60/856,795 11/06/2006

If Required, Foreign Filing License Granted: 12/16/2009

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/513,510**

Projected Publication Date: 04/01/2010

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

Preliminary Class

370

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER**Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
15 May 2008 (15.05.2008)

PCT

(10) International Publication Number
WO 2008/056349 A2(51) International Patent Classification:
H04L 12/28 (2006.01)(21) International Application Number:
PCT/IL2007/001336(22) International Filing Date:
1 November 2007 (01.11.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/856,795 6 November 2006 (06.11.2006) US(71) Applicant (for all designated States except US): **I-SPADE TECHNOLOGIES LTD.** [IL/IL]; 8/24 Balfur Street, 59301 Bat-Yam (IL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **ORON, Avi** [IL/IL]; Moshav Yahad, 20155 Doar Na Misgav (IL).(74) Agents: **G. E. EHRLICH (1995) LTD.** et al.; 11 Menachem Begin Street, 52521 Ramat Gan (IL).

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

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

Published:

— without international search report and to be republished upon receipt of that report

(54) Title: MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

(57) Abstract: A method of allocating, restricting or refusing communication resources to media sessions in accordance with individual session or session type, comprises: categorizing passing packets using packet traffic characteristics such as packet length or inter-arrival period; grouping together those packets having similar traffic characteristics, and analyzing the grouped packets for session characteristics, thereby to identify a session type and allocate resources to the session or provisioning or like actions or services.

WO 2008/056349 A2

COPYDocket No.
46203**Declaration and Power of Attorney For Patent Application****English Language Declaration**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

the specification of which

☐

is attached hereto.

☒

was filed on November 1, 2007 as ~~United States Application No.~~ **PCT**

International Application Number PCT/IL2007/001336

~~and was amended on~~ _____

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56. Including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Not Claimed

(Number)

(Country)

(Day/Month/Year Filed)

☐

(Number)

(Country)

(Day/Month/Year Filed)

☐

(Number)

(Country)

(Day/Month/Year Filed)

☐

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

60/856,795

(Application Serial No.)

November 6, 2006

(Filing Date)

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

I hereby claim the benefit under 35 U.S.C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112. I acknowledge the duty to disclose to the United States Patent and Trademark Office all the information known to me to be material to patentability as defined in Title 37, C.F.R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

PCT/IL2007/001336

(Application Serial No.)

November 1, 2007

(Filing Date)

(Status)

(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)

(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)

(patented, pending, abandoned)

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

POWER OF ATTORNEY: As a named inventor, I hereby appoint the attorney(s) and/or agent(s) associated with the following Customer Number to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

67801

Send Correspondence to the address associated with Customer Number:

67801

Direct Telephone Calls to: *(name and telephone number)*

Martin D. MOYNIHAN

Tel. No. (703) 598-7851

Fax No. (703) 415-4864

FULL NAME OF SOLE OR FIRST INVENTOR	Avi ORON	
Sole or first inventor's signature	<u>Avi</u>	Date <u>3/5/09</u>
Residence	: Moshav Yahad, 20155 Doar Na Misgav, Israel	
Citizenship	: Israeli	
Post Office Address	: Moshav Yahad, 20155 Doar Na Misgav, Israel	

COPY

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§	
	§	
Avi ORON	§	
	§	
Serial No.:	§	
Not Yet Assigned –	§	
US National Phase of	§	
PCT/IL2007/001336	§	
	§	
Filed:	§	Group Art Unit: Not Yet Assigned
	§	
For:	§	
Media Session Identification	§	
Method For IP Networks	§	
	§	Attorney Docket: 46203
Examiner:	§	
Not Yet Assigned	§	

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

PRELIMINARY AMENDMENT

Sir:

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

In the Specification:

Please insert the paragraph immediately after the Title, at Page 1, line 3, as follows:

RELATED APPLICATIONS

This application is a National Phase Application of PCT Application No. PCT/IL2007/001336 having International Filing Date of November 1, 2007, which claims benefit of US Provisional Patent Application No. 60/856,795, filed on November 6, 2006. The contents of the above Applications are all incorporated herein by reference.

REMARKS

This application is a National Phase Application of PCT Application No. PCT/IL2007/001336 having International Filing Date of November 1, 2007.

The Application comprises claims 1-24, of which claims 1 and 15 are in independent form.

An early and favorable action is respectfully requested.

Respectfully submitted,

/Martin D. Moynihan/

Martin D. Moynihan,
Registration No. 40,338

Date: May 5, 2009

Supplemental Application Data Sheet

Application Information

Application number::	Not Yet Assigned <u>12/513,510</u>
Filing Date::	Herewith <u>05/05/09</u>
Application Type::	Regular
Subject Matter::	Utility
<u>Suggested Classification::</u>	<u>370</u>
<u>Suggested Group Art Unit::</u>	<u>2472</u>
CD-ROM or CD-R?::	None
Title::	Media Session Identification Method For IP Networks
Attorney Docket Number::	46203
Request for Early Publication?::	No
Request for Non-Publication?::	No
Suggested Drawing Figure::	1
Total Drawing Sheets::	6
Small Entity?::	Yes
Petition included?::	No
Secrecy Order in Parent Appl.?::	No

Applicant Information

Applicant Authority Type:: Inventor
Primary Citizenship Country:: Israel
Status:: Full Capacity
Given Name:: Avi
Family Name:: Oron
City of Residence:: Moshav Yahad - Doar Na Misgav
Country of Residence:: Israel
Street of mailing address:: Moshav Yahad
City of mailing address:: Moshav Yahad - Doar Na Misgav
Country of mailing address:: Israel
Postal or Zip Code of mailing address:: 20155

Correspondence Information

Correspondence Customer Number:: 67801

Representative Information

Representative Customer Number::	67801	
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Domestic Priority Information

Application::	Continuity Type::	Parent Application::	Parent Filing Date::
This application	National Stage of	PCT/IL2007/001336	11/01/07
PCT/IL2007/001336	An application claiming the benefit under 35 USC 119(e)	60/856,795	11/06/06

[This application has no foreign priority claims]

Assignee Information

Assignee name::	I-Spade Technologies Ltd.
Street of mailing address::	c/o Mr. Jack Wakileh 8/24 Balfur Street
City of mailing address::	Bat-Yam
Country of mailing address::	Israel
Postal or Zip Code of mailing address::	59301

Electronic Acknowledgement Receipt

EFS ID:	9114217
Application Number:	12513510
International Application Number:	
Confirmation Number:	3332
Title of Invention:	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS
First Named Inventor/Applicant Name:	Avi Oron
Customer Number:	67801
Filer:	Jason Harris Rosenblum/Dorit Handrus
Filer Authorized By:	Jason Harris Rosenblum
Attorney Docket Number:	46203
Receipt Date:	25-DEC-2010
Filing Date:	05-MAY-2009
Time Stamp:	05:13:55
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
------------------------	----

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		46203_Request_for_Corrected _Filing_Receipt.pdf	645432 4f62ecae786edaa7e7b5aef94993a2e9155575b7	yes	15

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Request for Corrected Filing Receipt	1	12
	Application Data Sheet	13	15
Warnings:			
Information:			
Total Files Size (in bytes):		645432	
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>			



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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12/513,510

05/05/2009

Avi Oron

46203

3332

67801

7590

12/07/2010

MARTIN D. MOYNIHAN d/b/a PRTSI, INC.

P.O. BOX 16446

ARLINGTON, VA 22215

EXAMINER

LEE, CHI HO A

ART UNIT

PAPER NUMBER

2472

MAIL DATE

DELIVERY MODE

12/07/2010

PAPER

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

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

Office Action Summary	Application No. 12/513,510	Applicant(s) ORON, AVI	
	Examiner Andrew Lee	Art Unit 2472	

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

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

Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>3/24/10</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. 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.

2. Claims 1-3, 5-10, 12, 13, 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tayyar et al PG PUB 2007/0050773.

Re Claims 1, 15, Tayyar teaches a classifier¹⁴ (a packet characteristic extraction unit; a grouping unit) that classifies each of the received packets in accordance to the QoS (packet traffic characteristics) and its associated session (a common session) [0037+]. Tayyar fails to explicitly teach “a session analyzer....to identify a session type.”. However, one skilled in the art recognizes that the session type is typically associated with service profile or the QoS requirement, i.e., delay tolerance for voice type or data type sessions. One skilled in the art would have been motivated to determine the session type in Tayyar to prioritize the flow in accordance to the QoS requirement of the session. Therefore it would have been obvious to one skilled in the art to do so.

Re Claim 2, refer to Claim 1, wherein the Scheduler 23 allocates resources for the plurality of sessions.

Re Claim 3, refer to Claim 1, wherein by identifying the session type the session can be manage in accordance to the QoS.

Re Claims 5, 6, 10, 18, 19, 22, refer to Claim 1, wherein the Time Stamper (a thresholder) for determine the arrival time (inter-arrival period) between successive packets within the same session [0047].

Re Claims 7, 8, 9, 20, refer to Claim 1, examiner takes notice that packet can include session IDs (packet marker) for grouping the packets associated with the common session.

Re Claims 12, 13, refer to Claim 1, wherein the Scheduler allocates resource for each session and type.

Re Claims 16, 17, refer to Claim 15, wherein once the session type is known i.e., voice or data, the session can be managed in accordance with QoS requirement.

Re Claim 21, refer to Claim 15, wherein the packets are grouped with common QoS parameters (parameter patterns common)

3. Claims 4, 11, 14, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tayyar et al PG PUB 2007/0050773 in view of Freedman et al PG PUB 2004/0249650.

Re Claims 4, 11, 14, 23 and 24, Tayyar fails to explicitly teaches the neural network for the session analyzer. However, Freedman et al teaches learning function by the neural network to analyzing the session [0055]. One skilled in the art would have been motivated to use the known learning function for analyzing the session. Therefore, it would have been obvious to one ordinary skilled to have combined the teachings.

Art Unit: 2472

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Lee whose telephone number is 571-272-3130. The examiner can normally be reached on Monday to Friday from 8:30AM to 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Trost can be reached on 571-272-7872. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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

/Andrew Lee/
Primary Examiner, Art Unit 2472

Notice of References Cited	Application/Control No. 12/513,510		Applicant(s)/Patent Under Reexamination ORON, AVI	
	Examiner Andrew Lee		Art Unit 2472	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2007/0050773	03-2007	Tayyar et al.	718/102
*	B	US-2010/0293165	11-2010	Eldering et al.	707/737
*	C	US-2010/0080133	04-2010	Oron, Avi	370/252
*	D	US-2009/0151006	06-2009	Saeki et al.	726/28
*	E	US-2009/0106571	04-2009	Low et al.	713/310
*	F	US-2006/0120374	06-2006	Yoshimoto et al.	370/392
*	G	US-2004/0152439	08-2004	Kimura et al.	455/403
*	H	US-2003/0023744	01-2003	Sadot et al.	709/234
*	I	US-2003/0023744	01-2003	Sadot et al.	709/234
*	J	US-2004/0249650	12-2004	Freedman et al.	705/001
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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



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BIB DATA SHEET

CONFIRMATION NO. 3332

SERIAL NUMBER 12/513,510	FILING or 371(c) DATE 05/05/2009 RULE	CLASS 370	GROUP ART UNIT 2472	ATTORNEY DOCKET NO. 46203	
APPLICANTS Avi Oron, Doar Na Misgav, ISRAEL; ** CONTINUING DATA ***** This application is a 371 of PCT/IL07/01336 11/01/2007 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY ** 12/16/2009					
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Verified and Acknowledged <u>/CHIHO A LEE/</u> Examiner's Signature	<input type="checkbox"/> Met after Allowance Initials	STATE OR COUNTRY ISRAEL	SHEETS DRAWINGS 6	TOTAL CLAIMS 24	INDEPENDENT CLAIMS 3
ADDRESS MARTIN D. MOYNIHAN d/b/a PRTSI, INC. P.O. BOX 16446 ARLINGTON, VA 22215 UNITED STATES					
TITLE MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS					
FILING FEE RECEIVED 429	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		

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.

[illegible]

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

¹ Applicant's unique citation designation number (optional).

² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

6 Applicant is to place a check mark here if English language translation is attached.

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

IPR2018-00594
Exhibit 2015

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.

[illegible]

Examiner Signature	/Andrew Lee/	Date Considered	11/20/2010
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* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered.
Include copy of copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional).

² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04, 3 Enter Office that issued the document, by the two-letter code (WIPO Standard S1.3).

³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

⁶ Applicant is to place a check mark here if English language translation is attached.

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 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

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

IPR2018-00594
Exhibit 2015

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	1824	session adj type	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 20:18
L3	2	2 with (determin\$4 identify\$4) with group with packet	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 20:18
L4	21	2 with (determin\$4 identify\$4) with packet	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 20:19
L5	20	2 with qos	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 20:22
L6	3	"20070050773"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 20:30
L7	426	session adj analyz\$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 20:36
L8	1	7 with (neural adj network)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 20:36
L9	13	7 same (neural adj network)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 20:36

S1	702	common adj session	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:04
S2	65	(identify\$4 determin \$4) with S1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:05
S3	4	S2 with group\$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:05
S4	9602	session adj3 (id analyz \$4 marker)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:10
S5	9205	session adj (id analyz \$4 marker type)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:10
S6	44	S5 with group\$4 with (common "same")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:11
S7	426	session adj (analyz\$4)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:17
S8	27	S7 same (ID marker tag)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:17
S9	40	S7 same group\$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:18
S10	0	S9 same (ID marker tag\$4)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:18

S11	1	S9 same3 (ID marker tag\$4)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:18
S12	35	S1 with (group\$4 aggregat\$4)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:21
S13	806	(group\$4 aggregat\$4) with session with ((packet adj length) length period variance)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:25
S14	64	S13 with (common id marker tag)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:25
S15	5	(group\$4 aggregat\$4) with session with (packet adj length)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:32
S16	339	(group\$4 aggregat\$4) with (packet adj length)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:34
S17	5	S16 same session	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:34
S18	3	"20070050773"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/11/20 15:44

11/ 20/ 2010 9:25:26 PM

Substitute for form 1449A/PTO

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Complete if Known

Application Number	12/513,510
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Filing Date	May 05, 2009
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First Named Inventor	ORON Avi
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Art Unit	2472
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Examiner Name	N/A
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Sheet	1	of	2	Attorney Docket Number	46203
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				Application Number	12/513,510
				Filing Date	May 05, 2009
				First Named Inventor	ORON Avi
				Group Art Unit	2472
				Examiner Name	N/A
Sheet	2	Of	2	Attorney Docket Number	46203
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In re Application of:	§	
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ORON Avi	§	
	§	Confirmation No.: 3332
Serial No.: 12/513,510	§	
	§	
Filed: May 05, 2009	§	Group Art Unit: 2472
	§	
For: MEDIA SESSION	§	
IDENTIFICATION METHOD	§	
FOR IP NETWORKS	§	
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SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Sir:

Enclosed is a PTO Form 1449 which lists citations which may be material to the patentability and examination of the above identified application. Also enclosed are copies of the references cited, other than U.S. Patents and U.S. patent applications. These are submitted in compliance with the duty of disclosure defined in 37 CFR 1.56, 37 CFR 1.97 and 37 CFR 1.98. The Examiner is requested to make these citations of official record in this application.

The undersigned states:

A. NO CERTIFICATION OR FEE DUE

☒ This Information disclosure Statement is being filed within three months of filing a national application or entry of a national phase of an international application; or before the mailing date of a first Office action on the merits of the above-identified application. Accordingly, no fee or Certification is believed due. However, if a fee is due, authorization to deduct such fee from the Deposit Account 501407 of the undersigned is hereby provided.

B. CERTIFICATION

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This Information Disclosure Statement under 37 CFR 1.56 is not to be construed as a representation that a search has been made, that additional matter which is material to the examination of this application does not exist, or that any one or more of the citations listed constitutes prior art as defined by 35 U.S.C. 102.

It is respectfully requested that the Examiner consider the cited information, along with any other information, in reaching a determination concerning the patentability of the present claims, and sign the enclosed form PTO-1449 to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application. Notwithstanding any statements by the Applicant, the Examiner is urged to form his/her own conclusion regarding the relevance of the cited information.

Respectfully submitted,

/Jason H. Rosenblum/

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(54) Title: MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

(57) Abstract: A method of allocating, restricting or refusing communication resources to media sessions in accordance with individual session or session type, comprises: categorizing passing packets using packet traffic characteristics such as packet length or inter-arrival period; grouping together those packets having similar traffic characteristics, and analyzing the grouped packets for session characteristics, thereby to identify a session type and allocate resources to the session or provisioning or like actions or services.



WO 2008/056349 A2

MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

5 FIELD AND BACKGROUND OF THE INVENTION

The present invention, in some embodiments thereof, relates to a media session identification method for IP networks and, more particularly, but not exclusively, to a media session identification method that identifies media sessions from the flow of packets and assigns specific packets to the media sessions. It is noted that the term "session" includes streaming of data, such as in for example a video stream.

The continuous increase in IP based media traffic over the Internet and other networks, supported by the continuous increase in the various media communication applications, emphasizes the need for IP traffic control tools to cope with the increasingly congested networks. These IP traffic control tools are required by Internet service providers (ISPs), IP-Telephony providers (mobile and fixed) and by Enterprises for implementing traffic shaping measures such as availability of service and quality of service, for firewall enhancements, for providing media session logs supporting billing capabilities and for meeting and supporting lawful interception guidelines set by governments and governmental bodies.

A media session, such as a voice or video session, is expected to have a continuous stream of sampled data so it can be reconstructed at its destination to produce smooth sound or images or both. This means that a minimum amount of data bandwidth has to be sustained on the network. As media at either end is sampled and de-assembled or re-assembled by symmetrical session CODECs (coder & decoder) – data streaming must comply with a certain bandwidth demand and packet-rate so that the human ear or eye at the destination does not experience any information gaps or distortions.

It is desirable to identify packets as belonging to a session to group the succession of IP packets and also to identify a particular application or type that the session belongs to in order to apply provisioning, quality of service and control actions to the session or stream; applications that are real time sensitive such as Voice-over-IP and/or Video-over-IP tend also to be bandwidth availability sensitive, therefore maintaining the quality of service for such application sessions require the identification, and possibly the classification, of their traffic streams. It may also be

desirable to identify a session or a stream belonging to a particular application in order to implement and meet interception requirements by law enforcement authorities, as well as in the need to generate CDRs for billing and analysis purposes, and the like. In other cases, some applications may be perceived as prohibited or posing a security risk, that is creating 'security holes', and some networks may be interested in blocking such applications. Again, the best way to do so is to identify the session and the packets belonging to the session and then block packets belonging to the session. For example, many organizations treat Instant-Messaging (IM) applications as high security risks which might create a hole through which sensitive data can flow out of an organization. For those organizations, it is highly essential to identify data flow (e.g. file-transfers) within a media session.

Various methods for analyzing IP traffic are available. The traditional technologies for analyzing and identifying IP traffic (including IP media sessions) include packet header analysis. Packets whose headers indicate the same destination may be assumed to belong to the same session. Packet header analysis is however simplistic. The same user may be running several different sessions simultaneously and mere packet header analysis may not be able to distinguish between them. Thus there is also the so called 'Deep Packet Inspection' method, or the 'Packet Content Analysis'. These known technologies require digging into and analyzing the content, or Payload, of the packets, with the aim of extrapolating signatures or fingerprints of the payloads. The signatures can then be identified with a specific protocol or application. More often than not, the identification process includes analysis of additional factors from the packet 'Header' (e.g. addresses and port numbers).

There are several disadvantages of the Deep Packet Inspection approach, of which the major are known to be:

1. Alteration of Payloads: Packet Payloads can change due to changes in the application. Thus a signature that has been extrapolated and correlated to a specific protocol or application can be rendered invalid upon the alteration of the payload due say to a new version release.
2. Encryption of packet content: Certain media applications (e.g. Skype) encrypt the messages, which pose a difficulty in inspecting the Payload of its packets and obtaining a meaningful signature.

In other words, the deep packet inspection method is dependant on elements that can be encrypted or altered by the application and can therefore be initially unreadable or the reading can become invalid if the application alters its content sequence.

In order to at least partly overcome the above problems, it is also known to use
5 Complete Packet Inspection (CPI), which combines header analysis and deep packet inspection, otherwise known as payload pattern search. The header analysis provides additional information that complements the payload pattern search. Complete packet inspection is relatively widely used and applications include network monitoring, application discovery, behavioral analysis, network security, policy enforcement, test
10 and measurement, lawful interception, and trouble shooting.

Nevertheless, both deep packet inspection and complete packet analysis require analysis of multiple packets and their sequence down to the payload. Thus, using deep packet inspection/content inspection on any sizeable network requires strong powerful monitoring processing power as well as huge memory resources, as many thousands of
15 IP sessions occur simultaneously. This renders the solution unfeasible in many cases. In other cases the traffic throughput rate is limited by the inspection capacity. Where the aim is to ensure quality of service for the IP sessions that require it, the very attempt to solve the problem may be making things worse.

State-full inspection Firewalls, Session Border Controllers (SBC) and billing
20 mediation systems each require inspection for their own needs. Thus in some cases the interest may be in blocking the session, in other cases in prioritizing the session and in yet other cases the interest may lie in creating billing records (CDR) for the session. Due to the heavy processing requirement, inspection thus tends to be limited to a relatively small number of simultaneous IP-sessions (e.g. calls) that can be
25 managed, and this prohibits any effective inspection at perhaps the one place it could be most effective, namely at the operator's high-speed backbones.

Some existing data security systems detect and prevent intrusion using simple predefined behavioristic rules and thresholds to alert for abnormal traffic behavior which may indicate possible attacks on the network (customarily implemented in
30 Firewall technologies). Such suspicious behavior may include indications of denial of service (DoS) attacks.

One of the characteristics of a media session is the tendency to consist of a packet stream having a low variation in packet length and/or inter-arrival periods.

However, network delay & jittering as well as the fact that some codecs support silence suppression may lead to large inter-arrival period variations.

The existing technologies, including deep and complete packet inspections, do not help specifically in controlling these media sessions for the reasons given above, since the packets are not always recognized.

SUMMARY OF THE INVENTION

The present invention relates to the use of the regularity and similarity characteristics of packet traffic, belonging to a media session, to identify the packets belonging to a given media session, and subsequent identification of the kind of media session, so that the media session can be provisioned and/or controlled (e.g allocating appropriate resources or not allocating at all, as required). In general, the identification is probabilistic as opposed to definitive. Herein the media session may be identified on a number of levels from the most generic to the very specific. All the session identifications from the most generic to the most specific are referred to as the session type. A generic identification may refer to identification of the session type as being video or audio or music or the like, including the identification of interactions within such session, such as instant messaging, file transfer and application sharing. The more specific identifications may involve a specific end-device or application and the term type further includes anything in between. Packet identification or grouping, are terms used to refer to an identification of packets that belong together to a session type in a common session.

According to an aspect of some embodiments of the present invention there is provided electronic network apparatus for identifying media sessions over IP and network packets as belonging or not belonging to a media session, comprising:

a packet characteristic extraction unit configured for obtaining packet characteristics from a succession of packets, the characteristics comprising packet traffic characteristics;

a grouping unit associated with the packet characteristic extraction unit, configured to group together those packets having similar traffic characteristics as probably belonging to a common session, and

a session analyzer configured for analyzing the grouped packets for session characteristics, therewith to identify a session type.

The apparatus may comprise a resource allocator for allocating at least one member of the group consisting of resources, provisioning features and control features to the session.

In an embodiment the session type identification comprises identifying an application and/or end-device generating or managing the session.

In an embodiment, the session analyzer comprises a neural network, using characteristics automatically built into the neural network during a neural network training phase.

An embodiment comprises a thresholder for thresholding the traffic characteristics, and a packet session identifier configured to identify those packets whose characteristics are mutually within the thresholds for the grouping unit to group the packets as belonging to the common session.

In an embodiment, the traffic characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

In an embodiment, the grouping unit comprises a packet marker, associated with the packet session identifier, configured for inserting into a header of a respective packet an indication of the common session with which the respective packet has been identified.

An embodiment comprises a session analyzer associated with the packet marker, configured to obtain packets marked as belonging to the common session and to determine, from the packets, characteristics belonging to the common session, therefrom to identify a session type.

In an embodiment, the session analyzer is configured to obtain the characteristics belonging to the common session from parameter patterns common to the packets.

In an embodiment, the session analyzer is configured to use at least one member of the group consisting of:

- packet length
- inter-arrival period
- variance of inter-arrival period
- variance of length

- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period

In an embodiment, the session analyzer comprises a neural network, using characteristics automatically built into the neural network during a neural network training phase.

An embodiment comprises a resource allocator configured to allocate resources on a network according to the identified common session.

An embodiment comprises a resource allocator, configured to allocate resources on a network according to the identified session type

An embodiment comprises at least one of the packet session analyzer, the extraction unit and the grouping unit comprises a neural network.

5 According to a second aspect of the present invention there is provided a method of identifying session type, comprising

categorizing passing packets using traffic packet characteristics;

grouping together those packets having similar values of the traffic characteristics, and

10 analyzing the grouped packets for session characteristics,

thereby to identify a session type.

Unless otherwise defined, all technical and/or scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which the invention pertains. Although methods and materials similar or equivalent to those
15 described herein can be used in the practice or testing of embodiments of the invention, exemplary methods and/or materials are described below. In case of conflict, the patent specification, including definitions, will control. In addition, the materials, methods, and examples are illustrative only and are not intended to be necessarily limiting.

20 Implementation of the method and/or system of embodiments of the invention can involve performing or completing selected tasks manually, automatically, or a combination thereof. Moreover, according to actual instrumentation and equipment of embodiments of the method and/or system of the invention, several selected tasks could be implemented by hardware, by software or by firmware or by a combination
25 thereof using an operating system.

For example, hardware for performing selected tasks according to embodiments of the invention could be implemented as a chip or a circuit. As software, selected tasks according to embodiments of the invention could be implemented as a plurality of software instructions being executed by a computer
30 using any suitable operating system. In an exemplary embodiment of the invention, one or more tasks according to exemplary embodiments of method and/or system as described herein are performed by a data processor, such as a computing platform for executing a plurality of instructions. Optionally, the data processor includes a volatile

memory for storing instructions and/or data and/or a non-volatile storage, for example, a magnetic hard-disk and/or removable media, for storing instructions and/or data. Optionally, a network connection is provided as well. A display and/or a user input device such as a keyboard or mouse are optionally provided as well.

5

BRIEF DESCRIPTION OF THE DRAWINGS

Some embodiments of the invention are herein described, by way of example only, with reference to the accompanying drawings. With specific reference now to the drawings in detail, it is stressed that the particulars shown are by way of example and for purposes of illustrative discussion of embodiments of the invention. In this regard, the description taken with the drawings makes apparent to those skilled in the art how embodiments of the invention may be practiced.

10

In the drawings:

FIG. 1 is a simplified block diagram showing a packet and session identification apparatus according to a first embodiment of the present invention;

15

FIG. 2 is a simplified block diagram showing a general implementation of the apparatus of Fig. 1;

FIG. 3 is a simplified block diagram showing another embodiment of the present invention;

20

FIG. 4 is a simplified block diagram showing a hardware implementation of the embodiment of Fig. 3;

FIG. 5 is a simplified block diagram showing a software layer implementation of the embodiment of Fig. 3; and

FIG. 6 is a simplified flow chart showing a method of analyzing packets for media sessions according to an embodiment of the present invention.

25

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

The present invention, in some embodiments thereof, relates to IP traffic inspection by means of identifying those packets having similar traffic characteristics as probabilistically belonging to the same media session. Traffic characteristics relate to those parameters inherent to packets traffic flow as it travels from source to destination and includes features such as packet length, inter-arrival period, bandwidth and

30

statistical and other derivations thereof as well as certain header characteristics such as source address and destination address but excludes packet payload content whose inspection is common in deep packet inspection (packet content inspection) techniques. The traffic characteristics may also be used to identify the session type so that appropriate resources can be made available or not for the session, or other provisioning and control actions may be applied to the session.

Before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not necessarily limited in its application to the details of construction and the arrangement of the components and/or methods set forth in the following description and/or illustrated in the drawings and/or the Examples. The invention is capable of other embodiments or of being practiced or carried out in various ways.

Referring now to the drawings, Figure 1 illustrates electronic network apparatus 10 for identifying media sessions and network packets as belonging or not belonging to a media session, grouping, and for determining a session type. As explained the determinations need not be absolute but may be probabilistic. Apparatus 10 comprises a packet analyzer unit 12 and a session analyzer unit 14. A resource assignment unit 16 assigns, or for that matter limits or refuses, network resources to the identified media session so that individual packets are given a priority level according to the needs of the media session to which they are found to belong, or may provide other provisioning or control actions for the session.

The packet analyzer 12 analyzes incoming data packets and determines which packets belong to a common session. The packet analyzer 12 includes a packet characteristic extractor 18 which extracts readily available packet traffic characteristics such as packet length or inter-arrival period, or source or destination addresses or other traffic characteristics of the packets. Readily available characteristics are those characteristics that do not require deep analysis of the packet content. Preferably, characteristics that can be obtained from mere observable traffic behavior examination, without opening the packet, are used. The packet characteristic extraction unit obtains these packet characteristics from a succession of packets.

A thresholder 20 is connected to the packet characteristic extraction unit, and sets up thresholds based on the characteristics found by the extractor. Generally there is a certain amount of uniformity in packets belonging to the same session, thus they

tend to be approximately the same length and to turn up at approximately regular intervals. Thus thresholding for length or inter-arrival period or even better for both, allows for packets to be assigned to a common session with relatively high probability. A packet session identifier 22 uses the thresholds set up by the thresholder to identify
5 as belonging to a common session those packets whose characteristics are mutually within the thresholds.

As mentioned, effective characteristics include but are not limited to packet length and inter-arrival period.

A packet marker 24 may insert an indication of the common session with
10 which a given packet has been identified into its header. Thus packets believed to belong to the same session can be grouped together so that the session itself can be analyzed.

For the purpose of finding out information about the session, session analyzer
14 analyzes the grouped together packets to obtain characteristics that could provide
15 important information about the session type and its requirements. That is to say a session could be identified as being a video session and therefore having a real time quality of service requirement. If possible, an accurate session type, such as a video session using codec type X, or voice session using Skype™, is obtained.

In general a media stream tends to have a small packet rate variation, and also
20 relatively small packet length, or at least small variation in the packet length. . The method can thus inspect passing packets to see which of the passing packets correspond on this basis and group them together with high probability.

A good source of information that the session analyzer can use is the meta-level parameters which are often included in the packet headers.

25 The session analyzer may use the packet's traffic characteristics, such as packet length and/or inter-arrival period to indicate the session type.

In one embodiment, the session analyzer comprises a neural network. In this case the characteristics used for identifying the session type are automatically built into the neural network during the neural network training phase, and are not explicitly
30 programmed in.

The packets are now assigned to corresponding sessions, and resources are assigned to the session, so that each packet gets priority or otherwise, depending on the session to which it has been assigned. Thus a video session requiring real time

quality of service may receive high bandwidth and its packets may be given high priority. At the other extreme, a chat session may be regarded as a security risk and its packets may be assigned zero resources and dumped or simply blocked.

The present embodiments are now considered in greater detail. The present
5 embodiments identify and distinguish between different media sessions within IP network traffic using certain packet related elements or characteristics, primarily but not exclusively packet length and packet inter-arrival period. In practice the methodology may not use these characteristics directly but rather may make use of a range of statistical parameters which are derivatives thereof. The elements are
10 external elements that do not require opening of the packet payload, so that there is no dependency on packet elements that can be altered, hidden or encrypted by the application. That is to say encrypting the payload has no effect on the methodology and updates to software versions are unlikely to change the packets so radically that the session types, at least in terms of quality of service requirement, would not be
15 recognized

The algorithm expects the two parameters of packet length and packet inter-arrival period to meet certain thresholds if indeed the packets belong to the same session. Packets that belong to the same session generally have a constant average bandwidth, or at least an average bandwidth that maintains continuity. The average
20 bandwidth is the average packet length divided by average inter-arrival period, and the average bandwidth may be used by the method as a derivative of the above packet characteristics to indicate belonging or not belonging to a session.

Thresholding of the packet length and packet inter-arrival period, or of a derivative such as statistical variations, sets a basic acceptance criterion for a packet to
25 be considered as part of a media stream, against which each consecutive incoming IP packet is examined. Those packets that meet the acceptance criteria are categorized and marked, at high probability, as media session packets, while those packets that do not meet the acceptance criteria are filtered out or ignored as appropriate.

Using these markings, the marked media session packets are assembled to
30 create the various media streams, which streams are subsequently analyzed using predefined mathematical and statistical techniques for determining more specific conclusions on the media session protocol and even the application or end-devices being used.

Specific constant packet lengths and length-variation behaviors, along with specific packet-rate and rate-variation may further indicate standard and non-standard codecs, session protocols, media type and sometimes even the actual end-point media device being used.

Thus, a packet length histogram may be created by the algorithm and can be used to determine whether the media is using a Constant Bit Rate (CBR) Codec (e.g. G.723.1, G.729A) or a Variable Bit Rate (VBR) Codec (such as the GIPS codec). The G.729A codec for instance, uses constant packet length of 50/60/70 bytes and a corresponding packet inter-arrival period of 100/50/33 PPS (packets per second).

Reference is now made to Fig. 2, which is a simplified block diagram illustrating a more detailed embodiment of the apparatus of Fig. 1. Packets initially enter threshold filter 30. The filter can possibly contain a pre-filter stage in which it filters out those packets having a length and/or inter-arrival period and/or derivatives thereof which could not possibly represent a media session, that is anything whose length and/or inter-arrival period and/or derivatives thereof is above or below a predefined maximum and minimum threshold. Such a prefiltering stage with preset thresholds filters out packets belonging to large file transfer actions or web browsing, or small TCP connection related and acknowledge and like packets.

Following the pre-filter stage there is a characteristic dependent stage in which the packets are checked against characteristic dependent thresholds, for packet length and inter-arrival period to be within a small range, say 10%. Those packets within the threshold are marked as belonging to the media session with high probability.

More specifically, since IP media packets are entwined with data packets, the algorithm skips packets with unlikely data length or wrong packet rate, as compared with a previous media suspected packet.

Those packets that pass the threshold filter may be fed into a cyclic buffer 32. The cyclic buffer 32 emulates a Jitter-Buffer at the receiving end and allows for bandwidth continuity verification. Consecutive Packets with bandwidth complying with the jitter-buffer's average bandwidth are accepted as potentially true media session packets. A sequence of such packets may indicate a media session.

Packet length, inter-arrival period ("dt") and their derivatives may be accumulated by statistical accumulator 34 to create a statistical vector of session behavioral information. The derivatives may be statistical parameters such as:

- Average dt, Average length, Variance of dt & length, Covariance of dt & length
- Histograms of dt & lengths, Histogram matrixes of lengths variation vs. dt variation

5 Using the above derivatives, statistical behavioral acceptance criteria (SBAC) may be extrapolated, according to which SBAC media sessions are determined and categorized in SBAC decision maker 36. For example, for an incoming media stream of a given sort, the Average, Variance & Covariance of dt, length & bandwidth would not be expected to fluctuate over certain limits which are set by the SBAC. Thus the
10 sort of media stream can be derived.

 Reference is now made to Fig. 3, which is a simplified diagram showing a network probe according to a second embodiment of the present invention. A network adaptor
40 listens to all network traffic. A first level filter 42 then carries pre-filtering to remove irrelevant packets and first level filtering to extract those packets within the
15 length threshold of the suspected stream and.

 The extracted packets are passed to sliding window 44 to create a queue of those packets whose inter-arrival periods correspond, that is they arrive with a regular frequency and therefore could belong to the same media session.

 Series recognition filter 46 analyses the queue to detect a media session. Extractor
20 48 then extracts IP addresses, port, time stamps etc, to allow higher layers or third party equipment to handle the identified sessions.

 Reference is now made to Fig. 4, which is a simplified diagram showing an implementation of apparatus according to the present embodiments as standalone hardware. The network adaptor of Fig. 3 is implemented as an IP stack 50. The filter
25 itself 52 is implemented on a general purpose CPU or a specific DSP, and an additional network adapter 54 connects to a local IP network which runs supported applications 56 such as billing servers.

 Reference is now made to Fig. 5, which is a simplified block diagram illustrating an implementation of the present embodiments in software. In the software case the
30 filter 62 is a software layer between the network interface card (NIC) driver 60 and the application layer 64.

A further implementation uses Neural Networks. Neural networks and like algorithms, including pattern matching algorithms, can be used for either identification, classification or both phases.

5 A neural network is injected with a vector of statistical behavior of a sub-stream of packets. That is to say it is presented with statistical behavior of a sliding window portion of the media session. The vector may include both linear and non-linear (e.g. logarithmic, multiplication & power-function) statistics of accumulated information. The network is pre-trained (using supervised learning) so that it includes appropriate gains at each perceptron input. A hidden layer may be included within the
10 network for part of the non-linear input behaviors.

The neural network preferably has multiple outputs one for each required session type identification or classification. These may include generic types such as "video stream", or "voice stream" or "chat session", and specific application outputs such as Skype session, MSN session, as well as specific end-device outputs such as the
15 Cisco-ATA unit.

Each output preferably comprises a transient function, for example a Gaussian function, which produces a "1" to indicate a detection.

Neural networks being statistical or fuzzy, multiple outputs can become active – indicating that several networks may have detected the stream. In such as case, the
20 strongest output is used as the correct identification, as is known in the field of neural networks.

Furthermore, the neural network may use non-supervised training, for example Self-Organizing Maps ,SOM, to adapt itself and increase accuracy during operation.

Once a session is identified and categorized, the algorithm generates events and/or
25 alerts for each media session, which can be passed on to higher layers or to third party devices. The events or alerts may include:

- The sending and receiving IP addresses. These may be extracted from the source and destination fields in the packet header. Of course in the case of conference sessions there may be more than two such addresses. It is noted that end-users
30 with fixed (i.e. static) IP address, may use similar media traffic in the future as well, so that there may be some benefit to caching these IP-addresses for recognition later on. The cached addresses could be saved by the algorithm filter

or by the upper layer for a certain duration and marked as "suspected IP-addresses" for future inspection.

- IP-Port numbers associated with the session can be extracted from "Source Port" and "Destination Port" fields in the header. Note that some applications (e.g. Skype) tend to use the same Port-number for future media sessions, so that the Port-numbers could usefully be cached, along with the suspect IP-addresses as described above – to accelerate the detection process and/or increase detection probability factor for future sessions.
- "Session Start" and "Session End" time stamps (to milli-seconds resolution) can be recorded to indicate call duration. Such is useful where the primary motivation of monitoring the session is for billing purposes, for example in billing mediation systems.
- Session media type information, including media classification: voice call, video call etc may be recorded.
- Data transfer within a media session, may be identified, say by detecting sharp fluctuations in Bandwidth at various times during a media session. The durations or the bandwidth may be recorded as required.
- Session protocol type indicating the application or end-device being used if available may be recorded. An indication may be provided as to which standard if the session is a standard based session, that is based on Codecs conforming to a given standard. If possible an indication of the exact Codec used may be provided. Likewise an indication of a non-standard Codec based session, e.g. Skype, may be provided as an event.

The identification engine may be implemented in any suitable form. The implementation may include sequential logic using hardware or software modules to implement the above described features. Alternatively, the identification engine may be implemented in whole or in part by a Neural Network, whether pre-trained or self-trained. Other artificial intelligence mechanisms may be used in place of neural networks and the system may use a general purpose CPU or dedicated DSP components. Alternatively any combination of the above may be used.

Reference is now made to Fig. 6, which is a simplified flow chart illustrating operation of a method according to the presently preferred embodiments. A method of allocating communication resources to media sessions in accordance with session type,

comprises a first stage 60 of categorizing passing packets using external packet characteristics, such as length, inter-arrival period, or derivatives thereof.

A second stage 62 involves grouping together those packets having similar values of the external characteristics. Upper and lower thresholds are used based on the premise that packets of the same session vary only by small amounts. The thresholds may be dynamic since larger changes in the packets may occur over longer timescales.

A third stage 64 involves analyzing those packets which have been grouped together as having a high probability of belonging to the same session, for session characteristics. The session characteristics allow a session type to be identified and then in stage 66, resources can be assigned accordingly.

In one alternative, packets may be marked so that the network resource management can identify the relevant packets for resource allocation.

Advantages of the above embodiments include the possibility of inspection of high bandwidth IP traffic to allow media session detection using low computing resources. The system allows ubiquitous implementation of the identification technology on large and small network structures.

The present embodiments may be used with applications such as Session Border Controllers, Firewalls & billing mediation servers. The present embodiments allow media sessions to be filtered out and identified so that the application need only analyze relevant media traffic. Prior art versions of these applications had to filter out the packets of interest from the total high bandwidth traffic, meaning they had to inspect all the passing traffic.

In the claims that follow, the term "session managing entity refers to any application or endpoint device or terminal unit which manages or generates a session.

It is expected that during the life of a patent maturing from this application many relevant Internet Protocol transport variations will be developed and the scope of the term Internet Protocol is intended to include all such new technologies *a priori*.

The terms "comprises", "comprising", "includes", "including", "having" and their conjugates mean "including but not limited to". This term encompasses the terms "consisting of" and "consisting essentially of".

As used herein, the singular form "a", "an" and "the" include plural references unless the context clearly dictates otherwise. For example, the term "a compound" or

"at least one compound" may include a plurality of compounds, including mixtures thereof.

It is appreciated that certain features of the invention, which are, for clarity, described in the context of separate embodiments, may also be provided in combination in a single embodiment. Conversely, various features of the invention, which are, for brevity, described in the context of a single embodiment, may also be provided separately or in any suitable subcombination or as suitable in any other described embodiment of the invention. Certain features described in the context of various embodiments are not to be considered essential features of those embodiments, unless the embodiment is inoperative without those elements.

Although the invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art. Accordingly, it is intended to embrace all such alternatives, modifications and variations that fall within the spirit and broad scope of the appended claims.

All publications, patents and patent applications mentioned in this specification are herein incorporated in their entirety by reference into the specification, to the same extent as if each individual publication, patent or patent application was specifically and individually indicated to be incorporated herein by reference. In addition, citation or identification of any reference in this application shall not be construed as an admission that such reference is available as prior art to the present invention. To the extent that section headings are used, they should not be construed as necessarily limiting.

WHAT IS CLAIMED IS:

1. Electronic network apparatus for identifying media sessions over IP and network packets as belonging or not belonging to a media session, comprising:

a packet characteristic extraction unit configured for obtaining packet characteristics from a succession of packets, said characteristics comprising packet traffic characteristics;

a grouping unit associated with said packet characteristic extraction unit, configured to group together those packets having similar traffic characteristics as probably belonging to a common session, and

a session analyzer configured for analyzing said grouped packets for session characteristics, therewith to identify a session type.

2. The apparatus of claim 1 further comprising a resource allocator for allocating at least one member of the group consisting of resources, provisioning features and control features to said session.

3. The apparatus of claim 1, wherein said session type identification comprises identifying a session managing entity generating or managing said session.

4. The apparatus of claim 1, wherein said session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase.

5. Apparatus according to claim 1, further comprising a thresholder for thresholding said traffic characteristics, and a packet session identifier configured to identify those packets whose characteristics are mutually within said thresholds for said grouping unit to group said packets as belonging to said common session.

6. The apparatus of claim 1, wherein said traffic characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

7. The apparatus of claim 1, wherein said grouping unit comprises a packet marker, associated with said packet session identifier, configured for inserting into a header of a respective packet an indication of said common session with which said respective packet has been identified.

8. The apparatus of claim 7, further comprising a session analyzer associated with said packet marker, configured to obtain packets marked as belonging to said common session and to determine, from said packets, characteristics belonging to said common session, therefrom to identify a session type.

9. The apparatus of claim 8, wherein said session analyzer is configured to obtain said characteristics belonging to said common session from parameter patterns common to said packets.

10. The apparatus of claim 8, wherein said session analyzer is configured to use at least one member of the group consisting of:

- packet length
- inter-arrival period
- variance of inter-arrival period
- variance of length
- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length

- vii. a statistical derivative obtained from multi records of packet length
- viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period

11. The apparatus of claim 8, wherein said session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase.

12. The apparatus of claim 1, further comprising a resource allocator configured to allocate resources on a network according to said identified common session.

13. The apparatus of claim 8, further comprising a resource allocator, configured to allocate resources on a network according to said identified session type

14. The apparatus of claim 1, wherein at least one of said packet session analyzer, said extraction unit and said grouping unit comprises a neural network.

15. A method of identifying session type, comprising categorizing passing packets using traffic packet characteristics;

grouping together those packets having similar values of said traffic characteristics, and

analyzing said grouped packets for session characteristics,
thereby to identify a session type.

16. The method of claim 15 wherein said identifying a session type comprises identifying a session managing entity generating or managing said session.

17. The method of claim 15 wherein said identifying a session type is followed by at least one of the group comprising: providing provisioning and providing control actions to the session.

18. Method according to claim 15, further comprising thresholding said traffic characteristics, and identifying those packets whose characteristics are mutually within said thresholds for said grouping.

19. The method of claim 15, wherein said characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

20. The method of claim 15, further comprising inserting into a header of a respective packet an indication of said common session with which said respective packet has been identified.

21. The method of claim 15, comprising obtaining said characteristics belonging to said common session from parameter patterns common to said packets.

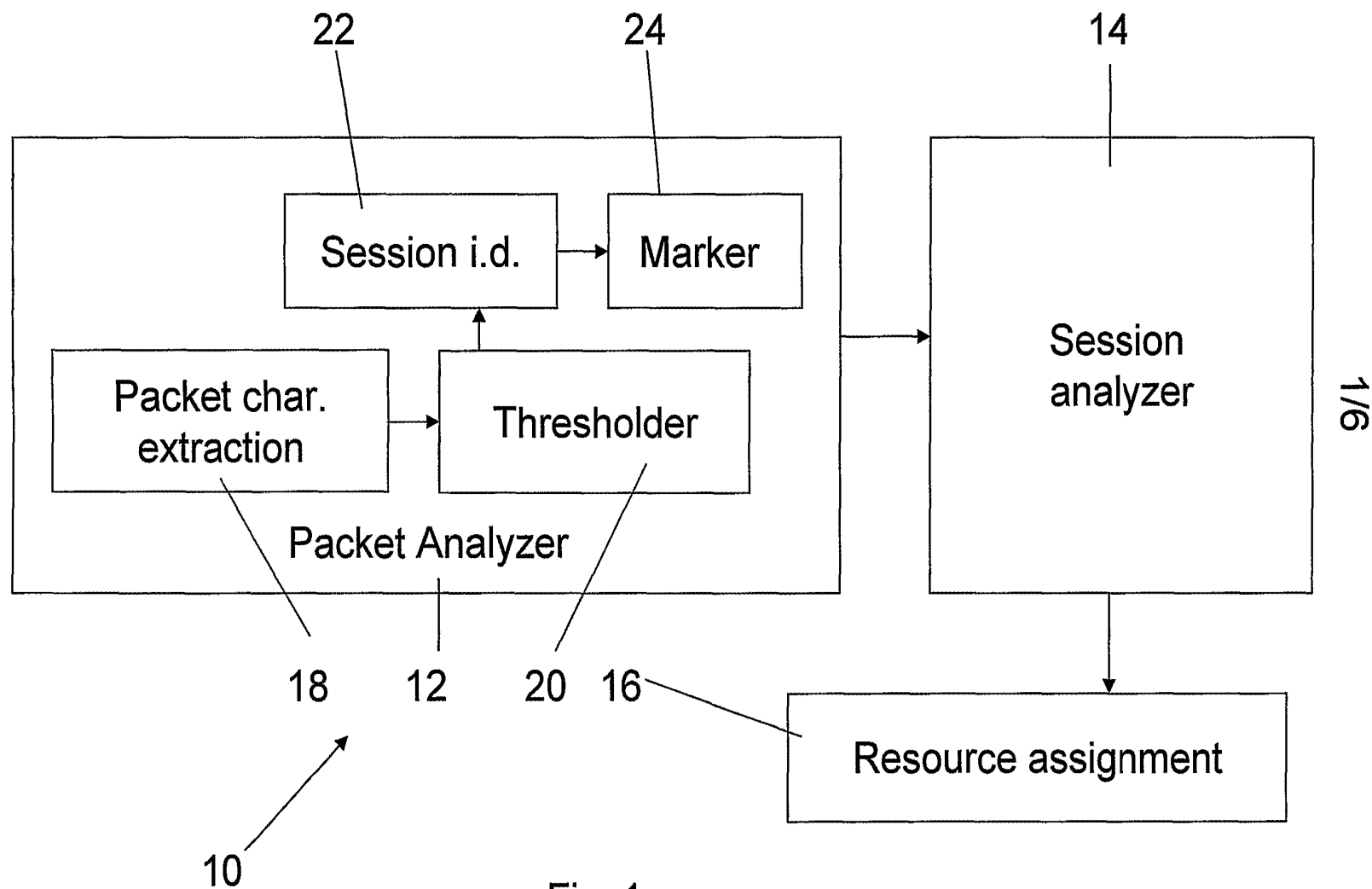
22. The method of claim 15, comprising using at least one member of the group consisting of:

- packet length
- inter-arrival period
- variance of inter-arrival period
- variance of length

- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period.

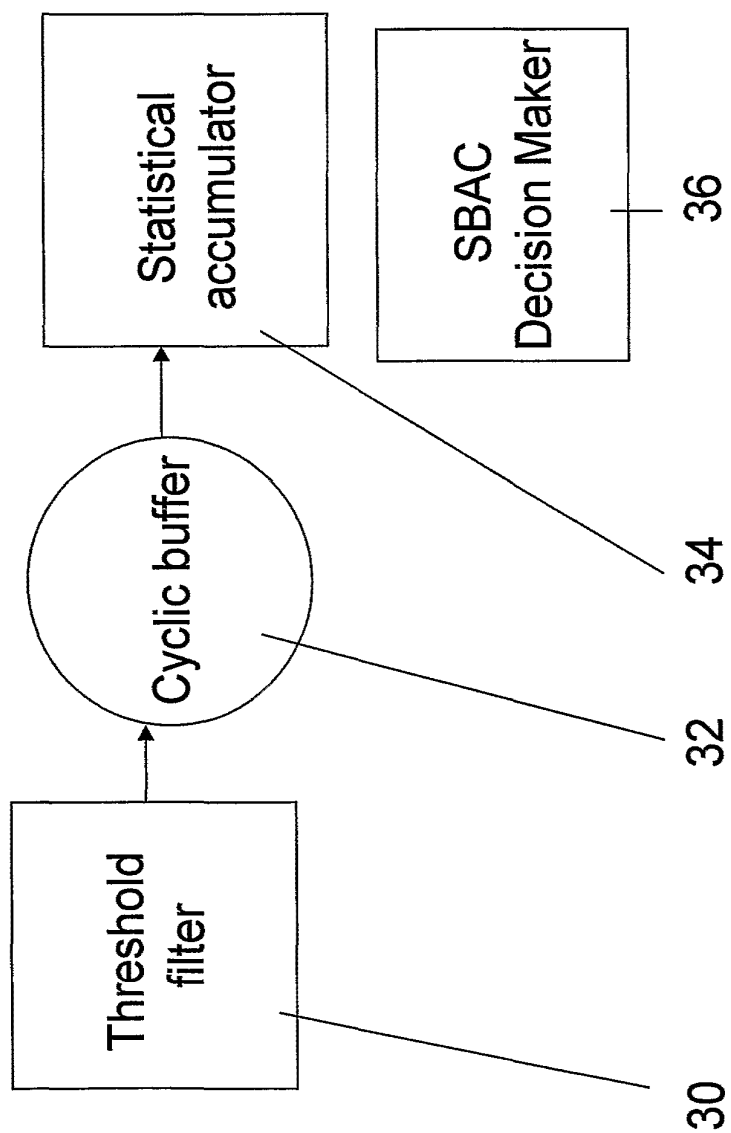
23. The method of claim 15, comprising using a neural network and characteristics automatically built into said neural network during a neural network training phase.

24. The method of claim 16, further comprising using a neural network and characteristics automatically built into said neural network during a neural network training phase.



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Fig. 2



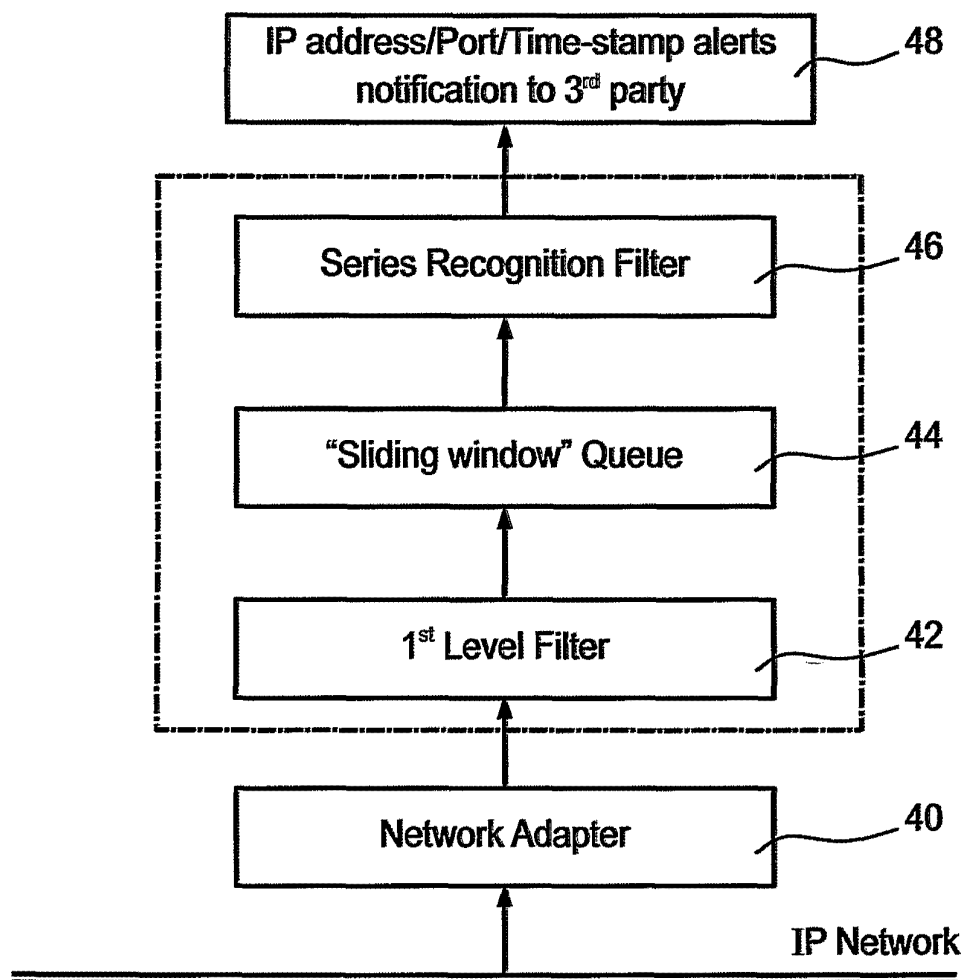


Fig. 3

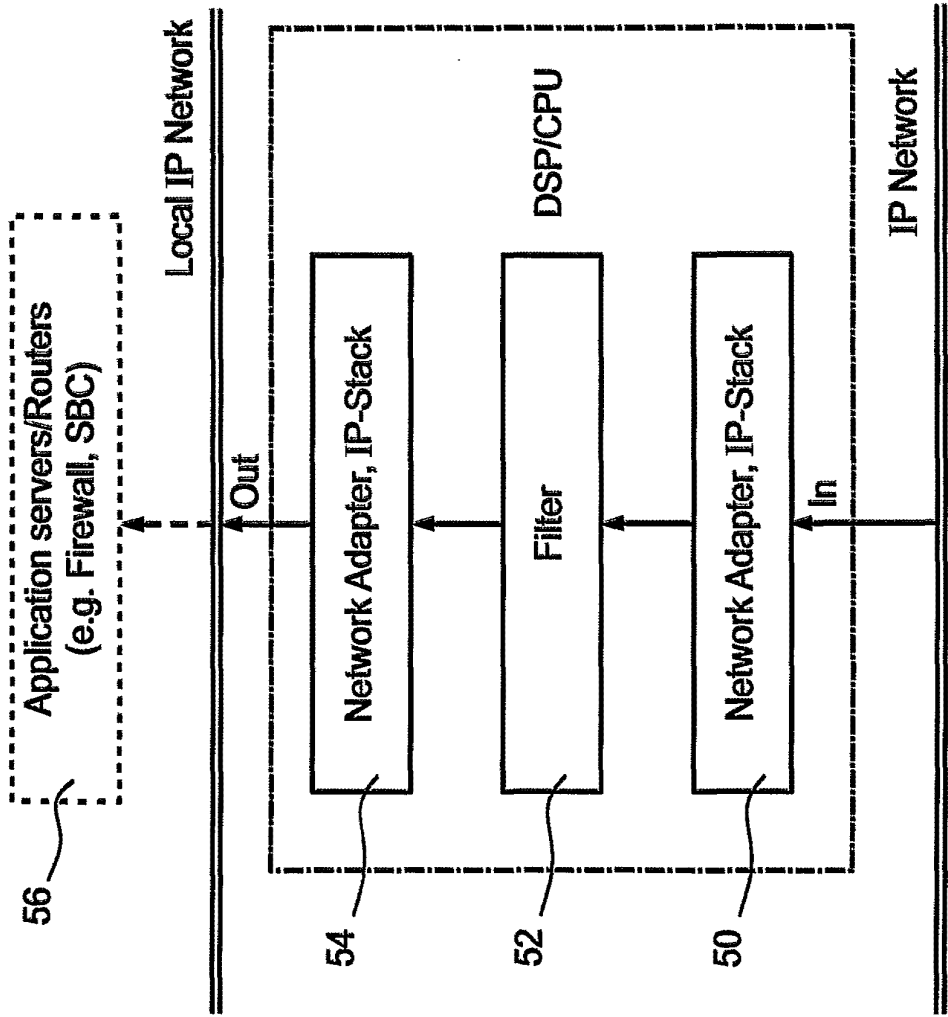


Fig. 4

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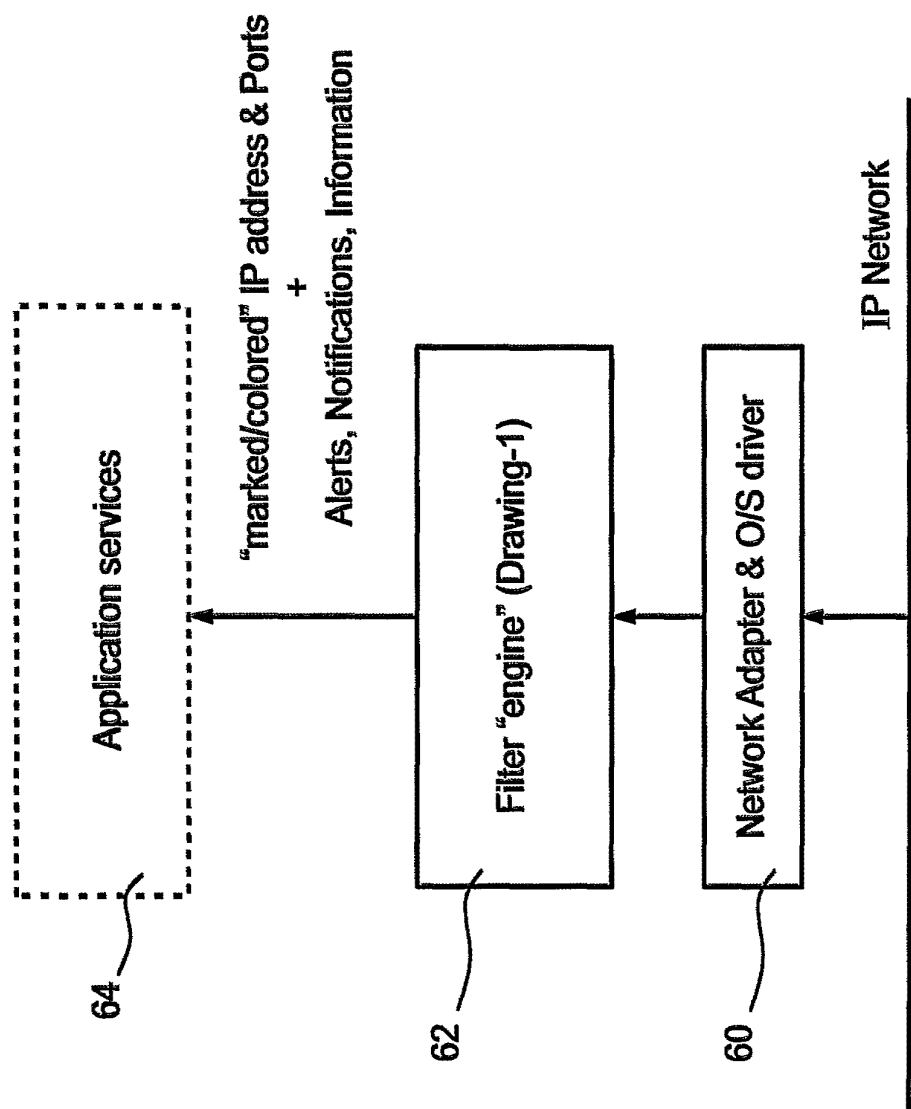


Fig. 5

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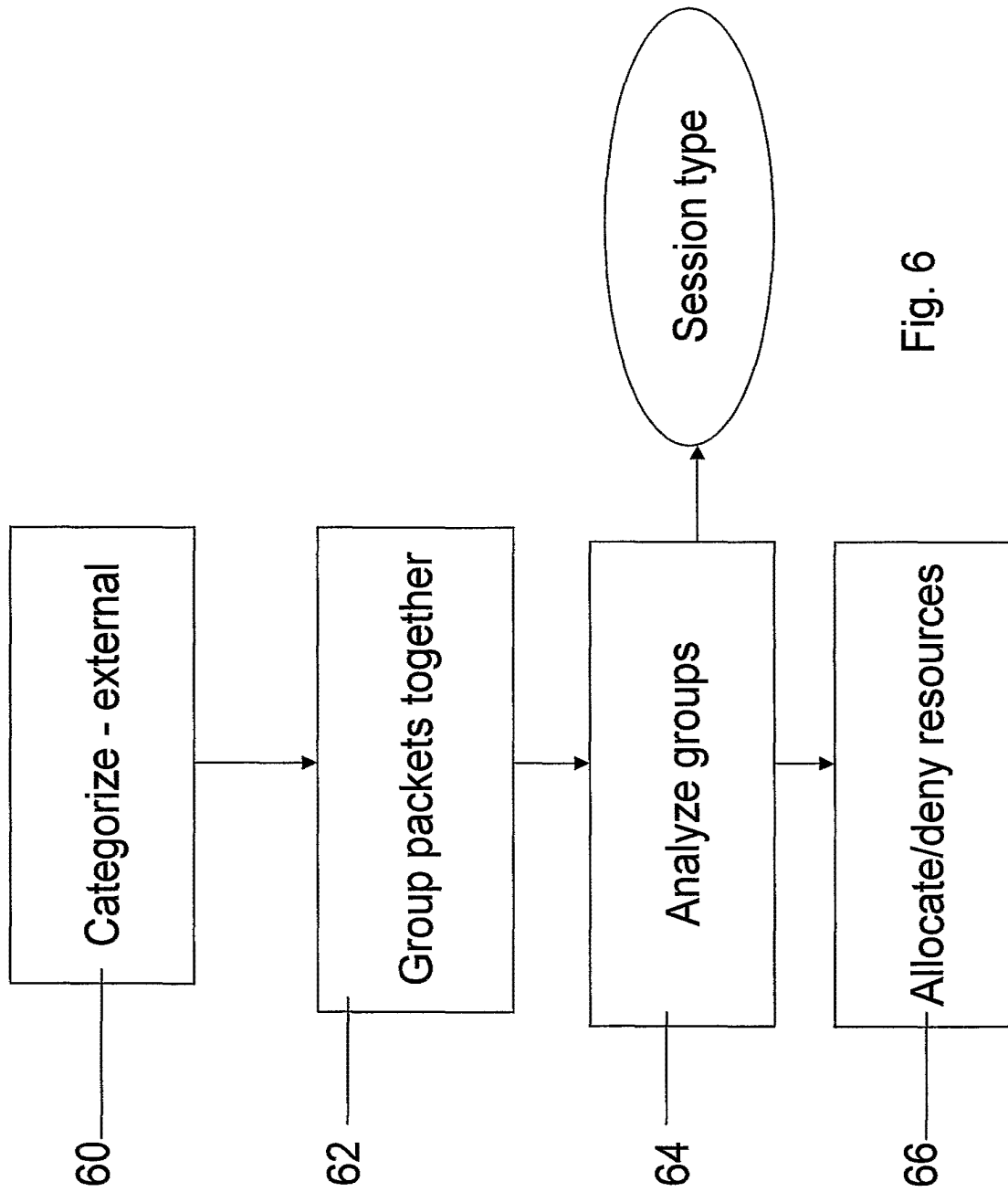


Fig. 6

Electronic Acknowledgement Receipt

EFS ID:	8862880
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Confirmation Number:	3332
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First Named Inventor/Applicant Name:	Avi Oron
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	form1449.pdf	43253 fcf95da3b9c5d0443dee54db45ec841d5300ed31	no	2

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(54) Title: MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

(57) Abstract: A method of allocating, restricting or refusing communication resources to media sessions in accordance with individual session or session type, comprises: categorizing passing packets using packet traffic characteristics such as packet length or inter-arrival period; grouping together those packets having similar traffic characteristics, and analyzing the grouped packets for session characteristics, thereby to identify a session type and allocate resources to the session or provisioning or like actions or services.



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MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

5 FIELD AND BACKGROUND OF THE INVENTION

The present invention, in some embodiments thereof, relates to a media session identification method for IP networks and, more particularly, but not exclusively, to a media session identification method that identifies media sessions from the flow of packets and assigns specific packets to the media sessions. It is noted that the term "session" includes streaming of data, such as in for example a video stream.

The continuous increase in IP based media traffic over the Internet and other networks, supported by the continuous increase in the various media communication applications, emphasizes the need for IP traffic control tools to cope with the increasingly congested networks. These IP traffic control tools are required by Internet service providers (ISPs), IP-Telephony providers (mobile and fixed) and by Enterprises for implementing traffic shaping measures such as availability of service and quality of service, for firewall enhancements, for providing media session logs supporting billing capabilities and for meeting and supporting lawful interception guidelines set by governments and governmental bodies.

A media session, such as a voice or video session, is expected to have a continuous stream of sampled data so it can be reconstructed at its destination to produce smooth sound or images or both. This means that a minimum amount of data bandwidth has to be sustained on the network. As media at either end is sampled and de-assembled or re-assembled by symmetrical session CODECs (coder & decoder) – data streaming must comply with a certain bandwidth demand and packet-rate so that the human ear or eye at the destination does not experience any information gaps or distortions.

It is desirable to identify packets as belonging to a session to group the succession of IP packets and also to identify a particular application or type that the session belongs to in order to apply provisioning, quality of service and control actions to the session or stream; applications that are real time sensitive such as Voice-over-IP and/or Video-over-IP tend also to be bandwidth availability sensitive, therefore maintaining the quality of service for such application sessions require the identification, and possibly the classification, of their traffic streams. It may also be

desirable to identify a session or a stream belonging to a particular application in order to implement and meet interception requirements by law enforcement authorities, as well as in the need to generate CDRs for billing and analysis purposes, and the like. In other cases, some applications may be perceived as prohibited or posing a security risk, that is creating 'security holes', and some networks may be interested in blocking such applications. Again, the best way to do so is to identify the session and the packets belonging to the session and then block packets belonging to the session. For example, many organizations treat Instant-Messaging (IM) applications as high security risks which might create a hole through which sensitive data can flow out of an organization. For those organizations, it is highly essential to identify data flow (e.g. file-transfers) within a media session.

Various methods for analyzing IP traffic are available. The traditional technologies for analyzing and identifying IP traffic (including IP media sessions) include packet header analysis. Packets whose headers indicate the same destination may be assumed to belong to the same session. Packet header analysis is however simplistic. The same user may be running several different sessions simultaneously and mere packet header analysis may not be able to distinguish between them. Thus there is also the so called 'Deep Packet Inspection' method, or the 'Packet Content Analysis'. These known technologies require digging into and analyzing the content, or Payload, of the packets, with the aim of extrapolating signatures or fingerprints of the payloads. The signatures can then be identified with a specific protocol or application. More often than not, the identification process includes analysis of additional factors from the packet 'Header' (e.g. addresses and port numbers).

There are several disadvantages of the Deep Packet Inspection approach, of which the major are known to be:

1. Alteration of Payloads: Packet Payloads can change due to changes in the application. Thus a signature that has been extrapolated and correlated to a specific protocol or application can be rendered invalid upon the alteration of the payload due say to a new version release.
2. Encryption of packet content: Certain media applications (e.g. Skype) encrypt the messages, which pose a difficulty in inspecting the Payload of its packets and obtaining a meaningful signature.

In other words, the deep packet inspection method is dependant on elements that can be encrypted or altered by the application and can therefore be initially unreadable or the reading can become invalid if the application alters its content sequence.

In order to at least partly overcome the above problems, it is also known to use
5 Complete Packet Inspection (CPI), which combines header analysis and deep packet inspection, otherwise known as payload pattern search. The header analysis provides additional information that complements the payload pattern search. Complete packet inspection is relatively widely used and applications include network monitoring, application discovery, behavioral analysis, network security, policy enforcement, test
10 and measurement, lawful interception, and trouble shooting.

Nevertheless, both deep packet inspection and complete packet analysis require analysis of multiple packets and their sequence down to the payload. Thus, using deep packet inspection/content inspection on any sizeable network requires strong powerful monitoring processing power as well as huge memory resources, as many thousands of
15 IP sessions occur simultaneously. This renders the solution unfeasible in many cases. In other cases the traffic throughput rate is limited by the inspection capacity. Where the aim is to ensure quality of service for the IP sessions that require it, the very attempt to solve the problem may be making things worse.

State-full inspection Firewalls, Session Border Controllers (SBC) and billing
20 mediation systems each require inspection for their own needs. Thus in some cases the interest may be in blocking the session, in other cases in prioritizing the session and in yet other cases the interest may lie in creating billing records (CDR) for the session. Due to the heavy processing requirement, inspection thus tends to be limited to a relatively small number of simultaneous IP-sessions (e.g. calls) that can be
25 managed, and this prohibits any effective inspection at perhaps the one place it could be most effective, namely at the operator's high-speed backbones.

Some existing data security systems detect and prevent intrusion using simple predefined behavioristic rules and thresholds to alert for abnormal traffic behavior which may indicate possible attacks on the network (customarily implemented in
30 Firewall technologies). Such suspicious behavior may include indications of denial of service (DoS) attacks.

One of the characteristics of a media session is the tendency to consist of a packet stream having a low variation in packet length and/or inter-arrival periods.

However, network delay & jittering as well as the fact that some codecs support silence suppression may lead to large inter-arrival period variations.

The existing technologies, including deep and complete packet inspections, do not help specifically in controlling these media sessions for the reasons given above, since the packets are not always recognized.

SUMMARY OF THE INVENTION

The present invention relates to the use of the regularity and similarity characteristics of packet traffic, belonging to a media session, to identify the packets belonging to a given media session, and subsequent identification of the kind of media session, so that the media session can be provisioned and/or controlled (e.g allocating appropriate resources or not allocating at all, as required). In general, the identification is probabilistic as opposed to definitive. Herein the media session may be identified on a number of levels from the most generic to the very specific. All the session identifications from the most generic to the most specific are referred to as the session type. A generic identification may refer to identification of the session type as being video or audio or music or the like, including the identification of interactions within such session, such as instant messaging, file transfer and application sharing. The more specific identifications may involve a specific end-device or application and the term type further includes anything in between. Packet identification or grouping, are terms used to refer to an identification of packets that belong together to a session type in a common session.

According to an aspect of some embodiments of the present invention there is provided electronic network apparatus for identifying media sessions over IP and network packets as belonging or not belonging to a media session, comprising:

a packet characteristic extraction unit configured for obtaining packet characteristics from a succession of packets, the characteristics comprising packet traffic characteristics;

a grouping unit associated with the packet characteristic extraction unit, configured to group together those packets having similar traffic characteristics as probably belonging to a common session, and

a session analyzer configured for analyzing the grouped packets for session characteristics, therewith to identify a session type.

The apparatus may comprise a resource allocator for allocating at least one member of the group consisting of resources, provisioning features and control features to the session.

In an embodiment the session type identification comprises identifying an application and/or end-device generating or managing the session.

In an embodiment, the session analyzer comprises a neural network, using characteristics automatically built into the neural network during a neural network training phase.

An embodiment comprises a thresholder for thresholding the traffic characteristics, and a packet session identifier configured to identify those packets whose characteristics are mutually within the thresholds for the grouping unit to group the packets as belonging to the common session.

In an embodiment, the traffic characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

In an embodiment, the grouping unit comprises a packet marker, associated with the packet session identifier, configured for inserting into a header of a respective packet an indication of the common session with which the respective packet has been identified.

An embodiment comprises a session analyzer associated with the packet marker, configured to obtain packets marked as belonging to the common session and to determine, from the packets, characteristics belonging to the common session, therefrom to identify a session type.

In an embodiment, the session analyzer is configured to obtain the characteristics belonging to the common session from parameter patterns common to the packets.

In an embodiment, the session analyzer is configured to use at least one member of the group consisting of:

- packet length
- inter-arrival period
- variance of inter-arrival period
- variance of length

- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period

In an embodiment, the session analyzer comprises a neural network, using characteristics automatically built into the neural network during a neural network training phase.

An embodiment comprises a resource allocator configured to allocate resources on a network according to the identified common session.

An embodiment comprises a resource allocator, configured to allocate resources on a network according to the identified session type

An embodiment comprises at least one of the packet session analyzer, the extraction unit and the grouping unit comprises a neural network.

5 According to a second aspect of the present invention there is provided a method of identifying session type, comprising

categorizing passing packets using traffic packet characteristics;

grouping together those packets having similar values of the traffic characteristics, and

10 analyzing the grouped packets for session characteristics,

thereby to identify a session type.

Unless otherwise defined, all technical and/or scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which the invention pertains. Although methods and materials similar or equivalent to those
15 described herein can be used in the practice or testing of embodiments of the invention, exemplary methods and/or materials are described below. In case of conflict, the patent specification, including definitions, will control. In addition, the materials, methods, and examples are illustrative only and are not intended to be necessarily limiting.

20 Implementation of the method and/or system of embodiments of the invention can involve performing or completing selected tasks manually, automatically, or a combination thereof. Moreover, according to actual instrumentation and equipment of embodiments of the method and/or system of the invention, several selected tasks could be implemented by hardware, by software or by firmware or by a combination
25 thereof using an operating system.

For example, hardware for performing selected tasks according to embodiments of the invention could be implemented as a chip or a circuit. As software, selected tasks according to embodiments of the invention could be implemented as a plurality of software instructions being executed by a computer
30 using any suitable operating system. In an exemplary embodiment of the invention, one or more tasks according to exemplary embodiments of method and/or system as described herein are performed by a data processor, such as a computing platform for executing a plurality of instructions. Optionally, the data processor includes a volatile

memory for storing instructions and/or data and/or a non-volatile storage, for example, a magnetic hard-disk and/or removable media, for storing instructions and/or data. Optionally, a network connection is provided as well. A display and/or a user input device such as a keyboard or mouse are optionally provided as well.

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BRIEF DESCRIPTION OF THE DRAWINGS

Some embodiments of the invention are herein described, by way of example only, with reference to the accompanying drawings. With specific reference now to the drawings in detail, it is stressed that the particulars shown are by way of example and for purposes of illustrative discussion of embodiments of the invention. In this regard, the description taken with the drawings makes apparent to those skilled in the art how embodiments of the invention may be practiced.

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In the drawings:

FIG. 1 is a simplified block diagram showing a packet and session identification apparatus according to a first embodiment of the present invention;

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FIG. 2 is a simplified block diagram showing a general implementation of the apparatus of Fig. 1;

FIG. 3 is a simplified block diagram showing another embodiment of the present invention;

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FIG. 4 is a simplified block diagram showing a hardware implementation of the embodiment of Fig. 3;

FIG. 5 is a simplified block diagram showing a software layer implementation of the embodiment of Fig. 3; and

FIG. 6 is a simplified flow chart showing a method of analyzing packets for media sessions according to an embodiment of the present invention.

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DESCRIPTION OF EMBODIMENTS OF THE INVENTION

The present invention, in some embodiments thereof, relates to IP traffic inspection by means of identifying those packets having similar traffic characteristics as probabilistically belonging to the same media session. Traffic characteristics relate to those parameters inherent to packets traffic flow as it travels from source to destination and includes features such as packet length, inter-arrival period, bandwidth and

30

statistical and other derivations thereof as well as certain header characteristics such as source address and destination address but excludes packet payload content whose inspection is common in deep packet inspection (packet content inspection) techniques. The traffic characteristics may also be used to identify the session type so that appropriate resources can be made available or not for the session, or other provisioning and control actions may be applied to the session.

Before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not necessarily limited in its application to the details of construction and the arrangement of the components and/or methods set forth in the following description and/or illustrated in the drawings and/or the Examples. The invention is capable of other embodiments or of being practiced or carried out in various ways.

Referring now to the drawings, Figure 1 illustrates electronic network apparatus 10 for identifying media sessions and network packets as belonging or not belonging to a media session, grouping, and for determining a session type. As explained the determinations need not be absolute but may be probabilistic. Apparatus 10 comprises a packet analyzer unit 12 and a session analyzer unit 14. A resource assignment unit 16 assigns, or for that matter limits or refuses, network resources to the identified media session so that individual packets are given a priority level according to the needs of the media session to which they are found to belong, or may provide other provisioning or control actions for the session.

The packet analyzer 12 analyzes incoming data packets and determines which packets belong to a common session. The packet analyzer 12 includes a packet characteristic extractor 18 which extracts readily available packet traffic characteristics such as packet length or inter-arrival period, or source or destination addresses or other traffic characteristics of the packets. Readily available characteristics are those characteristics that do not require deep analysis of the packet content. Preferably, characteristics that can be obtained from mere observable traffic behavior examination, without opening the packet, are used. The packet characteristic extraction unit obtains these packet characteristics from a succession of packets.

A thresholder 20 is connected to the packet characteristic extraction unit, and sets up thresholds based on the characteristics found by the extractor. Generally there is a certain amount of uniformity in packets belonging to the same session, thus they

tend to be approximately the same length and to turn up at approximately regular intervals. Thus thresholding for length or inter-arrival period or even better for both, allows for packets to be assigned to a common session with relatively high probability. A packet session identifier 22 uses the thresholds set up by the thresholder to identify
5 as belonging to a common session those packets whose characteristics are mutually within the thresholds.

As mentioned, effective characteristics include but are not limited to packet length and inter-arrival period.

A packet marker 24 may insert an indication of the common session with
10 which a given packet has been identified into its header. Thus packets believed to belong to the same session can be grouped together so that the session itself can be analyzed.

For the purpose of finding out information about the session, session analyzer
14 analyzes the grouped together packets to obtain characteristics that could provide
15 important information about the session type and its requirements. That is to say a session could be identified as being a video session and therefore having a real time quality of service requirement. If possible, an accurate session type, such as a video session using codec type X, or voice session using Skype™, is obtained.

In general a media stream tends to have a small packet rate variation, and also
20 relatively small packet length, or at least small variation in the packet length. . The method can thus inspect passing packets to see which of the passing packets correspond on this basis and group them together with high probability.

A good source of information that the session analyzer can use is the meta-level parameters which are often included in the packet headers.

25 The session analyzer may use the packet's traffic characteristics, such as packet length and/or inter-arrival period to indicate the session type.

In one embodiment, the session analyzer comprises a neural network. In this case the characteristics used for identifying the session type are automatically built into the neural network during the neural network training phase, and are not explicitly
30 programmed in.

The packets are now assigned to corresponding sessions, and resources are assigned to the session, so that each packet gets priority or otherwise, depending on the session to which it has been assigned. Thus a video session requiring real time

quality of service may receive high bandwidth and its packets may be given high priority. At the other extreme, a chat session may be regarded as a security risk and its packets may be assigned zero resources and dumped or simply blocked.

The present embodiments are now considered in greater detail. The present
5 embodiments identify and distinguish between different media sessions within IP
network traffic using certain packet related elements or characteristics, primarily but
not exclusively packet length and packet inter-arrival period. In practice the
methodology may not use these characteristics directly but rather may make use of a
range of statistical parameters which are derivatives thereof. The elements are
10 external elements that do not require opening of the packet payload, so that there is no
dependency on packet elements that can be altered, hidden or encrypted by the
application. That is to say encrypting the payload has no effect on the methodology
and updates to software versions are unlikely to change the packets so radically that
the session types, at least in terms of quality of service requirement, would not be
15 recognized

The algorithm expects the two parameters of packet length and packet inter-
arrival period to meet certain thresholds if indeed the packets belong to the same
session. Packets that belong to the same session generally have a constant average
bandwidth, or at least an average bandwidth that maintains continuity. The average
20 bandwidth is the average packet length divided by average inter-arrival period, and the
average bandwidth may be used by the method as a derivative of the above packet
characteristics to indicate belonging or not belonging to a session.

Thresholding of the packet length and packet inter-arrival period, or of a
derivative such as statistical variations, sets a basic acceptance criterion for a packet to
25 be considered as part of a media stream, against which each consecutive incoming IP
packet is examined. Those packets that meet the acceptance criteria are categorized
and marked, at high probability, as media session packets, while those packets that do
not meet the acceptance criteria are filtered out or ignored as appropriate.

Using these markings, the marked media session packets are assembled to
30 create the various media streams, which streams are subsequently analyzed using
predefined mathematical and statistical techniques for determining more specific
conclusions on the media session protocol and even the application or end-devices
being used.

Specific constant packet lengths and length-variation behaviors, along with specific packet-rate and rate-variation may further indicate standard and non-standard codecs, session protocols, media type and sometimes even the actual end-point media device being used.

Thus, a packet length histogram may be created by the algorithm and can be used to determine whether the media is using a Constant Bit Rate (CBR) Codec (e.g. G.723.1, G.729A) or a Variable Bit Rate (VBR) Codec (such as the GIPS codec). The G.729A codec for instance, uses constant packet length of 50/60/70 bytes and a corresponding packet inter-arrival period of 100/50/33 PPS (packets per second).

Reference is now made to Fig. 2, which is a simplified block diagram illustrating a more detailed embodiment of the apparatus of Fig. 1. Packets initially enter threshold filter 30. The filter can possibly contain a pre-filter stage in which it filters out those packets having a length and/or inter-arrival period and/or derivatives thereof which could not possibly represent a media session, that is anything whose length and/or inter-arrival period and/or derivatives thereof is above or below a predefined maximum and minimum threshold. Such a prefiltering stage with preset thresholds filters out packets belonging to large file transfer actions or web browsing, or small TCP connection related and acknowledge and like packets.

Following the pre-filter stage there is a characteristic dependent stage in which the packets are checked against characteristic dependent thresholds, for packet length and inter-arrival period to be within a small range, say 10%. Those packets within the threshold are marked as belonging to the media session with high probability.

More specifically, since IP media packets are entwined with data packets, the algorithm skips packets with unlikely data length or wrong packet rate, as compared with a previous media suspected packet.

Those packets that pass the threshold filter may be fed into a cyclic buffer 32. The cyclic buffer 32 emulates a Jitter-Buffer at the receiving end and allows for bandwidth continuity verification. Consecutive Packets with bandwidth complying with the jitter-buffer's average bandwidth are accepted as potentially true media session packets. A sequence of such packets may indicate a media session.

Packet length, inter-arrival period ("dt") and their derivatives may be accumulated by statistical accumulator 34 to create a statistical vector of session behavioral information. The derivatives may be statistical parameters such as:

- Average dt, Average length, Variance of dt & length, Covariance of dt & length
- Histograms of dt & lengths, Histogram matrixes of lengths variation vs. dt variation

5 Using the above derivatives, statistical behavioral acceptance criteria (SBAC) may be extrapolated, according to which SBAC media sessions are determined and categorized in SBAC decision maker 36. For example, for an incoming media stream of a given sort, the Average, Variance & Covariance of dt, length & bandwidth would not be expected to fluctuate over certain limits which are set by the SBAC. Thus the
10 sort of media stream can be derived.

 Reference is now made to Fig. 3, which is a simplified diagram showing a network probe according to a second embodiment of the present invention. A network adaptor
40 listens to all network traffic. A first level filter 42 then carries pre-filtering to remove irrelevant packets and first level filtering to extract those packets within the
15 length threshold of the suspected stream and.

 The extracted packets are passed to sliding window 44 to create a queue of those packets whose inter-arrival periods correspond, that is they arrive with a regular frequency and therefore could belong to the same media session.

 Series recognition filter 46 analyses the queue to detect a media session. Extractor
20 48 then extracts IP addresses, port, time stamps etc, to allow higher layers or third party equipment to handle the identified sessions.

 Reference is now made to Fig. 4, which is a simplified diagram showing an implementation of apparatus according to the present embodiments as standalone hardware. The network adaptor of Fig. 3 is implemented as an IP stack 50. The filter
25 itself 52 is implemented on a general purpose CPU or a specific DSP, and an additional network adapter 54 connects to a local IP network which runs supported applications 56 such as billing servers.

 Reference is now made to Fig. 5, which is a simplified block diagram illustrating an implementation of the present embodiments in software. In the software case the
30 filter 62 is a software layer between the network interface card (NIC) driver 60 and the application layer 64.

A further implementation uses Neural Networks. Neural networks and like algorithms, including pattern matching algorithms, can be used for either identification, classification or both phases.

5 A neural network is injected with a vector of statistical behavior of a sub-stream of packets. That is to say it is presented with statistical behavior of a sliding window portion of the media session. The vector may include both linear and non-linear (e.g. logarithmic, multiplication & power-function) statistics of accumulated information. The network is pre-trained (using supervised learning) so that it includes appropriate gains at each perceptron input. A hidden layer may be included within the
10 network for part of the non-linear input behaviors.

The neural network preferably has multiple outputs one for each required session type identification or classification. These may include generic types such as "video stream", or "voice stream" or "chat session", and specific application outputs such as Skype session, MSN session, as well as specific end-device outputs such as the
15 Cisco-ATA unit.

Each output preferably comprises a transient function, for example a Gaussian function, which produces a "1" to indicate a detection.

Neural networks being statistical or fuzzy, multiple outputs can become active – indicating that several networks may have detected the stream. In such as case, the
20 strongest output is used as the correct identification, as is known in the field of neural networks.

Furthermore, the neural network may use non-supervised training, for example Self-Organizing Maps ,SOM, to adapt itself and increase accuracy during operation.

Once a session is identified and categorized, the algorithm generates events and/or
25 alerts for each media session, which can be passed on to higher layers or to third party devices. The events or alerts may include:

- The sending and receiving IP addresses. These may be extracted from the source and destination fields in the packet header. Of course in the case of conference sessions there may be more that two such addresses. It is noted that end-users
30 with fixed (i.e. static) IP address, may use similar media traffic in the future as well, so that there may be some benefit to caching these IP-addresses for recognition later on. The cached addresses could be saved by the algorithm filter

or by the upper layer for a certain duration and marked as "suspected IP-addresses" for future inspection.

- IP-Port numbers associated with the session can be extracted from "Source Port" and "Destination Port" fields in the header. Note that some applications (e.g. Skype) tend to use the same Port-number for future media sessions, so that the Port-numbers could usefully be cached, along with the suspect IP-addresses as described above – to accelerate the detection process and/or increase detection probability factor for future sessions.
- "Session Start" and "Session End" time stamps (to milli-seconds resolution) can be recorded to indicate call duration. Such is useful where the primary motivation of monitoring the session is for billing purposes, for example in billing mediation systems.
- Session media type information, including media classification: voice call, video call etc may be recorded.
- Data transfer within a media session, may be identified, say by detecting sharp fluctuations in Bandwidth at various times during a media session. The durations or the bandwidth may be recorded as required.
- Session protocol type indicating the application or end-device being used if available may be recorded. An indication may be provided as to which standard if the session is a standard based session, that is based on Codecs conforming to a given standard. If possible an indication of the exact Codec used may be provided. Likewise an indication of a non-standard Codec based session, e.g. Skype, may be provided as an event.

The identification engine may be implemented in any suitable form. The implementation may include sequential logic using hardware or software modules to implement the above described features. Alternatively, the identification engine may be implemented in whole or in part by a Neural Network, whether pre-trained or self-trained. Other artificial intelligence mechanisms may be used in place of neural networks and the system may use a general purpose CPU or dedicated DSP components. Alternatively any combination of the above may be used.

Reference is now made to Fig. 6, which is a simplified flow chart illustrating operation of a method according to the presently preferred embodiments. A method of allocating communication resources to media sessions in accordance with session type,

comprises a first stage 60 of categorizing passing packets using external packet characteristics, such as length, inter-arrival period, or derivatives thereof.

A second stage 62 involves grouping together those packets having similar values of the external characteristics. Upper and lower thresholds are used based on the premise that packets of the same session vary only by small amounts. The thresholds may be dynamic since larger changes in the packets may occur over longer timescales.

A third stage 64 involves analyzing those packets which have been grouped together as having a high probability of belonging to the same session, for session characteristics. The session characteristics allow a session type to be identified and then in stage 66, resources can be assigned accordingly.

In one alternative, packets may be marked so that the network resource management can identify the relevant packets for resource allocation.

Advantages of the above embodiments include the possibility of inspection of high bandwidth IP traffic to allow media session detection using low computing resources. The system allows ubiquitous implementation of the identification technology on large and small network structures.

The present embodiments may be used with applications such as Session Border Controllers, Firewalls & billing mediation servers. The present embodiments allow media sessions to be filtered out and identified so that the application need only analyze relevant media traffic. Prior art versions of these applications had to filter out the packets of interest from the total high bandwidth traffic, meaning they had to inspect all the passing traffic.

In the claims that follow, the term "session managing entity refers to any application or endpoint device or terminal unit which manages or generates a session.

It is expected that during the life of a patent maturing from this application many relevant Internet Protocol transport variations will be developed and the scope of the term Internet Protocol is intended to include all such new technologies *a priori*.

The terms "comprises", "comprising", "includes", "including", "having" and their conjugates mean "including but not limited to". This term encompasses the terms "consisting of" and "consisting essentially of".

As used herein, the singular form "a", "an" and "the" include plural references unless the context clearly dictates otherwise. For example, the term "a compound" or

"at least one compound" may include a plurality of compounds, including mixtures thereof.

It is appreciated that certain features of the invention, which are, for clarity, described in the context of separate embodiments, may also be provided in combination in a single embodiment. Conversely, various features of the invention, which are, for brevity, described in the context of a single embodiment, may also be provided separately or in any suitable subcombination or as suitable in any other described embodiment of the invention. Certain features described in the context of various embodiments are not to be considered essential features of those embodiments, unless the embodiment is inoperative without those elements.

Although the invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art. Accordingly, it is intended to embrace all such alternatives, modifications and variations that fall within the spirit and broad scope of the appended claims.

All publications, patents and patent applications mentioned in this specification are herein incorporated in their entirety by reference into the specification, to the same extent as if each individual publication, patent or patent application was specifically and individually indicated to be incorporated herein by reference. In addition, citation or identification of any reference in this application shall not be construed as an admission that such reference is available as prior art to the present invention. To the extent that section headings are used, they should not be construed as necessarily limiting.

WHAT IS CLAIMED IS:

1. Electronic network apparatus for identifying media sessions over IP and network packets as belonging or not belonging to a media session, comprising:

a packet characteristic extraction unit configured for obtaining packet characteristics from a succession of packets, said characteristics comprising packet traffic characteristics;

a grouping unit associated with said packet characteristic extraction unit, configured to group together those packets having similar traffic characteristics as probably belonging to a common session, and

a session analyzer configured for analyzing said grouped packets for session characteristics, therewith to identify a session type.

2. The apparatus of claim 1 further comprising a resource allocator for allocating at least one member of the group consisting of resources, provisioning features and control features to said session.

3. The apparatus of claim 1, wherein said session type identification comprises identifying a session managing entity generating or managing said session.

4. The apparatus of claim 1, wherein said session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase.

5. Apparatus according to claim 1, further comprising a thresholder for thresholding said traffic characteristics, and a packet session identifier configured to identify those packets whose characteristics are mutually within said thresholds for said grouping unit to group said packets as belonging to said common session.

6. The apparatus of claim 1, wherein said traffic characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

7. The apparatus of claim 1, wherein said grouping unit comprises a packet marker, associated with said packet session identifier, configured for inserting into a header of a respective packet an indication of said common session with which said respective packet has been identified.

8. The apparatus of claim 7, further comprising a session analyzer associated with said packet marker, configured to obtain packets marked as belonging to said common session and to determine, from said packets, characteristics belonging to said common session, therefrom to identify a session type.

9. The apparatus of claim 8, wherein said session analyzer is configured to obtain said characteristics belonging to said common session from parameter patterns common to said packets.

10. The apparatus of claim 8, wherein said session analyzer is configured to use at least one member of the group consisting of:

- packet length
- inter-arrival period
- variance of inter-arrival period
- variance of length
- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length

- vii. a statistical derivative obtained from multi records of packet length
- viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period

11. The apparatus of claim 8, wherein said session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase.

12. The apparatus of claim 1, further comprising a resource allocator configured to allocate resources on a network according to said identified common session.

13. The apparatus of claim 8, further comprising a resource allocator, configured to allocate resources on a network according to said identified session type

14. The apparatus of claim 1, wherein at least one of said packet session analyzer, said extraction unit and said grouping unit comprises a neural network.

15. A method of identifying session type, comprising categorizing passing packets using traffic packet characteristics;

grouping together those packets having similar values of said traffic characteristics, and

analyzing said grouped packets for session characteristics,
thereby to identify a session type.

16. The method of claim 15 wherein said identifying a session type comprises identifying a session managing entity generating or managing said session.

17. The method of claim 15 wherein said identifying a session type is followed by at least one of the group comprising: providing provisioning and providing control actions to the session.

18. Method according to claim 15, further comprising thresholding said traffic characteristics, and identifying those packets whose characteristics are mutually within said thresholds for said grouping.

19. The method of claim 15, wherein said characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

20. The method of claim 15, further comprising inserting into a header of a respective packet an indication of said common session with which said respective packet has been identified.

21. The method of claim 15, comprising obtaining said characteristics belonging to said common session from parameter patterns common to said packets.

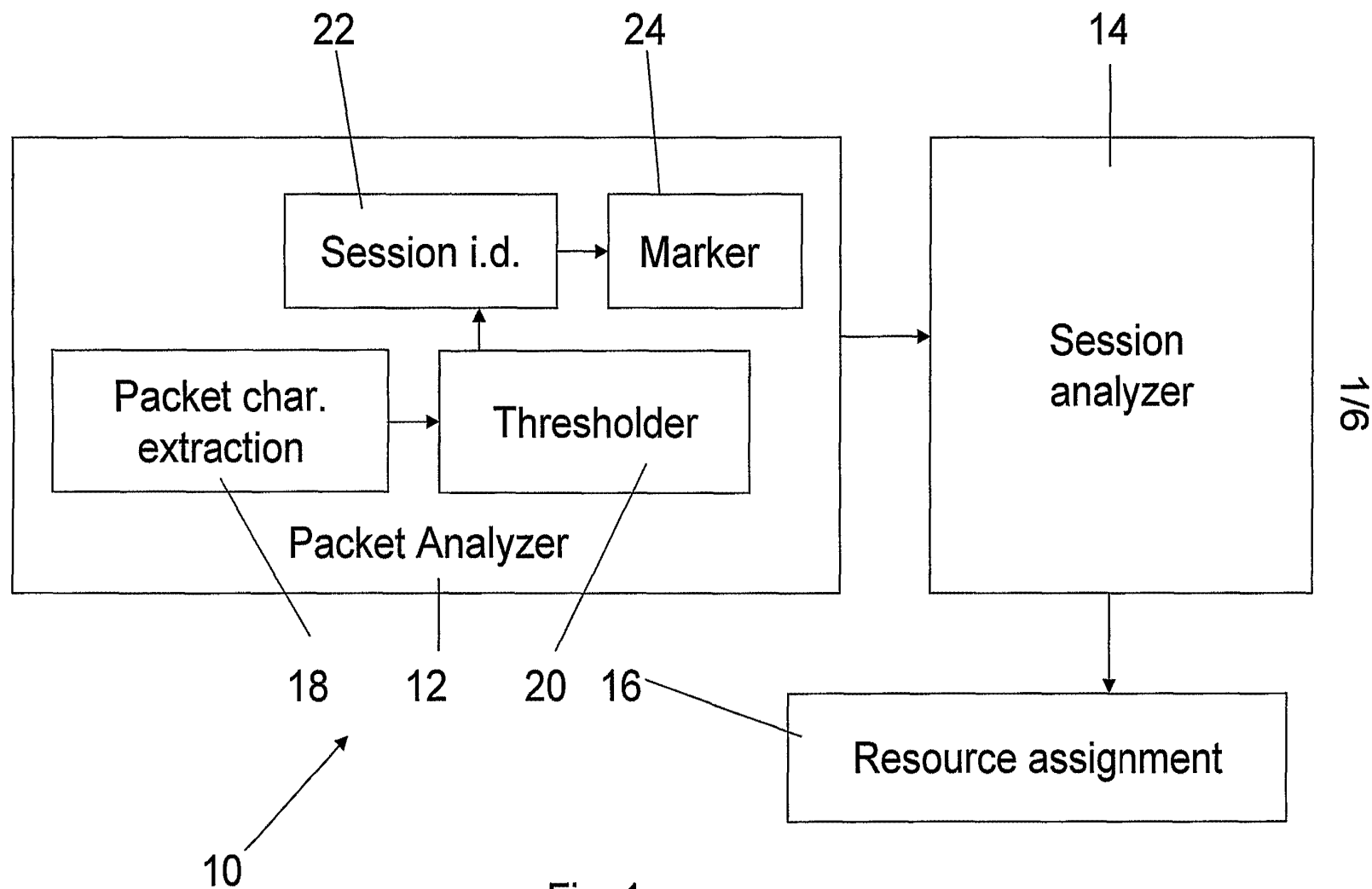
22. The method of claim 15, comprising using at least one member of the group consisting of:

- packet length
- inter-arrival period
- variance of inter-arrival period
- variance of length

- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period.

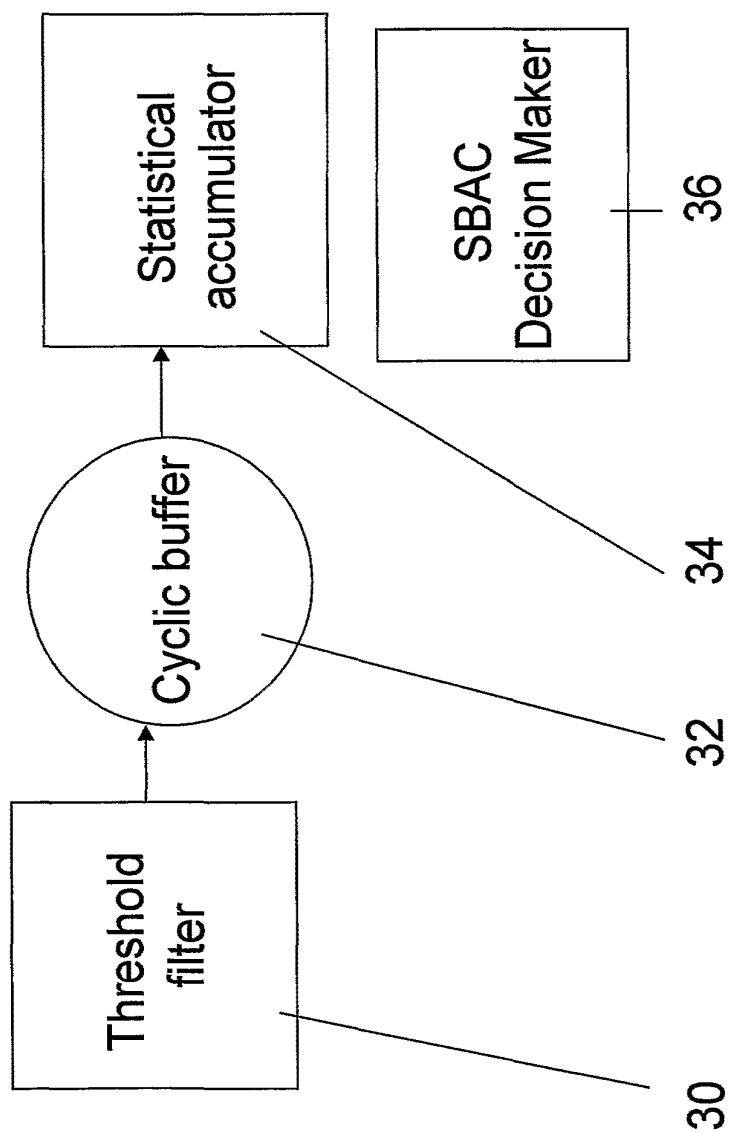
23. The method of claim 15, comprising using a neural network and characteristics automatically built into said neural network during a neural network training phase.

24. The method of claim 16, further comprising using a neural network and characteristics automatically built into said neural network during a neural network training phase.



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Fig. 2



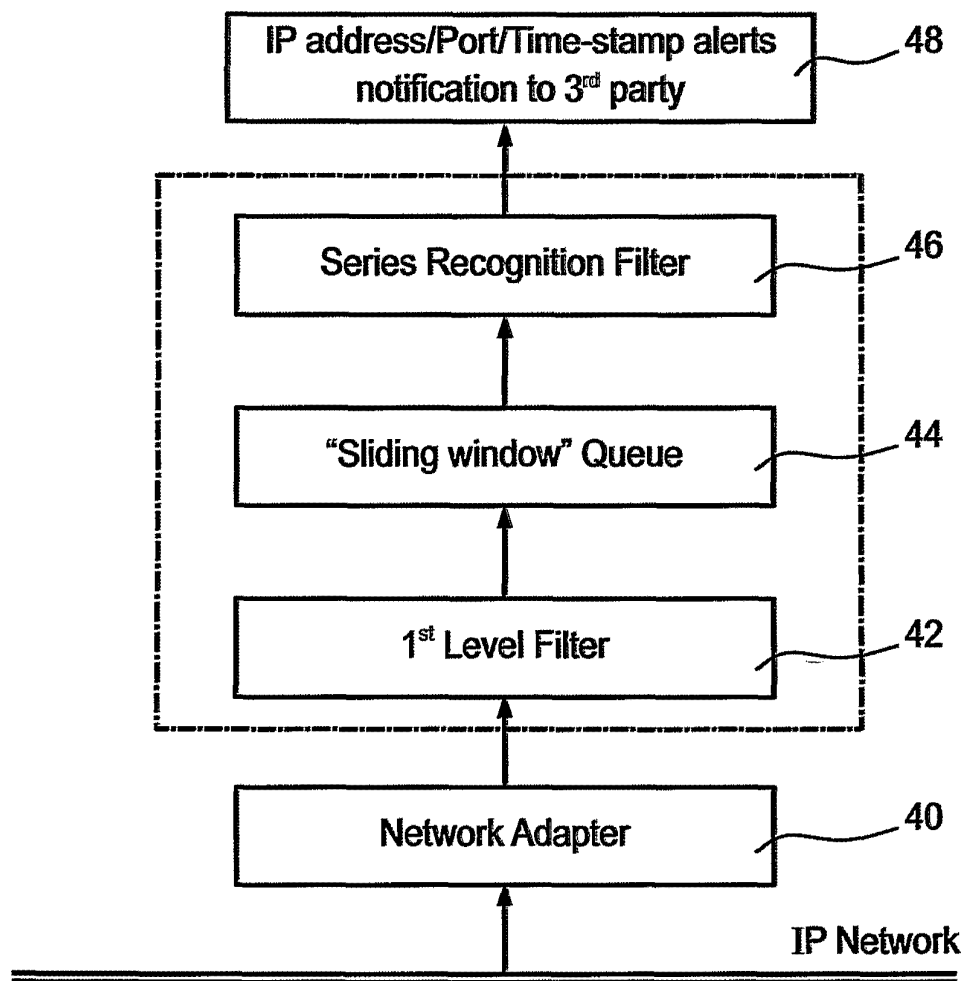


Fig. 3

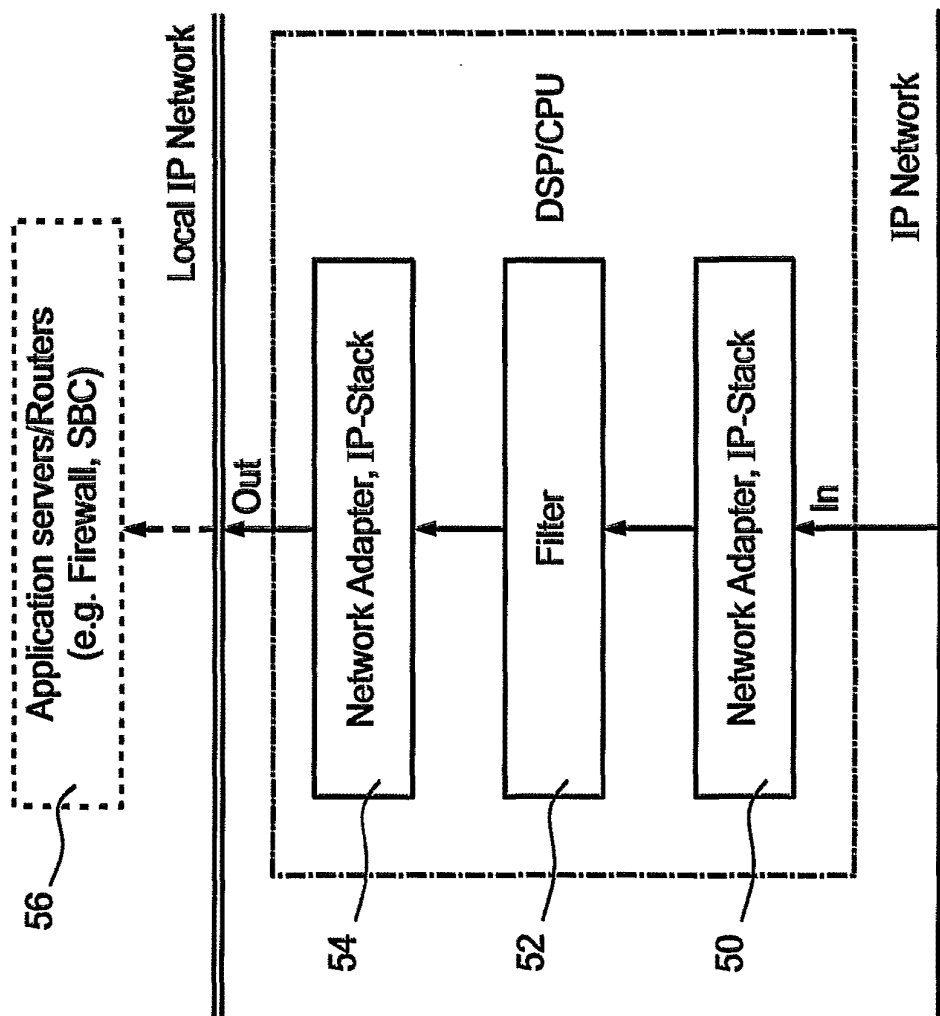


Fig. 4

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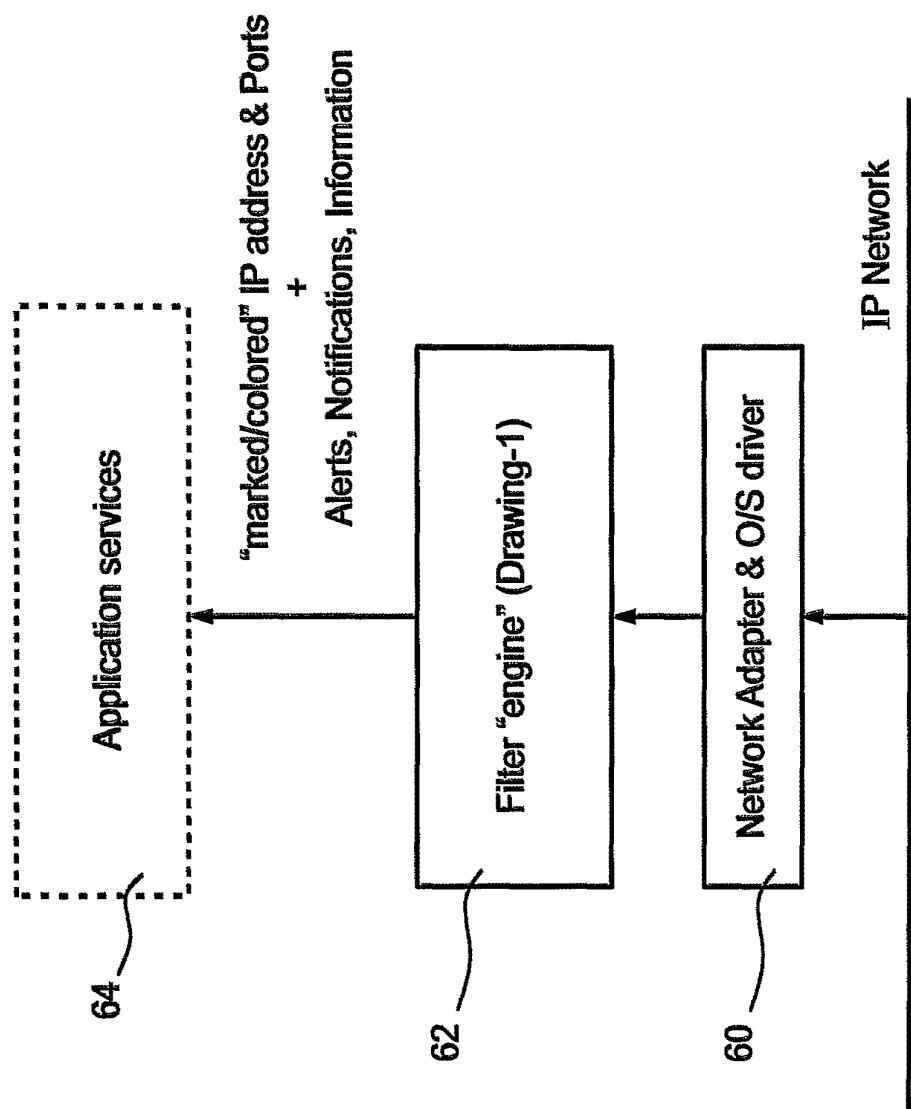


Fig. 5

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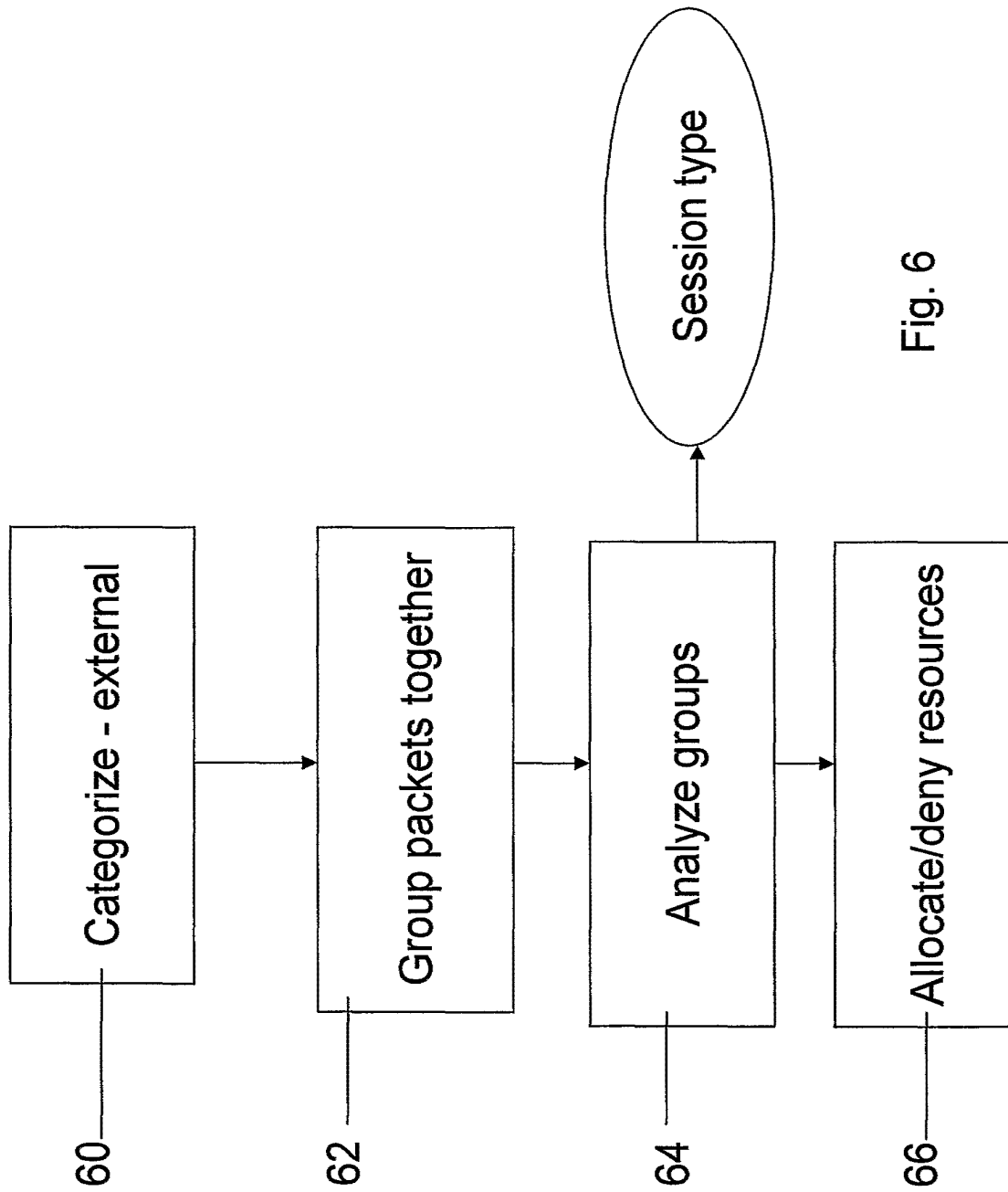


Fig. 6

PATENT COOPERATION TREATY

AG

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:
G.E EHLICH LTD.
11 MENACHEM BEGIN STREET
52521 RAMAT GAN
ISRAEL

RECEIVED
22 OCT 2008
FILE No. 42364
G.E. EHLICH (1995) LTD

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

(PCT Rule 44.1)

Date of mailing
(day-month-year)

07 OCT 2008

Applicant's or agent's file reference
42364

FOR FURTHER ACTION See paragraphs 1 and 4 below

International application No.
PCT/IL 07/01336

International filing date
(day-month-year) 01 November 2007 (01.11.2007)

Applicant ORON, AVI

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes
1211 Geneva 20, Switzerland, Facsimile No.: +41 22 740 14 35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Reminders

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

Form PCT/ISA/220 (January 2004)

(See notes on accompanying sheet)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 42364	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/IL 07/01336	International filing date (<i>day/month/year</i>) 01 November 2007 (01.11.2007)	(Earliest) Priority Date (<i>day/month/year</i>) 06 November 2006 (06.11.2006)
Applicant ORON, AVI		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of:

- ☒ the international application in the language in which it was filed.
☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (see Box No. II).

3. ☐ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

- ☒ the text is approved as submitted by the applicant.
☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- ☒ the text is approved as submitted by the applicant.
☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. 1
☐ as suggested by the applicant.
☒ as selected by this Authority, because the applicant failed to suggest a figure.
☐ as selected by this Authority, because this figure better characterizes the invention.
- b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL 07/01336

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H04L 12/28; H04L 12/56 (2008.04)

USPC - 370/389

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
USPC: 370/389Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 370/389, 392 (text search - see terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST (US PG-PUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT), Google Scholar

Search Terms Used: identify, analyze, test, packet, data, traffic, group, classify, categorize, session, path

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US 2003/0135667 A1 (Mann et al.) 17 July 2003 (17.07.2003), entire document, especially; para [0003], [0005], [0006], [0009], [0021], [0022], [0025], [0028], [0029], [0039], Fig. 2	1-3, 5-9, 12, 13, 15-21 4, 10, 11, 14, 22-24
Y	US 2003/0204562 A1 (Hwang) 30 October 2003 (30.10.2003), entire document, especially; para [0064], [0072], Fig. 3, 4	4, 11, 14, 23, 24
Y	US 6,975,592 B1 (Seddigh et al.) 13 December 2005 (13.12.2005), entire document, especially; col 2, ln 5-20, col 6, ln 5-20, col 9, lines 1-15, col 4, ln 15-45, TABLE I, Fig. 1A	10, 22

☐ Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

25 September 2008 (25.09.2008)

Date of mailing of the international search report

07 OCT 2008

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300

PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (April 2007)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To: G.E EHlich LTD. 11 MENACHEM BEGIN STREET 52521 RAMAT GAN ISRAEL		Date of mailing <i>(day/month/year)</i> <div style="font-size: 1.2em; font-weight: bold;">07 OCT 2008</div>
Applicant's or agent's file reference 42364		FOR FURTHER ACTION See paragraph 2 below
International application No. PCT/IL 07/01336	International filing date <i>(day-month-year)</i> 01 November 2007 (01.11.2007)	Priority date <i>(day-month-year)</i> 06 November 2006 (06.11.2006)
International Patent Classification (IPC) or both national classification and IPC IPC(8) - H04L 12/28; H04L 12/56 (2008.04) USPC - 370/389		
Applicant ORON, AVI		

<p>1. This opinion contains indications relating to the following items:</p> <div style="margin-left: 20px;"> <input checked="" type="checkbox"/> Box No. I Basis of the opinion <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application </div> <p>2. FURTHER ACTION</p> <p>If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.</p> <p>If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.</p> <p>For further options, see Form PCT/ISA/220.</p> <p>3. For further details, see notes to Form PCT/ISA/220.</p>

Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Date of completion of this opinion <div style="font-weight: bold;">28 September 2008 (28.09.2008)</div>	Authorized officer: <div style="text-align: right;">Lee W. Young</div> <div style="font-size: 0.8em;"> PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774 </div>
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Form PCT/ISA/237 (cover sheet) (April 2007)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/L 07/01336

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed.
 - ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. ☐ This opinion has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))
3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this opinion has been established on the basis of:
 - a. type of material
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing
 - ☐ contained in the international application as filed
 - ☐ filed together with the international application in electronic form
 - ☐ furnished subsequently to this Authority for the purposes of search
4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/IL 07/01336

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

1. Statement

Novelty (N)	Claims	4, 10, 11, 14, 22-24	YES
	Claims	1-3, 5-9, 12, 13, 15-21	NO
Inventive step (IS)	Claims	None.	YES
	Claims	1 - 24	NO
Industrial applicability (IA)	Claims	1 - 24	YES
	Claims	None.	NO

2. Citations and explanations:

Claims 1-3, 5-9, 12, 13 and 15-21 lack novelty under PCT Article 33(2) as being anticipated by US 2003/0135667 A1 to Mann et al. (hereinafter 'Mann').

Regarding claim 1, Mann teaches electronic network apparatus (fig. 2) for identifying media sessions over IP and network packets as belonging or not belonging to a media session (para [0005] - received packet individually, including identifying a session from the received packet and accordingly identifying a corresponding session on the host system to which the received packet belongs), comprising: a packet characteristic extraction unit (210 in fig. 2) configured for obtaining packet characteristics from a succession of packets (para [0005] - session from the received packet; para [0005] - identifying a corresponding session), said characteristics comprising packet traffic characteristics (para [0039] - packet status 425); a grouping unit associated with said packet characteristic extraction unit (para [0029] - buffered in the packet queue 220 and classifying them according to the session number), configured to group together those packets having similar traffic characteristics as probably belonging to a common session (para [0029] - buffered in the packet queue 220 and classifying them according to the session number), and a session analyzer configured for analyzing said grouped packets for session characteristics (para [0006] - determines the packet's underlying session), therewith to identify a session type (para [0006] - determines the packet's underlying session).

Regarding claim 2, Mann teaches the apparatus of claim 1, further comprising a resource allocator for allocating at least one member of the group consisting of resources (para [0025] - packet queue allocation mechanism 230 may allocate one or more packet queues as storage space for received packets), provisioning features and control features to said session (Para [0021] - session number; para [0022] - session ID).

Regarding claim 3, Mann teaches the apparatus of claim 1, wherein said session type identification comprises identifying a session managing entity generating or managing said session (para [0005] - identifying a corresponding session on the host system).

Regarding claim 5, Mann teaches the apparatus according to claim 1, further comprising a thresholder (para [0009] - packet queue 220) for thresholding said traffic characteristics (para [0009] - received packets buffered in the packet queue 220 and classifying them according to the session number), and a packet session identifier configured to identify those packets whose characteristics (para [0006] - determines the packet's underlying session) are mutually within said thresholds for said grouping unit to group said packets as belonging to said common session (para [0009] - classifying them according to the session number).

Regarding claim 6, Mann teaches the apparatus of claim 1, wherein said traffic characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth (para [0039] - information as packet identification (ID) 420, packet status 425, packet length 430, packet buffer address 435, or out-of-order indicator 440).

Regarding claim 7, Mann teaches the apparatus of claim 1, wherein said grouping unit comprises a packet marker (para [0022] - packet bundle), associated with said packet session identifier (para [0022] - classification ID" may be assigned to this packet bundle), configured for inserting into a header of a respective packet an indication of said common session with which said respective packet has been identified (para [0003] - marked as "belonging" to a particular session and such marking is usually included in (or encapsulated in) the packets).

Regarding claim 8, Mann teaches the apparatus of claim 7, further comprising a session analyzer associated with said packet marker, configured to obtain packets marked as belonging to said common session (para [0028] - classification-based packet transferring mechanism 120 may dynamically determine a session number) and to determine, from said packets, characteristics belonging to said common session, there from to identify a session type (para [0003] - packets are originally derived from data of some communication session).

Regarding claim 9, Mann teaches the apparatus of claim 8, wherein said session analyzer is configured to obtain said characteristics (para [0021] - session number; para [0022] - session ID) belonging to said common session from parameter patterns common to said packets (para [0005] - session from the received packet).

Regarding claim 12, Mann teaches the apparatus of claim 1, further comprising a resource allocator configured to allocate resources on a network according to said identified common session (para [0025]).

--(continued on supplemental pages)--

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/IL 07/01336

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Box V.2. Citations and explanations:

Regarding claim 13, Mann teaches the apparatus of claim 8, further comprising a resource allocator, configured to allocate resources on a network according to said identified session type (para [0025] - packet queue allocation mechanism 230 may allocate one or more packet queues as storage space for received packets).

Regarding claim 15, Mann teaches a method of identifying session type, comprising categorizing passing packets using traffic packet characteristics (abstract - packets are classified according to a classification); grouping together those packets having similar values of said traffic characteristics (para [0029] - buffered in the packet queue 220 and classifying them according to the session number), and analyzing said grouped packets for session characteristics (para [0006] - determines the packet's underlying session), thereby to identify a session type (para [0005] - Identifying a session from the received packet).

Regarding claim 16, Mann teaches the method of claim 15 wherein said identifying a session type comprises identifying a session managing entity generating or managing said session (para [0005] - identifying a corresponding session on the host system).

Regarding claim 17, Mann teaches the method of claim 15 wherein said identifying a session type (para [0005] - identifying a session) is followed by at least one of the group (para [0022] - packet bundle) comprising: providing provisioning and providing control actions to the session (Para [0021] - session number; para [0022] - session ID).

Regarding claim 18, Mann teaches method according to claim 15, further comprising thresholding said traffic characteristics (para [0009] - received packets buffered in the packet queue 220 and classifying them according to the session number), and identifying those packets (para [0006] - determines the packet's underlying session) whose characteristics are mutually within said thresholds for said grouping (para [0009] - classifying them).

Regarding claim 19, Mann teaches the method of claim 15, wherein said characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth (para [0039] - information as packet identification (ID) 420, packet status 425, packet length 430, packet buffer address 435, or out-of-order indicator 440).

Regarding claim 20, Mann teaches the method of claim 15, further comprising inserting into a header of a respective packet an indication of said common session with which said respective packet has been identified (para [0022] - classification ID" may be assigned to this packet bundle).

Regarding claim 21, Mann teaches the method of claim 15, comprising obtaining said characteristics (para [0005] - session from the received packet) belonging to said common session from parameter patterns common to said packets (Para [0021] - session number; para [0022] - session ID).

Claims 4, 11, 14, 23 and 24 lack an inventive step under PCT Article 33(3) as being obvious over Mann in view of US 2003/0204562 A1 to Hwang.

Regarding claim 4, Mann teaches an apparatus of packet classification of claim 1. Mann does not teach session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase. Hwang does teach session analyzer comprises a neural network (para [0072] - neural network), using characteristics (para [0064] - User's data in a connection session are classified into the following three categories) automatically built into said neural network during a neural network training phase (fig. 3 and 4 show different phase of the method). It would have been obvious to one of ordinary skill in the art to combine the device of packet grouping of Mann with the packet analyzer in neural network of Hwang in order to have flexible compatibility in various types of networks when implementing packet classification.

Regarding claim 11, Mann teaches an apparatus of packet classification of claims 1, 7 and 8. Mann does not teach session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase. Hwang does teach session analyzer comprises a neural network (para [0072] - neural network), using characteristics (para [0064] - User's data in a connection session are classified into the following three categories) automatically built into said neural network during a neural network training phase (fig. 3 and 4 show different phase of the method). It would have been obvious to one of ordinary skill in the art to combine the device of packet grouping of Mann with the packet analyzer in neural network of Hwang in order to have flexible compatibility in various types of networks when implementing packet classification.

Regarding claim 14, Mann teaches an apparatus of packet classification of claim 1. Mann does not teach at least one of said packet session analyzer, said extraction unit and said grouping unit comprises a neural network. Hwang does teach at least one of said packet session analyzer, said extraction unit and said grouping unit (fig. 2) comprises a neural network (para [0072] - neural network). It would have been obvious to one of ordinary skill in the art to combine the device of packet grouping of Mann with the grouping unit in neural network of Hwang in order to have flexible compatibility in various types of networks when implementing packet classification.

Regarding claim 23, Mann teaches a method of packet classification of claim 15. Mann does not teach using a neural network and characteristics automatically built into said neural network during a neural network training phase. Hwang does teach using a neural network (para [0072] - neural network) and characteristics (para [0064] - User's data in a connection session are classified into the following three categories) automatically built into said neural network during a neural network training phase (fig. 3 and 4 show different phase of the method). It would have been obvious to one of ordinary skill in the art to combine the method of packet grouping of Mann with the packet analyzing in neural network of Hwang in order to have flexible compatibility in various types of networks when implementing packet classification.

-----continued in Supplemental Box-----

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IL 07/01336

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

Box V.2. Citations and explanations:

Regarding claim 24, Mann teaches a method of packet classification of claims 15 and 16. Mann does not teach using a neural network (para [0072] - neural network) and characteristics (para [0064] - User's data in a connection session are classified into the following three categories) automatically built into said neural network during a neural network training phase (fig. 3 and 4 show different phase of the method). Mann does not teach using a neural network and characteristics automatically built into said neural network during a neural network training phase. Hwang does teach using a neural network (para [0072] - neural network) and characteristics (para [0064] - User's data in a connection session are classified into the following three categories) automatically built into said neural network during a neural network training phase (fig. 3 and 4 show different phase of the method). It would have been obvious to one of ordinary skill in the art to combine the method of packet grouping of Mann with the packet analyzing in neural network of Hwang in order to have flexible compatibility in various types of networks when implementing packet classification.

Claims 10 and 22 lack an inventive step under PCT Article 33(3) as being obvious over Mann in view of US 6,975,592 B1 to Seddigh et al (hereinafter 'Seddigh').

Regarding claim 10, Mann teaches an apparatus of packet classification of claims 1, 7 and 8. Mann does not teach session analyzer is configured to use at least one member of the group consisting of: -packet length -inter-arrival period -variance of inter-arrival period -variance of length -covariance of inter-arrival period -covariance of length -a statistical derivative obtained from multi records of packet length -a statistical derivative obtained from multi records of inter-arrival period -a histogram built of at least one of the following; I. packet length 11. inter-arrival period III. variance of inter-arrival period IV. variance of length v. covariance of inter-arrival period vi. covariance of length vii. a statistical derivative obtained from multi records of packet length VIII. a statistical derivative obtained from multi records of inter-arrival period -a matrix histogram built of at least one of the following; 1. packet length 11. inter-arrival period 111. variance of inter-arrival period iv. variance of length v. covariance of inter-arrival period vi. covariance of length vii. a statistical derivative obtained from multi records of packet length viii. a statistical derivative obtained from multi records of inter-arrival period. However Seddigh does teach session analyzer (106 in fig. 1A) is configured to use at least one member of the group consisting (col 2, ln 5-20 - Dynamic flow classification schemes examine certain flow qualities to determine the class associated with the traffic flow) of: -packet length (col 4, ln 15-45 - size of current packet (includes entire packet)) -inter-arrival period (col 2, ln 5-20 - inter-arrival times) -variance of inter-arrival period -variance of length -covariance of inter-arrival period -covariance of length -a statistical derivative obtained from multi records of packet length -a statistical derivative obtained from multi records of inter-arrival period -a histogram built of at least one of the following; I. packet length 11. inter-arrival period III. variance of inter-arrival period IV. variance of length v. covariance of inter-arrival period vi. covariance of length vii. a statistical derivative obtained from multi records of packet length VIII. a statistical derivative obtained from multi records of inter-arrival period -a matrix histogram built of at least one of the following; 1. packet length 11. inter-arrival period 111. variance of inter-arrival period iv. variance of length v. covariance of inter-arrival period vi. covariance of length vii. a statistical derivative obtained from multi records of packet length viii. a statistical derivative obtained from multi records of inter-arrival period (TABLE I - average bandwidth measured over time interval T PPS 4 average packets-per-second measured over time interval. size of IP payload for current packet). It would have been obvious to one of ordinary skill in the art to combine the device of packet grouping of Mann with the feature of packet length and inter-arrival period determination of Seddigh in order to provide more choice for user to classify traffic based on different characteristics of the traffic such as packet length and packet's inter-arrival period.

Regarding claim 22, Mann teaches a method of packet classification of claims 1. Mann does not teach using at least one member of the group consisting: -packet length -inter-arrival period -variance of inter-arrival period -variance of length -covariance of inter-arrival period -covariance of length -a statistical derivative obtained from multi records of packet length -a statistical derivative obtained from multi records of inter-arrival period -a histogram built of at least one of the following; I. packet length 11. inter-arrival period III. variance of inter-arrival period IV. variance of length v. covariance of inter-arrival period vi. covariance of length vii. a statistical derivative obtained from multi records of packet length VIII. a statistical derivative obtained from multi records of inter-arrival period -a matrix histogram built of at least one of the following; 1. packet length 11. inter-arrival period 111. variance of inter-arrival period iv. variance of length v. covariance of inter-arrival period vi. covariance of length vii. a statistical derivative obtained from multi records of packet length viii. a statistical derivative obtained from multi records of inter-arrival period. However Seddigh does teach using at least one member of the group consisting (col 2, ln 5-20 - Dynamic flow classification schemes examine certain flow qualities to determine the class associated with the traffic flow) of: -packet length (col 4, ln 15-45 - size of current packet (includes entire packet)) -inter-arrival period (col 2, ln 5-20 - inter-arrival times) -variance of inter-arrival period -variance of length -covariance of inter-arrival period -covariance of length -a statistical derivative obtained from multi records of packet length -a statistical derivative obtained from multi records of inter-arrival period -a histogram built of at least one of the following; I. packet length 11. inter-arrival period III. variance of inter-arrival period IV. variance of length v. covariance of inter-arrival period vi. covariance of length vii. a statistical derivative obtained from multi records of packet length VIII. a statistical derivative obtained from multi records of inter-arrival period -a matrix histogram built of at least one of the following; 1. packet length 11. inter-arrival period 111. variance of inter-arrival period iv. variance of length v. covariance of inter-arrival period vi. covariance of length vii. a statistical derivative obtained from multi records of packet length viii. a statistical derivative obtained from multi records of inter-arrival period (TABLE I - average bandwidth measured over time interval T PPS 4 average packets-per-second measured over time interval. size of IP payload for current packet). It would have been obvious to one of ordinary skill in the art to combine the method of packet grouping of Mann with the feature of packet length and inter-arrival period determination of Seddigh in order to provide more choice for user to classify traffic based on different characteristics of the traffic such as packet length and packet's inter-arrival period.

Claims 1-24 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used in industry.

Electronic Acknowledgement Receipt

EFS ID:	7279000
Application Number:	12513510
International Application Number:	
Confirmation Number:	3332
Title of Invention:	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS
First Named Inventor/Applicant Name:	Avi Oron
Customer Number:	67801
Filer:	Martin Dennis Moynihan/Kitty Huffman
Filer Authorized By:	Martin Dennis Moynihan
Attorney Docket Number:	46203
Receipt Date:	24-MAR-2010
Filing Date:	05-MAY-2009
Time Stamp:	17:40:41
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	USPTOltr.pdf	83216 e2e6ba6055f334c87f59cd38452b67ff2fd4a180	no	1

Warnings:

Information:

IPR2018-00594

Exhibit 2015

2	Information Disclosure Statement (IDS) Filed (SB/08)	form1449.pdf	167779 edc127517b516baf71a08c30726e5f5fc588b482	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Foreign Reference	4-81966.pdf	1345519 06b2228261a90773e7f0459913596311285f4af5	no	30
Warnings:					
Information:					
4	NPL Documents	5-81970.pdf	126590 ad20101d75747fc46afe16664d566347b446aac8	no	3
Warnings:					
Information:					
5	NPL Documents	6-81971.pdf	268328 5f4d3cbc09615b013ff4049d2c543ea0ba480e62	no	5
Warnings:					
Information:					
Total Files Size (in bytes):			1991432		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

PATENT APPLICATION FEE DETERMINATION RECORD

Effective September 30, 2007

Application or Docket Number

12-513510

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
U.S. NATIONAL STAGE FEES		
BASIC FEE	SMALL ENT = \$ 155	LARGE ENT = \$ 310
EXAMINATION FEE	Satisfies PCT Article 33(1)(4) = \$ 50 / \$ 100	All other situations = \$ 105 / \$ 210
SEARCH FEE	U.S. is ISA = \$ 50 / \$ 100 ALL other countries = \$ 205 / \$ 410	ALL other situations = \$ 255 / \$ 510
FEE FOR EXTRA SPEC PGS.	minus 100 =	/ 50 =
TOTAL CHARGEABLE CLAIMS	24 minus 20 =	
INDEPENDENT CLAIMS	3 minus 3 =	
MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/>		

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE

OR

OTHER THAN SMALL ENTITY

RATE	FEE		RATE	FEE
BASIC FEE	165.00	OR	BASIC FEE	
EXAM. FEE	50.00		EXAM FEE	
SEARCH FEE	110.00		SEARCH FEE	
X \$ 130 =			X \$ 260 =	
X \$ 25 =		OR	X \$ 50 =	
X \$ 105 =		OR	X \$ 210 =	
+ \$ 185 =		OR	+ \$ 370 =	
TOTAL		OR	TOTAL	

CLAIMS AS AMENDED - PART II

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus	**
Independent	*	Minus	***
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

SMALL ENTITY

OR

OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X \$ 25 =		OR	X \$ 50 =	
X \$ 105 =		OR	X \$ 210 =	
+ \$ 185 =		OR	+ \$ 370 =	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus	**
Independent	*	Minus	***
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X \$ 25 =		OR	X \$ 50 =	
X \$ 105 =		OR	X \$ 210 =	
+ \$ 185 =		OR	+ \$ 370 =	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. 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

IPR2018-00594

**MULTIPLE DEPENDENT CLAIM
FEE CALCULATION SHEET**
(FOR USE WITH FORM PTO-875)

SERIAL NO.
12-513510
APPLICANT

FILING DATE

CLAIMS

	AS FILED		AFTER 1 ST AMENDMENT		AFTER 2 ND AMENDMENT	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
1	1		1			
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TOTAL IND.	3		3			
TOTAL DEP.	21		21			

	AS FILED		AFTER 1 ST AMENDMENT		AFTER 2 ND AMENDMENT	
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TOTAL IND.						
TOTAL DEP.						

PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 2, 2008*

Application or Docket Number

12-513510

CLAIMS AS FILED - PART I

SMALL ENTITY
TYPE ☐ OR

OTHER THAN
SMALL ENTITY

	(Column 1)	(Column 2)
U.S. NATIONAL STAGE FEES		
BASIC FEE	SMALL ENT. = \$ 165	LARGE ENT. = \$ 330
EXAMINATION FEE	Satisfies PCT Article 33(1). (4) = \$ 0 / \$ 0	All other situations = \$ 110 / \$ 220
SEARCH FEE	U.S. ISA = \$ 50 / \$ 100 ALL other countries = \$ 215 / \$ 430	ALL other situations = \$ 270 / \$ 540
FEE FOR EXTRA SPEC. PGS.	minus 100 =	/ 50 =
TOTAL CHARGEABLE CLAIMS	24 minus 20 = *	
INDEPENDENT CLAIMS	1 minus 3 = *	
MULTIPLE DEPENDENT CLAIM PRESENT		<input type="checkbox"/>

RATE	FEE
BASIC FEE	165.00
EXAM. FEE	50.00
SEARCH FEE	110.00
X \$ 135 =	
X \$ 26 =	
X \$ 110 =	
+ \$ 195 =	
TOTAL	

RATE	FEE
BASIC FEE	
EXAM. FEE	
SEARCH FEE	
X \$ 270 =	
X \$ 52 =	
X \$ 220 =	
+ \$ 390 =	
TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

SMALL ENTITY OR

OTHER THAN
SMALL ENTITY

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus	**
Independent	*	Minus	***
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			<input type="checkbox"/>

RATE	ADDITIONAL FEE
X \$ 26 =	
X \$ 110 =	
+ \$ 195 =	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X \$ 52 =	
X \$ 220 =	
+ \$ 390 =	
TOTAL ADDIT. FEE	

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus	**
Independent	*	Minus	***
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			<input type="checkbox"/>

RATE	ADDITIONAL FEE
X \$ 26 =	
X \$ 115 =	
+ \$ 195 =	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X \$ 52 =	
X \$ 220 =	
+ \$ 390 =	
TOTAL ADDIT. 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.

e Division

IPR2018-00594

**MULTIPLE DEPENDENT CLAIM
FEE CALCULATION SHEET**
(FOR USE WITH FORM PTO-875)

SERIAL NO.
12513510
APPLICANT(S)

FILED DATE

CLAIMS

	AS FILED		AFTER 1 ST AMENDMENT		AFTER 2 ND AMENDMENT	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
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TOTAL DEP.						



UNITED STATES PATENT AND TRADEMARK OFFICE

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

U.S. APPLICATION NUMBER NO.	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
12/513,510	Avi Oron	46203

67801
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

INTERNATIONAL APPLICATION NO.	
PCT/IL07/01336	
I.A. FILING DATE	PRIORITY DATE

CONFIRMATION NO. 3332
371 ACCEPTANCE LETTER



Date Mailed: 12/22/2009

NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office in its capacity as a Designated / Elected Office (37 CFR 1.495), has determined that the above identified international application has met the requirements of 35 U.S.C. 371, and is ACCEPTED for national patentability examination in the United States Patent and Trademark Office.

The United States Application Number assigned to the application is shown above and the relevant dates are:

05/05/2009
DATE OF RECEIPT OF 35 U.S.C. 371(c)(1),
(c)(2) and (c)(4) REQUIREMENTS

05/05/2009
DATE OF COMPLETION OF ALL
35 U.S.C. 371 REQUIREMENTS

A Filing Receipt (PTO-103X) will be issued for the present application in due course. **THE DATE APPEARING ON THE FILING RECEIPT AS THE " FILING DATE" IS THE DATE ON WHICH THE LAST OF THE 35 U.S.C. 371 (c)(1), (c)(2) and (c)(4) REQUIREMENTS HAS BEEN RECEIVED IN THE OFFICE. THIS DATE IS SHOWN ABOVE.** *The filing date of the above identified application is the international filing date of the international application (Article 11(3) and 35 U.S.C. 363).* Once the Filing Receipt has been received, send all correspondence to the Group Art Unit designated thereon.

The following items have been received:

- Indication of Small Entity Status
- Copy of the International Application filed on 05/05/2009
- Copy of the International Search Report filed on 05/05/2009
- Copy of IPE Report filed on 05/05/2009
- Preliminary Amendments filed on 05/05/2009
- Information Disclosure Statements filed on 05/05/2009
- Oath or Declaration filed on 05/05/2009
- Request for Immediate Examination filed on 05/05/2009
- U.S. Basic National Fees filed on 05/05/2009
- Priority Documents filed on 05/05/2009
- Power of Attorney filed on 05/05/2009
- Specification filed on 05/05/2009
- Claims filed on 05/05/2009
- Abstracts filed on 05/05/2009
- Drawings filed on 05/05/2009

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

DEBORAH D WILLIAMS

Telephone: (571) 272-0466



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/513,510	05/05/2009	2465	429	46203	24	3

CONFIRMATION NO. 3332

67801

MARTIN D. MOYNIHAN d/b/a PRTSI, INC.

P.O. BOX 16446

ARLINGTON, VA 22215

FILING RECEIPT



OC000000039274982

Date Mailed: 12/22/2009

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Avi Oron, Doar Na Misgav, ISRAEL;

Power of Attorney: The patent practitioners associated with Customer Number 67801

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/IL07/01336 11/01/2007

Foreign Applications

If Required, Foreign Filing License Granted: 12/16/2009

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/513,510**

Projected Publication Date: 04/01/2010

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

Preliminary Class

370

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

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

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER**Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

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FORM PTO-1390(modified) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE (REV 10-95)		ATTORNEY'S DOCKET NUMBER 46203
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C., 371		U.S. APPLICATION NO. (IF KNOWN), SEE 37 CFR
INTERNATIONAL APPLICATION NO. PCT/IL2007/001336	INTERNATIONAL FILING DATE November 1, 2007	PRIORITY DATE CLAIMED November 6, 2006
TITLE OF INVENTION MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS		
APPLICANT(S) FOR DO/EO/US Avi ORON		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO.US) the following items and other information:		
<ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371 3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1). 4. <input type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(3)(2) <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). b. <input checked="" type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(3)(2). 7. <input checked="" type="checkbox"/> A copy of the International Search Report (PCT/ISA/210) and Written Opinion (PCT/ISA/237). 8. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3) <ol style="list-style-type: none"> a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. 9. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19(35 U.S.C. 371(c)(3)). 10. <input checked="" type="checkbox"/> An <u>executed</u> oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 11. <input type="checkbox"/> A copy of the International Preliminary Report on Patentability (PCT/IPEA/409). 12. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). <p>Items 13 to 18 below concern document(s) of information included:</p> <ol style="list-style-type: none"> 13. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 14. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 15. <input checked="" type="checkbox"/> A FIRST preliminary amendment. 16. <input type="checkbox"/> A substitute specification. 17. <input type="checkbox"/> A change of power of attorney and/or address letter. 18. <input type="checkbox"/> Certificate of Mailing by Express Mail 19. <input type="checkbox"/> The sequence listing information recorded in computer readable form is identical to the written (on paper or compact disc) sequence listing 20. <input checked="" type="checkbox"/> Other items or information: PCT REQUEST; APPLICATION DATA SHEET; 21. <input checked="" type="checkbox"/> <u>24</u> pages of specification (including Abstract page) 22. <input checked="" type="checkbox"/> <u>6</u> sheets of drawings 23. <input type="checkbox"/> <u> </u> pages of sequence listing 24. <input checked="" type="checkbox"/> <u>30</u> total pages 		

U.S. APPLICATION NO. (IF KNOWN), See 37 CFR	INTERNATIONAL APPLICATION NO. PCT/IL2007/001336	ATTORNEY'S DOCKET NUMBER 46203
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☒ Applicant is entitled to Small Entity Status under 37 CFR 1.9 and 37 CFR 1.27

THE FILING FEE HAS BEEN CALCULATED AS SHOWN BELOW:

<i>FOR:</i>	<i>Column 1 No. FILED</i>	<i>Column 2 No. EXTRA</i>	<i>SMALL ENTITY RATE FEE</i>		<i>OTHER THAN A SMALL ENTITY RATE FEE</i>	
Basic National Stage Fee				\$165.00		\$
National Stage Search Fee				\$ 50.00		\$
National Stage Examination Fee				\$110.00		\$
National Stage Application Size Fee (Per 50 Pages Over 100)			0 x \$135.00	\$ 0.00		\$
Multiple Dependent Claim			0 x \$195.00	\$ 0.00		\$
Total Claims*	24 - 20 =	4	4 x \$ 26.00	\$104.00		\$
Independent Claims*	2 - 3 =	0	0 x \$110.00	\$ 0.00		\$
* (If the difference in Column 1 is less than "0", enter "0" in Column 2)			TOTAL	\$429.00	TOTAL	\$

☒ Please charge my deposit account No. 50-1407 in the amount of \$429.00.

☒ The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No 50-1407.

☒ Any additional filing fees required under 37 CFR 1.16.

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☒ Any patent application processing fees under 37 CFR 1.17.

☒ Any filing fees under 37 CFR 1.16 for presentation of extra claims.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

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SIGNATURE

Martin D. Moynihan
NAME

40,338
REGISTRATION NUMBER

May 5, 2009
DATE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§	
	§	
Avi ORON	§	
	§	
Serial No.:	§	
Not Yet Assigned –	§	
US National Phase of	§	
PCT/IL2007/001336	§	
	§	
Filed:	§	Group Art Unit: Not Yet Assigned
	§	
For:	§	
Media Session Identification	§	
Method For IP Networks	§	
	§	
Examiner:	§	Attorney Docket: 46203
Not Yet Assigned	§	

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

PRELIMINARY AMENDMENT

Sir:

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

In the Specification:

Please insert the paragraph immediately after the Title, at Page 1, line 3, as follows:

RELATED APPLICATIONS

This application is a National Phase Application of PCT Application No. PCT/IL2007/001336 having International Filing Date of November 1, 2007, which claims benefit of US Provisional Patent Application No. 60/856,795, filed on November 6, 2006. The contents of the above Applications are all incorporated herein by reference.

REMARKS

This application is a National Phase Application of PCT Application No. PCT/IL2007/001336 having International Filing Date of November 1, 2007.

The Application comprises claims 1-24, of which claims 1 and 15 are in independent form.

An early and favorable action is respectfully requested.

Respectfully submitted,

/Martin D. Moynihan/

Martin D. Moynihan,
Registration No. 40,338

Date: May 5, 2009

MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

5 FIELD AND BACKGROUND OF THE INVENTION

The present invention, in some embodiments thereof, relates to a media session identification method for IP networks and, more particularly, but not exclusively, to a media session identification method that identifies media sessions from the flow of packets and assigns specific packets to the media sessions. It is noted that the term
10 "session" includes streaming of data, such as in for example a video stream.

The continuous increase in IP based media traffic over the Internet and other networks, supported by the continuous increase in the various media communication applications, emphasizes the need for IP traffic control tools to cope with the increasingly congested networks. These IP traffic control tools are required by Internet
15 service providers (ISPs), IP-Telephony providers (mobile and fixed) and by Enterprises for implementing traffic shaping measures such as availability of service and quality of service, for firewall enhancements, for providing media session logs supporting billing capabilities and for meeting and supporting lawful interception guidelines set by governments and governmental bodies.

20 A media session, such as a voice or video session, is expected to have a continuous stream of sampled data so it can be reconstructed at its destination to produce smooth sound or images or both. This means that a minimum amount of data bandwidth has to be sustained on the network. As media at either end is sampled and de-assembled or re-assembled by symmetrical session CODECs (coder & decoder) –
25 data streaming must comply with a certain bandwidth demand and packet-rate so that the human ear or eye at the destination does not experience any information gaps or distortions.

It is desirable to identify packets as belonging to a session to group the succession of IP packets and also to identify a particular application or type that the
30 session belongs to in order to apply provisioning, quality of service and control actions to the session or stream; applications that are real time sensitive such as Voice-over-IP and/or Video-over-IP tend also to be bandwidth availability sensitive, therefore maintaining the quality of service for such application sessions require the identification, and possibly the classification, of their traffic streams. It may also be

desirable to identify a session or a stream belonging to a particular application in order to implement and meet interception requirements by law enforcement authorities, as well as in the need to generate CDRs for billing and analysis purposes, and the like. In other cases, some applications may be perceived as prohibited or posing a security risk, that is creating 'security holes', and some networks may be interested in blocking such applications. Again, the best way to do so is to identify the session and the packets belonging to the session and then block packets belonging to the session. For example, many organizations treat Instant-Messaging (IM) applications as high security risks which might create a hole through which sensitive data can flow out of an organization. For those organizations, it is highly essential to identify data flow (e.g. file-transfers) within a media session.

Various methods for analyzing IP traffic are available. The traditional technologies for analyzing and identifying IP traffic (including IP media sessions) include packet header analysis. Packets whose headers indicate the same destination may be assumed to belong to the same session. Packet header analysis is however simplistic. The same user may be running several different sessions simultaneously and mere packet header analysis may not be able to distinguish between them. Thus there is also the so called 'Deep Packet Inspection' method, or the 'Packet Content Analysis'. These known technologies require digging into and analyzing the content, or Payload, of the packets, with the aim of extrapolating signatures or fingerprints of the payloads. The signatures can then be identified with a specific protocol or application. More often than not, the identification process includes analysis of additional factors from the packet 'Header' (e.g. addresses and port numbers).

There are several disadvantages of the Deep Packet Inspection approach, of which the major are known to be:

1. Alteration of Payloads: Packet Payloads can change due to changes in the application. Thus a signature that has been extrapolated and correlated to a specific protocol or application can be rendered invalid upon the alteration of the payload due say to a new version release.
2. Encryption of packet content: Certain media applications (e.g. Skype) encrypt the messages, which pose a difficulty in inspecting the Payload of its packets and obtaining a meaningful signature.

In other words, the deep packet inspection method is dependant on elements that can be encrypted or altered by the application and can therefore be initially unreadable or the reading can become invalid if the application alters its content sequence.

5 In order to at least partly overcome the above problems, it is also known to use Complete Packet Inspection (CPI), which combines header analysis and deep packet inspection, otherwise known as payload pattern search. The header analysis provides additional information that complements the payload pattern search. Complete packet inspection is relatively widely used and applications include network monitoring,
10 application discovery, behavioral analysis, network security, policy enforcement, test and measurement, lawful interception, and trouble shooting.

Nevertheless, both deep packet inspection and complete packet analysis require analysis of multiple packets and their sequence down to the payload. Thus, using deep packet inspection/content inspection on any sizeable network requires strong powerful
15 monitoring processing power as well as huge memory resources, as many thousands of IP sessions occur simultaneously. This renders the solution unfeasible in many cases. In other cases the traffic throughput rate is limited by the inspection capacity. Where the aim is to ensure quality of service for the IP sessions that require it, the very attempt to solve the problem may be making things worse.

20 State-full inspection Firewalls, Session Border Controllers (SBC) and billing mediation systems each require inspection for their own needs. Thus in some cases the interest may be in blocking the session, in other cases in prioritizing the session and in yet other cases the interest may lie in creating billing records (CDR) for the session. Due to the heavy processing requirement, inspection thus tends to be limited
25 to a relatively small number of simultaneous IP-sessions (e.g. calls) that can be managed, and this prohibits any effective inspection at perhaps the one place it could be most effective, namely at the operator's high-speed backbones.

Some existing data security systems detect and prevent intrusion using simple predefined behavioristic rules and thresholds to alert for abnormal traffic behavior
30 which may indicate possible attacks on the network (customarily implemented in Firewall technologies). Such suspicious behavior may include indications of denial of service (DoS) attacks.

One of the characteristics of a media session is the tendency to consist of a packet stream having a low variation in packet length and/or inter-arrival periods. However, network delay & jittering as well as the fact that some codecs support silence suppression may lead to large inter-arrival period variations.

5 The existing technologies, including deep and complete packet inspections, do not help specifically in controlling these media sessions for the reasons given above, since the packets are not always recognized.

SUMMARY OF THE INVENTION

10 The present invention relates to the use of the regularity and similarity characteristics of packet traffic, belonging to a media session, to identify the packets belonging to a given media session, and subsequent identification of the kind of media session, so that the media session can be provisioned and/or controlled (e.g allocating appropriate resources or not allocating at all, as required). In general, the
15 identification is probabilistic as opposed to definitive. Herein the media session may be identified on a number of levels from the most generic to the very specific. All the session identifications from the most generic to the most specific are referred to as the session type. A generic identification may refer to identification of the session type as being video or audio or music or the like, including the identification of interactions
20 within such session, such as instant messaging, file transfer and application sharing. The more specific identifications may involve a specific end-device or application and the term type further includes anything in between. Packet identification or grouping, are terms used to refer to an identification of packets that belong together to a session type in a common session.

25 According to an aspect of some embodiments of the present invention there is provided electronic network apparatus for identifying media sessions over IP and network packets as belonging or not belonging to a media session, comprising:

 a packet characteristic extraction unit configured for obtaining packet characteristics from a succession of packets, the characteristics comprising packet
30 traffic characteristics;

 a grouping unit associated with the packet characteristic extraction unit, configured to group together those packets having similar traffic characteristics as probably belonging to a common session, and

a session analyzer configured for analyzing the grouped packets for session characteristics, therewith to identify a session type.

5 The apparatus may comprise a resource allocator for allocating at least one member of the group consisting of resources, provisioning features and control features to the session.

In an embodiment the session type identification comprises identifying an application and/or end-device generating or managing the session.

10 In an embodiment, the session analyzer comprises a neural network, using characteristics automatically built into the neural network during a neural network training phase.

An embodiment comprises a thresholder for thresholding the traffic characteristics, and a packet session identifier configured to identify those packets whose characteristics are mutually within the thresholds for the grouping unit to group the packets as belonging to the common session.

15 In an embodiment, the traffic characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

20 In an embodiment, the grouping unit comprises a packet marker, associated with the packet session identifier, configured for inserting into a header of a respective packet an indication of the common session with which the respective packet has been identified.

An embodiment comprises a session analyzer associated with the packet marker, configured to obtain packets marked as belonging to the common session and to determine, from the packets, characteristics belonging to the common session, therefrom to identify a session type.

25 In an embodiment, the session analyzer is configured to obtain the characteristics belonging to the common session from parameter patterns common to the packets.

In an embodiment, the session analyzer is configured to use at least one member of the group consisting of:

- 30
- packet length
 - inter-arrival period
 - variance of inter-arrival period
 - variance of length

- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period

In an embodiment, the session analyzer comprises a neural network, using characteristics automatically built into the neural network during a neural network training phase.

An embodiment comprises a resource allocator configured to allocate resources on a network according to the identified common session.

An embodiment comprises a resource allocator, configured to allocate resources on a network according to the identified session type

An embodiment comprises at least one of the packet session analyzer, the extraction unit and the grouping unit comprises a neural network.

5 According to a second aspect of the present invention there is provided a method of identifying session type, comprising

categorizing passing packets using traffic packet characteristics;

grouping together those packets having similar values of the traffic characteristics, and

10 analyzing the grouped packets for session characteristics,
thereby to identify a session type.

Unless otherwise defined, all technical and/or scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which the invention pertains. Although methods and materials similar or equivalent to those
15 described herein can be used in the practice or testing of embodiments of the invention, exemplary methods and/or materials are described below. In case of conflict, the patent specification, including definitions, will control. In addition, the materials, methods, and examples are illustrative only and are not intended to be necessarily limiting.

20 Implementation of the method and/or system of embodiments of the invention can involve performing or completing selected tasks manually, automatically, or a combination thereof. Moreover, according to actual instrumentation and equipment of embodiments of the method and/or system of the invention, several selected tasks could be implemented by hardware, by software or by firmware or by a combination
25 thereof using an operating system.

For example, hardware for performing selected tasks according to embodiments of the invention could be implemented as a chip or a circuit. As software, selected tasks according to embodiments of the invention could be implemented as a plurality of software instructions being executed by a computer
30 using any suitable operating system. In an exemplary embodiment of the invention, one or more tasks according to exemplary embodiments of method and/or system as described herein are performed by a data processor, such as a computing platform for executing a plurality of instructions. Optionally, the data processor includes a volatile

memory for storing instructions and/or data and/or a non-volatile storage, for example, a magnetic hard-disk and/or removable media, for storing instructions and/or data. Optionally, a network connection is provided as well. A display and/or a user input device such as a keyboard or mouse are optionally provided as well.

5

BRIEF DESCRIPTION OF THE DRAWINGS

Some embodiments of the invention are herein described, by way of example only, with reference to the accompanying drawings. With specific reference now to the drawings in detail, it is stressed that the particulars shown are by way of example and for purposes of illustrative discussion of embodiments of the invention. In this regard, the description taken with the drawings makes apparent to those skilled in the art how embodiments of the invention may be practiced.

In the drawings:

FIG. 1 is a simplified block diagram showing a packet and session identification apparatus according to a first embodiment of the present invention;

FIG. 2 is a simplified block diagram showing a general implementation of the apparatus of Fig. 1;

FIG. 3 is a simplified block diagram showing another embodiment of the present invention;

FIG. 4 is a simplified block diagram showing a hardware implementation of the embodiment of Fig. 3;

FIG. 5 is a simplified block diagram showing a software layer implementation of the embodiment of Fig. 3; and

FIG. 6 is a simplified flow chart showing a method of analyzing packets for media sessions according to an embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

The present invention, in some embodiments thereof, relates to IP traffic inspection by means of identifying those packets having similar traffic characteristics as probabilistically belonging to the same media session. Traffic characteristics relate to those parameters inherent to packets traffic flow as it travels from source to destination and includes features such as packet length, inter-arrival period, bandwidth and statistical and other derivations thereof as well as certain header characteristics

such as source address and destination address but excludes packet payload content whose inspection is common in deep packet inspection (packet content inspection) techniques. The traffic characteristics may also be used to identify the session type so that appropriate resources can be made available or not for the session, or other provisioning and control actions may be applied to the session.

Before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not necessarily limited in its application to the details of construction and the arrangement of the components and/or methods set forth in the following description and/or illustrated in the drawings and/or the Examples. The invention is capable of other embodiments or of being practiced or carried out in various ways.

Referring now to the drawings, Figure 1 illustrates electronic network apparatus 10 for identifying media sessions and network packets as belonging or not belonging to a media session, grouping, and for determining a session type. As explained the determinations need not be absolute but may be probabilistic. Apparatus 10 comprises a packet analyzer unit 12 and a session analyzer unit 14. A resource assignment unit 16 assigns, or for that matter limits or refuses, network resources to the identified media session so that individual packets are given a priority level according to the needs of the media session to which they are found to belong, or may provide other provisioning or control actions for the session.

The packet analyzer 12 analyzes incoming data packets and determines which packets belong to a common session. The packet analyzer 12 includes a packet characteristic extractor 18 which extracts readily available packet traffic characteristics such as packet length or inter-arrival period, or source or destination addresses or other traffic characteristics of the packets. Readily available characteristics are those characteristics that do not require deep analysis of the packet content. Preferably, characteristics that can be obtained from mere observable traffic behavior examination, without opening the packet, are used. The packet characteristic extraction unit obtains these packet characteristics from a succession of packets.

A thresholder 20 is connected to the packet characteristic extraction unit, and sets up thresholds based on the characteristics found by the extractor. Generally there is a certain amount of uniformity in packets belonging to the same session, thus they tend to be approximately the same length and to turn up at approximately regular

intervals. Thus thresholding for length or inter-arrival period or even better for both, allows for packets to be assigned to a common session with relatively high probability. A packet session identifier 22 uses the thresholds set up by the thresholder to identify as belonging to a common session those packets whose characteristics are mutually
5 within the thresholds.

As mentioned, effective characteristics include but are not limited to packet length and inter-arrival period.

A packet marker 24 may insert an indication of the common session with which a given packet has been identified into its header. Thus packets believed to
10 belong to the same session can be grouped together so that the session itself can be analyzed.

For the purpose of finding out information about the session, session analyzer 14 analyzes the grouped together packets to obtain characteristics that could provide important information about the session type and its requirements. That is to say a
15 session could be identified as being a video session and therefore having a real time quality of service requirement. If possible, an accurate session type, such as a video session using codec type X, or voice session using Skype™, is obtained.

In general a media stream tends to have a small packet rate variation, and also relatively small packet length, or at least small variation in the packet length. The
20 method can thus inspect passing packets to see which of the passing packets correspond on this basis and group them together with high probability.

A good source of information that the session analyzer can use is the meta-level parameters which are often included in the packet headers.

The session analyzer may use the packet's traffic characteristics, such as packet
25 length and/or inter-arrival period to indicate the session type.

In one embodiment, the session analyzer comprises a neural network. In this case the characteristics used for identifying the session type are automatically built into the neural network during the neural network training phase, and are not explicitly
programmed in.

30 The packets are now assigned to corresponding sessions, and resources are assigned to the session, so that each packet gets priority or otherwise, depending on the session to which it has been assigned. Thus a video session requiring real time quality of service may receive high bandwidth and its packets may be given high

priority. At the other extreme, a chat session may be regarded as a security risk and its packets may be assigned zero resources and dumped or simply blocked.

The present embodiments are now considered in greater detail. The present embodiments identify and distinguish between different media sessions within IP network traffic using certain packet related elements or characteristics, primarily but not exclusively packet length and packet inter-arrival period. In practice the methodology may not use these characteristics directly but rather may make use of a range of statistical parameters which are derivatives thereof. The elements are external elements that do not require opening of the packet payload, so that there is no dependency on packet elements that can be altered, hidden or encrypted by the application. That is to say encrypting the payload has no effect on the methodology and updates to software versions are unlikely to change the packets so radically that the session types, at least in terms of quality of service requirement, would not be recognized

The algorithm expects the two parameters of packet length and packet inter-arrival period to meet certain thresholds if indeed the packets belong to the same session. Packets that belong to the same session generally have a constant average bandwidth, or at least an average bandwidth that maintains continuity. The average bandwidth is the average packet length divided by average inter-arrival period, and the average bandwidth may be used by the method as a derivative of the above packet characteristics to indicate belonging or not belonging to a session.

Thresholding of the packet length and packet inter-arrival period, or of a derivative such as statistical variations, sets a basic acceptance criterion for a packet to be considered as part of a media stream, against which each consecutive incoming IP packet is examined. Those packets that meet the acceptance criteria are categorized and marked, at high probability, as media session packets, while those packets that do not meet the acceptance criteria are filtered out or ignored as appropriate.

Using these markings, the marked media session packets are assembled to create the various media streams, which streams are subsequently analyzed using predefined mathematical and statistical techniques for determining more specific conclusions on the media session protocol and even the application or end-devices being used.

Specific constant packet lengths and length-variation behaviors, along with specific packet-rate and rate-variation may further indicate standard and non-standard codecs, session protocols, media type and sometimes even the actual end-point media device being used.

Thus, a packet length histogram may be created by the algorithm and can be used to determine whether the media is using a Constant Bit Rate (CBR) Codec (e.g. G.723.1, G.729A) or a Variable Bit Rate (VBR) Codec (such as the GIPS codec). The G.729A codec for instance, uses constant packet length of 50/60/70 bytes and a corresponding packet inter-arrival period of 100/50/33 PPS (packets per second).

Reference is now made to Fig. 2, which is a simplified block diagram illustrating a more detailed embodiment of the apparatus of Fig. 1. Packets initially enter threshold filter 30. The filter can possibly contain a pre-filter stage in which it filters out those packets having a length and/or inter-arrival period and/or derivatives thereof which could not possibly represent a media session, that is anything whose length and/or inter-arrival period and/or derivatives thereof is above or below a predefined maximum and minimum threshold. Such a prefiltering stage with preset thresholds filters out packets belonging to large file transfer actions or web browsing, or small TCP connection related and acknowledge and like packets.

Following the pre-filter stage there is a characteristic dependent stage in which the packets are checked against characteristic dependent thresholds, for packet length and inter-arrival period to be within a small range, say 10%. Those packets within the threshold are marked as belonging to the media session with high probability.

More specifically, since IP media packets are entwined with data packets, the algorithm skips packets with unlikely data length or wrong packet rate, as compared with a previous media suspected packet.

Those packets that pass the threshold filter may be fed into a cyclic buffer 32. The cyclic buffer 32 emulates a Jitter-Buffer at the receiving end and allows for bandwidth continuity verification. Consecutive Packets with bandwidth complying with the jitter-buffer's average bandwidth are accepted as potentially true media session packets. A sequence of such packets may indicate a media session.

Packet length, inter-arrival period ("dt") and their derivatives may be accumulated by statistical accumulator 34 to create a statistical vector of session behavioral information. The derivatives may be statistical parameters such as:

- Average dt, Average length, Variance of dt & length, Covariance of dt & length
- Histograms of dt & lengths, Histogram matrixes of lengths variation vs. dt variation

5 Using the above derivatives, statistical behavioral acceptance criteria (SBAC) may be extrapolated, according to which SBAC media sessions are determined and categorized in SBAC decision maker 36. For example, for an incoming media stream of a given sort, the Average, Variance & Covariance of dt, length & bandwidth would not be expected to fluctuate over certain limits which are set by the SBAC. Thus the
10 sort of media stream can be derived.

 Reference is now made to Fig. 3, which is a simplified diagram showing a network probe according to a second embodiment of the present invention. A network adaptor 40 listens to all network traffic. A first level filter 42 then carries pre-filtering to remove irrelevant packets and first level filtering to extract those packets within the
15 length threshold of the suspected stream and.

 The extracted packets are passed to sliding window 44 to create a queue of those packets whose inter-arrival periods correspond, that is they arrive with a regular frequency and therefore could belong to the same media session.

 Series recognition filter 46 analyses the queue to detect a media session.
20 Extractor 48 then extracts IP addresses, port, time stamps etc, to allow higher layers or third party equipment to handle the identified sessions.

 Reference is now made to Fig. 4, which is a simplified diagram showing an implementation of apparatus according to the present embodiments as standalone hardware. The network adaptor of Fig. 3 is implemented as an IP stack 50. The filter
25 itself 52 is implemented on a general purpose CPU or a specific DSP, and an additional network adapter 54 connects to a local IP network which runs supported applications 56 such as billing servers.

 Reference is now made to Fig. 5, which is a simplified block diagram illustrating an implementation of the present embodiments in software. In the software
30 case the filter 62 is a software layer between the network interface card (NIC) driver 60 and the application layer 64.

A further implementation uses Neural Networks. Neural networks and like algorithms, including pattern matching algorithms, can be used for either identification, classification or both phases.

5 A neural network is injected with a vector of statistical behavior of a sub-stream of packets. That is to say it is presented with statistical behavior of a sliding window portion of the media session. The vector may include both linear and non-linear (e.g. logarithmic, multiplication & power-function) statistics of accumulated information. The network is pre-trained (using supervised learning) so that it includes appropriate gains at each perceptron input. A hidden layer may be included within the
10 network for part of the non-linear input behaviors.

The neural network preferably has multiple outputs one for each required session type identification or classification. These may include generic types such as "video stream", or "voice stream" or "chat session", and specific application outputs such as Skype session, MSN session, as well as specific end-device outputs such as the
15 Cisco-ATA unit.

Each output preferably comprises a transient function, for example a Gaussian function, which produces a "1" to indicate a detection.

Neural networks being statistical or fuzzy, multiple outputs can become active – indicating that several networks may have detected the stream. In such as case, the
20 strongest output is used as the correct identification, as is known in the field of neural networks.

Furthermore, the neural network may use non-supervised training, for example Self-Organizing Maps ,SOM, to adapt itself and increase accuracy during operation.

Once a session is identified and categorized, the algorithm generates events
25 and/or alerts for each media session, which can be passed on to higher layers or to third party devices. The events or alerts may include:

- The sending and receiving IP addresses. These may be extracted from the source and destination fields in the packet header. Of course in the case of conference sessions there may be more that two such addresses. It is noted that end-users
30 with fixed (i.e. static) IP address, may use similar media traffic in the future as well, so that there may be some benefit to caching these IP-addresses for recognition later on. The cached addresses could be saved by the algorithm filter

or by the upper layer for a certain duration and marked as "suspected IP-addresses" for future inspection.

- IP-Port numbers associated with the session can be extracted from "Source Port" and "Destination Port" fields in the header. Note that some applications (e.g. Skype) tend to use the same Port-number for future media sessions, so that the Port-numbers could usefully be cached, along with the suspect IP-addresses as described above – to accelerate the detection process and/or increase detection probability factor for future sessions.
- "Session Start" and "Session End" time stamps (to milli-seconds resolution) can be recorded to indicate call duration. Such is useful where the primary motivation of monitoring the session is for billing purposes, for example in billing mediation systems.
- Session media type information, including media classification: voice call, video call etc may be recorded.
- Data transfer within a media session, may be identified, say by detecting sharp fluctuations in Bandwidth at various times during a media session. The durations or the bandwidth may be recorded as required.
- Session protocol type indicating the application or end-device being used if available may be recorded. An indication may be provided as to which standard if the session is a standard based session, that is based on Codecs conforming to a given standard. If possible an indication of the exact Codec used may be provided. Likewise an indication of a non-standard Codec based session, e.g. Skype, may be provided as an event.

The identification engine may be implemented in any suitable form. The implementation may include sequential logic using hardware or software modules to implement the above described features. Alternatively, the identification engine may be implemented in whole or in part by a Neural Network, whether pre-trained or self-trained. Other artificial intelligence mechanisms may be used in place of neural networks and the system may use a general purpose CPU or dedicated DSP components. Alternatively any combination of the above may be used.

Reference is now made to Fig. 6, which is a simplified flow chart illustrating operation of a method according to the presently preferred embodiments. A method of allocating communication resources to media sessions in accordance with session type,

comprises a first stage 60 of categorizing passing packets using external packet characteristics, such as length, inter-arrival period, or derivatives thereof.

A second stage 62 involves grouping together those packets having similar values of the external characteristics. Upper and lower thresholds are used based on the premise that packets of the same session vary only by small amounts. The thresholds may be dynamic since larger changes in the packets may occur over longer timescales.

A third stage 64 involves analyzing those packets which have been grouped together as having a high probability of belonging to the same session, for session characteristics. The session characteristics allow a session type to be identified and then in stage 66, resources can be assigned accordingly.

In one alternative, packets may be marked so that the network resource management can identify the relevant packets for resource allocation.

Advantages of the above embodiments include the possibility of inspection of high bandwidth IP traffic to allow media session detection using low computing resources. The system allows ubiquitous implementation of the identification technology on large and small network structures.

The present embodiments may be used with applications such as Session Border Controllers, Firewalls & billing mediation servers. The present embodiments allow media sessions to be filtered out and identified so that the application need only analyze relevant media traffic. Prior art versions of these applications had to filter out the packets of interest from the total high bandwidth traffic, meaning they had to inspect all the passing traffic.

In the claims that follow, the term "session managing entity refers to any application or endpoint device or terminal unit which manages or generates a session.

It is expected that during the life of a patent maturing from this application many relevant Internet Protocol transport variations will be developed and the scope of the term Internet Protocol is intended to include all such new technologies *a priori*.

The terms "comprises", "comprising", "includes", "including", "having" and their conjugates mean "including but not limited to". This term encompasses the terms "consisting of" and "consisting essentially of".

As used herein, the singular form "a", "an" and "the" include plural references unless the context clearly dictates otherwise. For example, the term "a compound" or

"at least one compound" may include a plurality of compounds, including mixtures thereof.

5 It is appreciated that certain features of the invention, which are, for clarity, described in the context of separate embodiments, may also be provided in combination in a single embodiment. Conversely, various features of the invention, which are, for brevity, described in the context of a single embodiment, may also be provided separately or in any suitable subcombination or as suitable in any other described embodiment of the invention. Certain features described in the context of various embodiments are not to be considered essential features of those embodiments,
10 unless the embodiment is inoperative without those elements.

Although the invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art. Accordingly, it is intended to embrace all such alternatives, modifications and variations that fall within the spirit and broad
15 scope of the appended claims.

All publications, patents and patent applications mentioned in this specification are herein incorporated in their entirety by reference into the specification, to the same extent as if each individual publication, patent or patent application was specifically and individually indicated to be incorporated herein by reference. In addition, citation
20 or identification of any reference in this application shall not be construed as an admission that such reference is available as prior art to the present invention. To the extent that section headings are used, they should not be construed as necessarily limiting.

WHAT IS CLAIMED IS:

1. Electronic network apparatus for identifying media sessions over IP and network packets as belonging or not belonging to a media session, comprising:

a packet characteristic extraction unit configured for obtaining packet characteristics from a succession of packets, said characteristics comprising packet traffic characteristics;

a grouping unit associated with said packet characteristic extraction unit, configured to group together those packets having similar traffic characteristics as probably belonging to a common session, and

a session analyzer configured for analyzing said grouped packets for session characteristics, therewith to identify a session type.

2. The apparatus of claim 1 further comprising a resource allocator for allocating at least one member of the group consisting of resources, provisioning features and control features to said session.

3. The apparatus of claim 1, wherein said session type identification comprises identifying a session managing entity generating or managing said session.

4. The apparatus of claim 1, wherein said session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase.

5. Apparatus according to claim 1, further comprising a thresholder for thresholding said traffic characteristics, and a packet session identifier configured to identify those packets whose characteristics are mutually within said thresholds for said grouping unit to group said packets as belonging to said common session.

6. The apparatus of claim 1, wherein said traffic characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

7. The apparatus of claim 1, wherein said grouping unit comprises a packet marker, associated with said packet session identifier, configured for inserting into a header of a respective packet an indication of said common session with which said respective packet has been identified.

8. The apparatus of claim 7, further comprising a session analyzer associated with said packet marker, configured to obtain packets marked as belonging to said common session and to determine, from said packets, characteristics belonging to said common session, therefrom to identify a session type.

9. The apparatus of claim 8, wherein said session analyzer is configured to obtain said characteristics belonging to said common session from parameter patterns common to said packets.

10. The apparatus of claim 8, wherein said session analyzer is configured to use at least one member of the group consisting of:

- packet length
- inter-arrival period
- variance of inter-arrival period
- variance of length
- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length

- vii. a statistical derivative obtained from multi records of packet length
- viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period

11. The apparatus of claim 8, wherein said session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase.

12. The apparatus of claim 1, further comprising a resource allocator configured to allocate resources on a network according to said identified common session.

13. The apparatus of claim 8, further comprising a resource allocator, configured to allocate resources on a network according to said identified session type

14. The apparatus of claim 1, wherein at least one of said packet session analyzer, said extraction unit and said grouping unit comprises a neural network.

15. A method of identifying session type, comprising categorizing passing packets using traffic packet characteristics;

grouping together those packets having similar values of said traffic characteristics, and

analyzing said grouped packets for session characteristics,
thereby to identify a session type.

16. The method of claim 15 wherein said identifying a session type comprises identifying a session managing entity generating or managing said session.

17. The method of claim 15 wherein said identifying a session type is followed by at least one of the group comprising: providing provisioning and providing control actions to the session.

18. Method according to claim 15, further comprising thresholding said traffic characteristics, and identifying those packets whose characteristics are mutually within said thresholds for said grouping.

19. The method of claim 15, wherein said characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

20. The method of claim 15, further comprising inserting into a header of a respective packet an indication of said common session with which said respective packet has been identified.

21. The method of claim 15, comprising obtaining said characteristics belonging to said common session from parameter patterns common to said packets.

22. The method of claim 15, comprising using at least one member of the group consisting of:

- packet length
- inter-arrival period
- variance of inter-arrival period
- variance of length

- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period.

23. The method of claim 15, comprising using a neural network and characteristics automatically built into said neural network during a neural network training phase.

24. The method of claim 16, further comprising using a neural network and characteristics automatically built into said neural network during a neural network training phase.

ABSTRACT OF THE DISCLOSURE

A method of allocating, restricting or refusing communication resources to media sessions in accordance with individual session or session type, comprises: categorizing passing packets using packet traffic characteristics such as packet length or inter-arrival period; grouping together those packets having similar traffic characteristics, and analyzing the grouped packets for session characteristics, thereby to identify a session type and allocate resources to the session or provisioning or like actions or services.

Docket No.
46203

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

the specification of which

☐

is attached hereto.

☒

was filed on November 1, 2007 as ~~United States Application No.~~ or PCT

International Application Number PCT/IL2007/001336

~~and was amended on~~

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56. Including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Not Claimed

_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)	<input type="checkbox"/>
_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)	<input type="checkbox"/>
_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)	<input type="checkbox"/>

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

<u>60/856,795</u>	<u>November 6, 2006</u>
(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)

I hereby claim the benefit under 35 U.S.C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112. I acknowledge the duty to disclose to the United States Patent and Trademark Office all the information known to me to be material to patentability as defined in Title 37, C.F.R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

<u>PCT/IL2007/001336</u>	<u>November 1, 2007</u>	
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

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

POWER OF ATTORNEY: As a named inventor, I hereby appoint the attorney(s) and/or agent(s) associated with the following Customer Number to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

67801

Send Correspondence to the address associated with Customer Number:

67801

Direct Telephone Calls to: *(name and telephone number)*

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Sole or first inventor's signature	<u>Avi</u> Date <u>3/5/09</u>
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Citizenship	: Israeli
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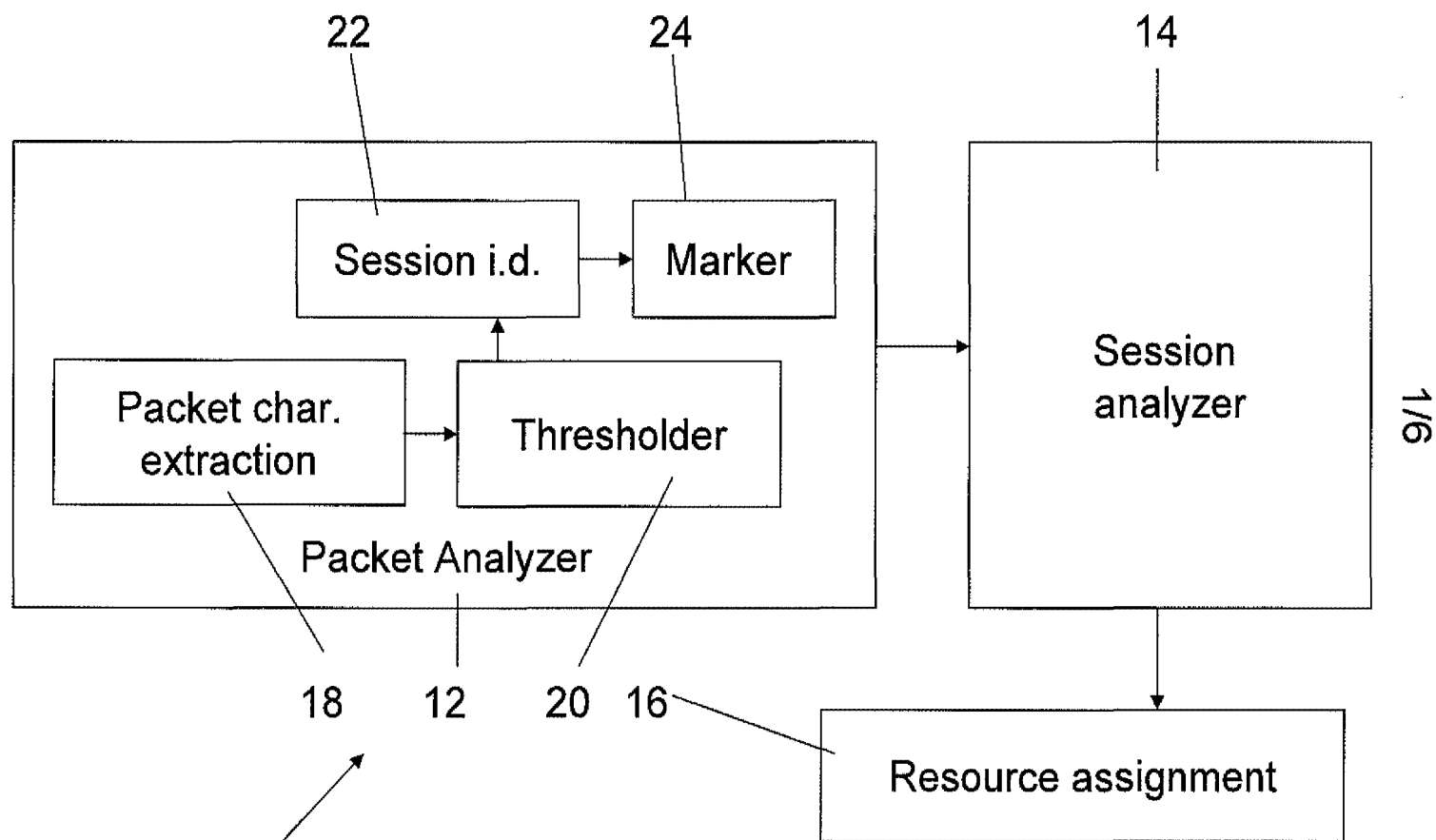


Fig. 1

Fig. 2

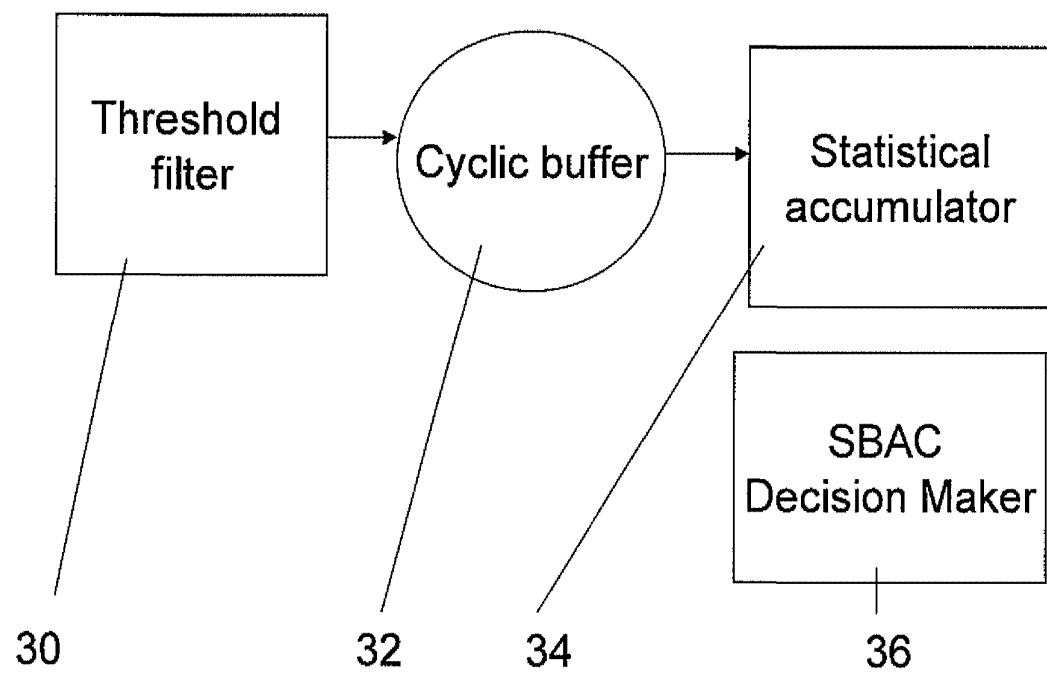


Fig. 3

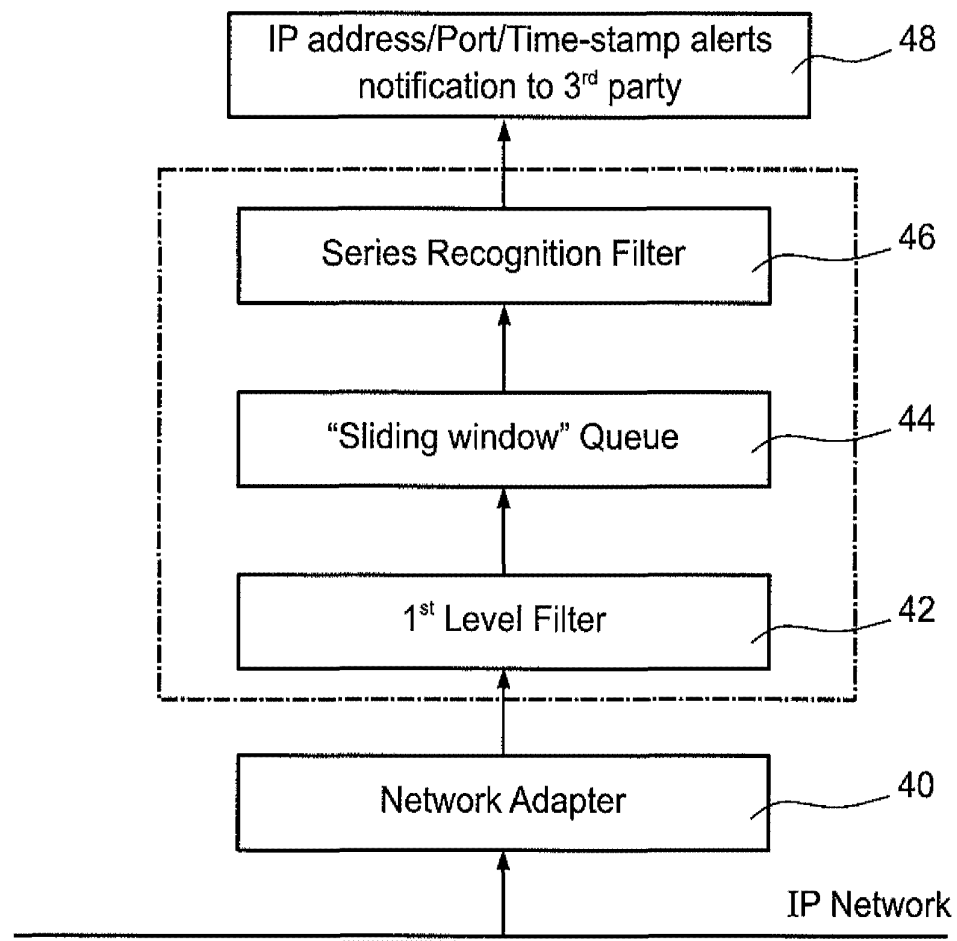


Fig. 4

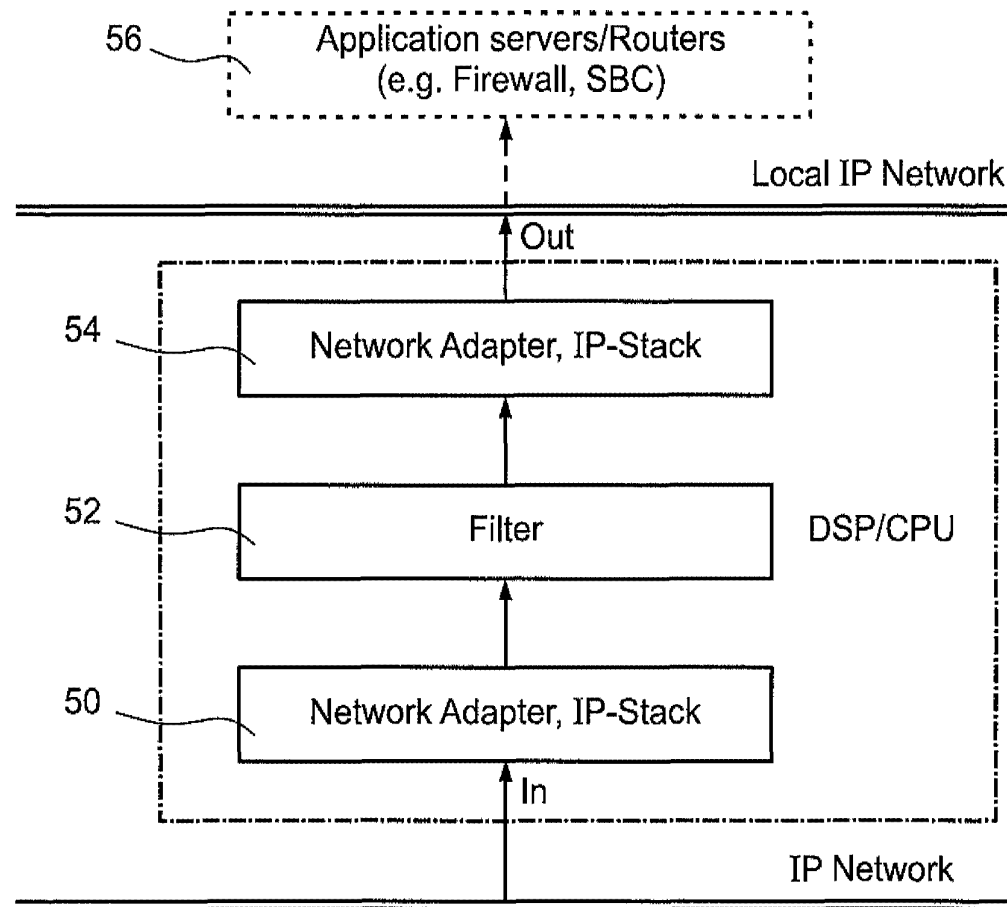
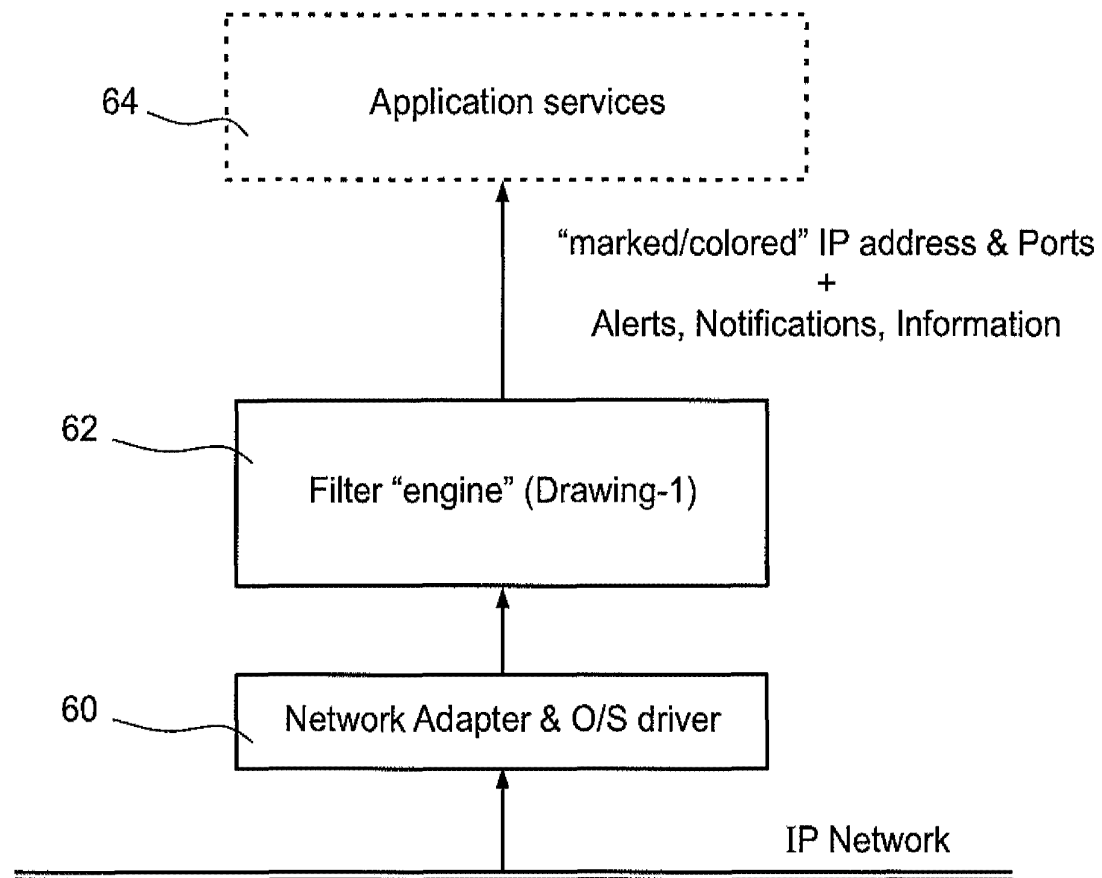


Fig. 5



5/6

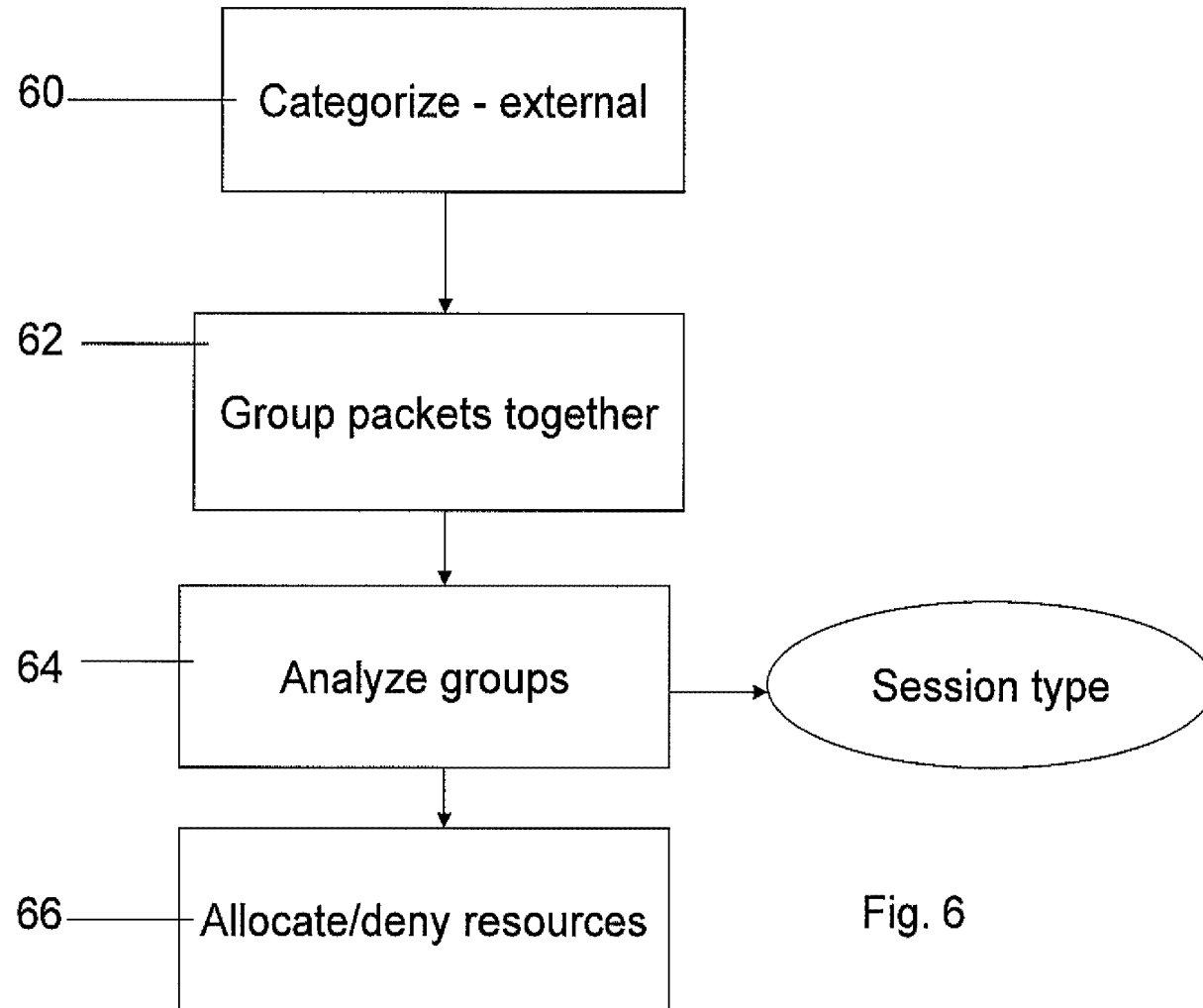


Fig. 6

9/9

Application Data Sheet

Application Information

Application number::	Not Yet Assigned
Filing Date::	Herewith
Application Type::	Regular
Subject Matter::	Utility
CD-ROM or CD-R?::	None
Title::	Media Session Identification Method For IP Networks
Attorney Docket Number::	46203
Request for Early Publication?::	No
Request for Non-Publication?::	No
Suggested Drawing Figure::	1
Total Drawing Sheets::	6
Small Entity?::	Yes
Petition included?::	No
Secrecy Order in Parent Appl.?::	No

Applicant Information

Applicant Authority Type:: Inventor
Primary Citizenship Country:: Israel
Status:: Full Capacity
Given Name:: Avi
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City of mailing address:: Doar Na Misgav
Country of mailing address:: Israel
Postal or Zip Code of mailing address:: 20155

Correspondence Information

Correspondence Customer Number:: 67801

Representative Information

Representative	67801	
Customer Number::		

Domestic Priority Information

Application::	Continuity Type::	Parent Application::	Parent Filing Date::
This application	National Stage of	PCT/IL2007/001336	11/01/07
PCT/IL2007/001336	An application claiming the benefit under 35 USC 119(e)	60/856,795	11/06/06

[This application has no foreign priority claims]

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City of mailing address:: Bat-Yam
Country of mailing address:: Israel
Postal or Zip Code of mailing address:: 59301

PCT REQUESTOriginal (for **SUBMISSION**)

0	For receiving Office use only	
0-1	International Application No.	
0-2	International Filing Date	
0-3	Name of receiving Office and "PCT International Application"	
0-4	Form PCT/RO/101 PCT Request	
0-4-1	Prepared Using	PCT-SAFE [EASY mode] Version 3.51.022.197 MT/FOP 20071001/0.20.5.10
0-5	Petition The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	Israel Patent Office (RO/IL)
0-7	Applicant's or agent's file reference	42364
I	Title of Invention	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS
II	Applicant	
II-1	This person is	applicant and inventor
II-2	Applicant for	all designated States
II-4	Name (LAST, First)	ORON, Avi
II-5	Address	Moshav Yahad 20155 Doar Na Misgav Israel
II-6	State of nationality	IL
II-7	State of residence	IL
II-8	Telephone No.	.
II-9	Facsimile No.	.

PCT REQUEST

Original (for SUBMISSION)

IV-1	Agent or common representative; or address for correspondence The person identified below is hereby/ has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	agent
IV-1-1	Name	G. E. EHRLICH (1995) LTD.
IV-1-2	Address	11 Menachem Begin Street 52521 Ramat Gan Israel
IV-1-3	Telephone No.	972-73-7919199
IV-1-4	Facsimile No.	972-73-7919100
IV-1-5	e-mail	patents@ipatent.co.il
IV-2	Additional agent(s)	additional agent(s) with same address as first named agent
IV-2-1	Name(s)	EHRLICH, Gal; WATERMAN, Hadassa; MELNICK, Geoffrey, L.
V	DESIGNATIONS	
V-1	The filing of this request constitutes under Rule 4.9(a), the designation of all Contracting States bound by the PCT on the International filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.	
VI-1	Priority claim of earlier national application	
VI-1-1	Filing date	06 November 2006 (06.11.2006)
VI-1-2	Number	60/856,795
VI-1-3	Country	US
VI-2	Incorporation by reference : where an element of the international application referred to in Article 11(1)(iii)(d) or (e) or a part of the description, claims or drawings referred to in Rule 20.5(a) is not otherwise contained in this international application but is completely contained in an earlier application whose priority is claimed on the date on which one or more elements referred to in Article 11(1)(iii) were first received by the receiving Office, that element or part is, subject to confirmation under Rule 20.6, incorporated by reference in this international application for the purposes of Rule 20.6.	
VII-1	International Searching Authority Chosen	United States Patent and Trademark Office (USPTO) (ISA/US)

PCT REQUEST

Original (for SUBMISSION)

VIII	Declarations	Number of declarations	
VIII-1	Declaration as to the identity of the inventor	-	
VIII-2	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	-	
VIII-3	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	-	
VIII-4	Declaration of inventorship (only for the purposes of the designation of the United States of America)	-	
VIII-5	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	-	
IX	Check list	number of sheets	electronic file(s) attached
IX-1	Request (including declaration sheets)	4	✓
IX-2	Description	17	-
IX-3	Claims	6	-
IX-4	Abstract	1	✓
IX-5	Drawings	6	-
IX-7	TOTAL	34	
	Accompanying Items	paper document(s) attached	electronic file(s) attached
IX-8	Fee calculation sheet	✓	-
IX-13	Priority document(s)	Item(s) VI-1	-
IX-17	PCT-SAFE physical media	-	✓
IX-18	other	ILS 486 - transmittal fee	
IX-19	Figure of the drawings which should accompany the abstract	.	
IX-20	Language of filing of the international application	English	
X-1	Signature of applicant, agent or common representative		
X-1-1	Name	G. E. EHRLICH (1995) LTD.	
X-1-2	Name of signatory	MELNICK, Geoffrey, L.	
X-1-3	Capacity	Agent	

PCT REQUEST

Original (for SUBMISSION)

FOR RECEIVING OFFICE USE ONLY

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

FOR INTERNATIONAL BUREAU USE ONLY

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

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 42364	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/IL 07/01336	International filing date (<i>day/month/year</i>) 01 November 2007 (01.11.2007)	(Earliest) Priority Date (<i>day/month/year</i>) 06 November 2006 (06.11.2006)
Applicant ORON, AVI		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of:

- ☒ the international application in the language in which it was filed.
☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (see Box No. II).

3. ☐ Unity of invention is lacking (see Box No. III).

4. With regard to the title,

- ☒ the text is approved as submitted by the applicant.
☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- ☒ the text is approved as submitted by the applicant.
☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

- a. the figure of the drawings to be published with the abstract is Figure No. 1
☐ as suggested by the applicant.
☒ as selected by this Authority, because the applicant failed to suggest a figure.
☐ as selected by this Authority, because this figure better characterizes the invention.
- b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL 07/01336

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H04L 12/28; H04L 12/56 (2008.04)

USPC - 370/389

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

USPC: 370/389

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 370/389, 392 (text search - see terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST (US PG-PUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT), Google Scholar

Search Terms Used: identify, analyze, test, packet, data, traffic, group, classify, categorize, session, path

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/0135667 A1 (Mann et al.) 17 July 2003 (17.07.2003), entire document, especially; para [0003], [0005], [0006], [0009], [0021], [0022], [0025], [0028], [0029], [0039], Fig. 2	1-3, 5-9, 12, 13, 15-21
Y		4, 10, 11, 14, 22-24
Y	US 2003/0204562 A1 (Hwang) 30 October 2003 (30.10.2003), entire document, especially; para [0064], [0072], Fig. 3, 4	4, 11, 14, 23, 24
Y	US 6,975,592 B1 (Seddigh et al.) 13 December 2005 (13.12.2005), entire document, especially; col 2, ln 5-20, col 6, ln 5-20, col 9, lines 1-15, col 4, ln 15-45, TABLE I, Fig. 1A	10, 22

☐ Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

25 September 2008 (25.09.2008)

Date of mailing of the international search report

07 OCT 2008

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-3201

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (April 2007)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
G.E EHlich LTD.
11 MENACHEM BEGIN STREET
52521 RAMAT GAN
ISRAEL

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing
(day/month/year)

07 OCT 2008

Applicant's or agent's file reference
42364

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/IL 07/01336

International filing date (day/month/year)

01 November 2007 (01.11.2007)

Priority date (day/month/year)

06 November 2006 (06.11.2006)

International Patent Classification (IPC) or both national classification and IPC

IPC(8) - H04L 12/28; H04L 12/56 (2008.04)

USPC - 370/389

Applicant ORON, AVI

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability: citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

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

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

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

Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Date of completion of this opinion <p style="text-align: center; font-weight: bold;">28 September 2008 (28.09.2008)</p>	Authorized officer: <p style="text-align: center;">Lee W. Young</p> <p style="font-size: 0.8em;">PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774</p>
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Form PCT/ISA/237 (cover sheet) (April 2007)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/IL 07/01336

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:
☒ the international application in the language in which it was filed.
☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. ☐ This opinion has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a)).
3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material
☐ on paper
☐ in electronic form
 - c. time of filing/furnishing
☐ contained in the international application as filed
☐ filed together with the international application in electronic form
☐ furnished subsequently to this Authority for the purposes of search
4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/IL 07/01336

Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement			
1. Statement				
Novelty (N)	Claims	4, 10, 11, 14, 22-24		YES
	Claims	1-3, 5-9, 12, 13, 15-21		NO
Inventive step (IS)	Claims	None.		YES
	Claims	1 - 24		NO
Industrial applicability (IA)	Claims	1 - 24		YES
	Claims	None.		NO
2. Citations and explanations:				
<p>Claims 1-3, 5-9, 12, 13 and 15-21 lack novelty under PCT Article 33(2) as being anticipated by US 2003/0135667 A1 to Mann et al. (hereinafter 'Mann').</p> <p>Regarding claim 1, Mann teaches electronic network apparatus (fig. 2) for identifying media sessions over IP and network packets as belonging or not belonging to a media session (para [0005] - received packet individually, including identifying a session from the received packet and accordingly identifying a corresponding session on the host system to which the received packet belongs), comprising: a packet characteristic extraction unit (210 in fig. 2) configured for obtaining packet characteristics from a succession of packets (para [0005] - session from the received packet; para [0005] - identifying a corresponding session), said characteristics comprising packet traffic characteristics (para [0039] - packet status 425); a grouping unit associated with said packet characteristic extraction unit (para [0029] - buffered in the packet queue 220 and classifying them according to the session number), configured to group together those packets having similar traffic characteristics as probably belonging to a common session (para [0029] - buffered in the packet queue 220 and classifying them according to the session number), and a session analyzer configured for analyzing said grouped packets for session characteristics (para [0006] - determines the packet's underlying session), therewith to identify a session type (para [0006] - determines the packet's underlying session).</p> <p>Regarding claim 2, Mann teaches the apparatus of claim 1, further comprising a resource allocator for allocating at least one member of the group consisting of resources (para [0025] - packet queue allocation mechanism 230 may allocate one or more packet queues as storage space for received packets), provisioning features and control features to said session (Para [0021] - session number; para [0022] - session ID).</p> <p>Regarding claim 3, Mann teaches the apparatus of claim 1, wherein said session type identification comprises identifying a session managing entity generating or managing said session (para [0005] - identifying a corresponding session on the host system).</p> <p>Regarding claim 5, Mann teaches the apparatus according to claim 1, further comprising a thresholder (para [0009] - packet queue 220) for thresholding said traffic characteristics (para [0009] - received packets buffered in the packet queue 220 and classifying them according to the session number), and a packet session identifier configured to identify those packets whose characteristics (para [0006] - determines the packet's underlying session) are mutually within said thresholds for said grouping unit to group said packets as belonging to said common session (para [0009] - classifying them according to the session number).</p> <p>Regarding claim 6, Mann teaches the apparatus of claim 1, wherein said traffic characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth (para [0039] - information as packet identification (ID) 420, packet status 425, packet length 430, packet buffer address 435, or out-of-order indicator 440).</p> <p>Regarding claim 7, Mann teaches the apparatus of claim 1, wherein said grouping unit comprises a packet marker (para [0022] - packet bundle), associated with said packet session identifier (para [0022] - classification ID" may be assigned to this packet bundle), configured for inserting into a header of a respective packet an indication of said common session with which said respective packet has been identified (para [0003] - marked as "belonging" to a particular session and such marking is usually included in (or encapsulated in) the packets).</p> <p>Regarding claim 8, Mann teaches the apparatus of claim 7, further comprising a session analyzer associated with said packet marker, configured to obtain packets marked as belonging to said common session (para [0028] - classification-based packet transferring mechanism 120 may dynamically determine a session number) and to determine, from said packets, characteristics belonging to said common session, therefrom to identify a session type (para [0003] - packets are originally derived from data of some communication session).</p> <p>Regarding claim 9, Mann teaches the apparatus of claim 8, wherein said session analyzer is configured to obtain said characteristics (para [0021] - session number; para [0022] - session ID) belonging to said common session from parameter patterns common to said packets (para [0005] - session from the received packet).</p> <p>Regarding claim 12, Mann teaches the apparatus of claim 1, further comprising a resource allocator configured to allocate resources on a network according to said identified common session (para [0025]).</p> <p style="text-align: center;">--(continued on supplemental pages)--</p>				

Form PCT/ISA/237 (Box No. V) (April 2007)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/IL 07/01336

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

Box V.2. Citations and explanations:

Regarding claim 13, Mann teaches the apparatus of claim 8, further comprising a resource allocator, configured to allocate resources on a network according to said identified session type (para [0025] - packet queue allocation mechanism 230 may allocate one or more packet queues as storage space for received packets).

Regarding claim 15, Mann teaches a method of identifying session type, comprising categorizing passing packets using traffic packet characteristics (abstract - packets are classified according to a classification); grouping together those packets having similar values of said traffic characteristics (para [0029] - buffered in the packet queue 220 and classifying them according to the session number), and analyzing said grouped packets for session characteristics (para [0006] - determines the packet's underlying session), thereby to identify a session type (para [0005] - Identifying a session from the received packet).

Regarding claim 16, Mann teaches the method of claim 15 wherein said identifying a session type comprises identifying a session managing entity generating or managing said session (para [0005] - Identifying a corresponding session on the host system).

Regarding claim 17, Mann teaches the method of claim 15 wherein said identifying a session type (para [0005] - identifying a session) is followed by at least one of the group (para [0022] - packet bundle) comprising: providing provisioning and providing control actions to the session (Para [0021] - session number; para [0022] - session ID).

Regarding claim 18, Mann teaches method according to claim 15, further comprising thresholding said traffic characteristics (para [0009] - received packets buffered in the packet queue 220 and classifying them according to the session number), and identifying those packets (para [0006] - determines the packet's underlying session) whose characteristics are mutually within said thresholds for said grouping (para [0009] - classifying them).

Regarding claim 19, Mann teaches the method of claim 15, wherein said characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth (para [0039] - information as packet identification (ID) 420, packet status 425, packet length 430, packet buffer address 435, or out-of-order indicator 440).

Regarding claim 20, Mann teaches the method of claim 15, further comprising inserting into a header of a respective packet an indication of said common session with which said respective packet has been identified (para [0022] - classification ID" may be assigned to this packet bundle).

Regarding claim 21, Mann teaches the method of claim 15, comprising obtaining said characteristics (para [0005] - session from the received packet) belonging to said common session from parameter patterns common to said packets (Para [0021] - session number; para [0022] - session ID).

Claims 4, 11, 14, 23 and 24 lack an inventive step under PCT Article 33(3) as being obvious over Mann in view of US 2003/0204562 A1 to Hwang.

Regarding claim 4, Mann teaches an apparatus of packet classification of claim 1. Mann does not teach session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase. Hwang does teach session analyzer comprises a neural network (para [0072] - neural network), using characteristics (para [0064] - User's data in a connection session are classified into the following three categories) automatically built into said neural network during a neural network training phase (fig. 3 and 4 show different phase of the method). It would have been obvious to one of ordinary skill in the art to combine the device of packet grouping of Mann with the packet analyzer in neural network of Hwang in order to have flexible compatibility in various types of networks when implementing packet classification.

Regarding claim 11, Mann teaches an apparatus of packet classification of claims 1, 7 and 8. Mann does not teach session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase. Hwang does teach session analyzer comprises a neural network (para [0072] - neural network), using characteristics (para [0064] - User's data in a connection session are classified into the following three categories) automatically built into said neural network during a neural network training phase (fig. 3 and 4 show different phase of the method). It would have been obvious to one of ordinary skill in the art to combine the device of packet grouping of Mann with the packet analyzer in neural network of Hwang in order to have flexible compatibility in various types of networks when implementing packet classification.

Regarding claim 14, Mann teaches an apparatus of packet classification of claim 1. Mann does not teach at least one of said packet session analyzer, said extraction unit and said grouping unit comprises a neural network. Hwang does teach at least one of said packet session analyzer, said extraction unit and said grouping unit (fig. 2) comprises a neural network (para [0072] - neural network). It would have been obvious to one of ordinary skill in the art to combine the device of packet grouping of Mann with the grouping unit in neural network of Hwang in order to have flexible compatibility in various types of networks when implementing packet classification.

Regarding claim 23, Mann teaches a method of packet classification of claim 15. Mann does not teach using a neural network and characteristics automatically built into said neural network during a neural network training phase. Hwang does teach using a neural network (para [0072] - neural network) and characteristics (para [0064] - User's data in a connection session are classified into the following three categories) automatically built into said neural network during a neural network training phase (fig. 3 and 4 show different phase of the method). It would have been obvious to one of ordinary skill in the art to combine the method of packet grouping of Mann with the packet analyzing in neural network of Hwang in order to have flexible compatibility in various types of networks when implementing packet classification.

-----continued In Supplemental Box-----

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IL 07/01336

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

Box V.2. Citations and explanations:

Regarding claim 24, Mann teaches a method of packet classification of claims 15 and 16. Mann does not teach using a neural network (para [0072] - neural network) and characteristics (para [0064] - User's data in a connection session are classified into the following three categories) automatically built into said neural network during a neural network training phase (fig. 3 and 4 show different phase of the method). Mann does not teach using a neural network and characteristics automatically built into said neural network during a neural network training phase. Hwang does teach using a neural network (para [0072] - neural network) and characteristics (para [0064] - User's data in a connection session are classified into the following three categories) automatically built into said neural network during a neural network training phase (fig. 3 and 4 show different phase of the method). It would have been obvious to one of ordinary skill in the art to combine the method of packet grouping of Mann with the packet analyzing in neural network of Hwang in order to have flexible compatibility in various types of networks when implementing packet classification.

Claims 10 and 22 lack an inventive step under PCT Article 33(3) as being obvious over Mann in view of US 6,975,592 B1 to Seddigh et al (hereinafter 'Seddigh').

Regarding claim 10, Mann teaches an apparatus of packet classification of claims 1, 7 and 8. Mann does not teach session analyzer is configured to use at least one member of the group consisting of: -packet length -inter-arrival period -variance of inter-arrival period -variance of length -covariance of inter-arrival period -covariance of length -a statistical derivative obtained from multi records of packet length -a statistical derivative obtained from multi records of inter-arrival period -a histogram built of at least one of the following: i. packet length 11. inter-arrival period iii. variance of inter-arrival period iv. variance of length v. covariance of inter-arrival period vi. covariance of length vii. a statistical derivative obtained from multi records of packet length viii. a statistical derivative obtained from multi records of inter-arrival period. However Seddigh does teach session analyzer (106 in fig. 1A) is configured to use at least one member of the group consisting (col 2, ln 5-20 - Dynamic flow classification schemes examine certain flow qualities to determine the class associated with the traffic flow) of: -packet length (col 4, ln 15-45 - size of current packet (includes entire packet)) -inter-arrival period (col 2, ln 5-20 - inter-arrival times) -variance of inter-arrival period -variance of length -covariance of inter-arrival period -covariance of length -a statistical derivative obtained from multi records of packet length -a statistical derivative obtained from multi records of inter-arrival period -a histogram built of at least one of the following: i. packet length 11. inter-arrival period iii. variance of inter-arrival period iv. variance of length v. covariance of inter-arrival period vi. covariance of length vii. a statistical derivative obtained from multi records of packet length viii. a statistical derivative obtained from multi records of inter-arrival period (TABLE I - average bandwidth measured over time interval T PPS 4 average packets-per-second measured over time interval, size of IP payload for current packet). It would have been obvious to one of ordinary skill in the art to combine the device of packet grouping of Mann with the feature of packet length and inter-arrival period determination of Seddigh in order to provide more choice for user to classify traffic based on different characteristics of the traffic such as packet length and packet's inter-arrival period.

Regarding claim 22, Mann teaches a method of packet classification of claims 1. Mann does not teach using at least one member of the group consisting: -packet length -inter-arrival period -variance of inter-arrival period -variance of length -covariance of inter-arrival period -covariance of length -a statistical derivative obtained from multi records of packet length -a statistical derivative obtained from multi records of inter-arrival period -a histogram built of at least one of the following: i. packet length 11. inter-arrival period iii. variance of inter-arrival period iv. variance of length v. covariance of inter-arrival period vi. covariance of length vii. a statistical derivative obtained from multi records of packet length viii. a statistical derivative obtained from multi records of inter-arrival period -a matrix histogram built of at least one of the following: i. packet length 11. inter-arrival period iii. variance of inter-arrival period iv. variance of length v. covariance of inter-arrival period vi. covariance of length vii. a statistical derivative obtained from multi records of packet length viii. a statistical derivative obtained from multi records of inter-arrival period. However Seddigh does teach using at least one member of the group consisting (col 2, ln 5-20 - Dynamic flow classification schemes examine certain flow qualities to determine the class associated with the traffic flow) of: -packet length (col 4, ln 15-45 - size of current packet (includes entire packet)) -inter-arrival period (col 2, ln 5-20 - inter-arrival times) -variance of inter-arrival period -variance of length -covariance of inter-arrival period -covariance of length -a statistical derivative obtained from multi records of packet length -a statistical derivative obtained from multi records of inter-arrival period -a histogram built of at least one of the following: i. packet length 11. inter-arrival period iii. variance of inter-arrival period iv. variance of length v. covariance of inter-arrival period vi. covariance of length vii. a statistical derivative obtained from multi records of packet length viii. a statistical derivative obtained from multi records of inter-arrival period (TABLE I - average bandwidth measured over time interval T PPS 4 average packets-per-second measured over time interval, size of IP payload for current packet). It would have been obvious to one of ordinary skill in the art to combine the method of packet grouping of Mann with the feature of packet length and inter-arrival period determination of Seddigh in order to provide more choice for user to classify traffic based on different characteristics of the traffic such as packet length and packet's inter-arrival period.

Claims 1-24 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used in industry.

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS			
First Named Inventor/Applicant Name:	Avi ORON			
Filer:	Martin Moynihan			
Attorney Docket Number:	46203			
Filed as Small Entity				
U.S. National Stage under 35 USC 371 Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Basic National Stage Fee	2631	1	165	165
Natl Stage Search Fee - U.S. was the ISA	2641	1	50	50
Natl Stage Exam Fee - all other cases	2633	1	110	110
Pages:				
Claims:				
Claims in excess of 20	2615	4	26	104
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				429

Electronic Acknowledgement Receipt

EFS ID:	5275203
Application Number:	12513510
International Application Number:	PCT/IL07/01336
Confirmation Number:	3332
Title of Invention:	MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS
First Named Inventor/Applicant Name:	Avi ORON
Customer Number:	67801
Filer:	Martin Moynihan
Filer Authorized By:	
Attorney Docket Number:	46203
Receipt Date:	05-MAY-2009
Filing Date:	
Time Stamp:	08:52:03
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$429
RAM confirmation Number	6614
Deposit Account	501407
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part / Zip (if appl.)	Pages (if appl.)
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IPR2018-00594
Exhibit 2015

1	Transmittal of New Application	Transmittal.pdf	83677	no	2
			71514310ad62dd525e800c942dbccfbb4778e11		
Warnings:					
Information:					
2	Preliminary Amendment	PreliminaryAmendment.pdf	27331	no	3
			855819aa6f9ac5b4fc7bc9eca0195291166591fa		
Warnings:					
Information:					
3	Specification	Spec.pdf	785022	no	24
			2c39e39b61320ef07cbcb708fb585940b8e25080		
Warnings:					
Information:					
4	Oath or Declaration filed	Oath.pdf	100084	no	3
			332beafc4f417c7d7d2fee00577802c41e84895b		
Warnings:					
Information:					
5	Drawings-only black and white line drawings	Figures.pdf	43094	no	6
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Warnings:					
Information:					
6	Miscellaneous Incoming Letter	ADS.pdf	31602	no	3
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Warnings:					
Information:					
7	Documents submitted with 371 Applications	PCTRequest.pdf	76851	no	4
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Warnings:					
Information:					
8	Documents submitted with 371 Applications	SR.pdf	81174	no	2
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Warnings:					
Information:					
9	Documents submitted with 371 Applications	WO.pdf	283533	no	5
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Warnings:					
Information:					
IPR2018-00594 Exhibit 2015					

10	Fee Worksheet (PTO-875)	fee-info.pdf	36495 <div>6842006052a587ebdd6e37cb44ff0b7d159a825e</div>	no	2
Warnings:					
Information:					
Total Files Size (in bytes):				1548863	
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

(19) World Intellectual Property Organization
International Bureau



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15 May 2008 (15.05.2008)

PCT

(10) International Publication Number
WO 2008/056349 A2

(51) International Patent Classification:
H04L 12/28 (2006.01)

(21) International Application Number:
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1 November 2007 (01.11.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/856,795 6 November 2006 (06.11.2006) US

(71) Applicant (for all designated States except US): **I-SPADE TECHNOLOGIES LTD.** [IL/IL]; 8/24 Balfur Street, 59301 Bat-Yam (IL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **ORON, Avi** [IL/IL]; Moshav Yahad, 20155 Doar Na Misgav (IL).

(74) Agents: **G. E. EHRLICH (1995) LTD.** et al.; 11 Menachem Begin Street, 52521 Ramat Gan (IL).

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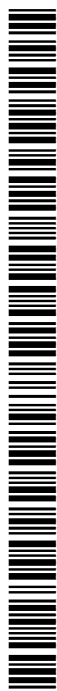
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(54) Title: MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

(57) Abstract: A method of allocating, restricting or refusing communication resources to media sessions in accordance with individual session or session type, comprises: categorizing passing packets using packet traffic characteristics such as packet length or inter-arrival period; grouping together those packets having similar traffic characteristics, and analyzing the grouped packets for session characteristics, thereby to identify a session type and allocate resources to the session or provisioning or like actions or services.



WO 2008/056349 A2

MEDIA SESSION IDENTIFICATION METHOD FOR IP NETWORKS

5 FIELD AND BACKGROUND OF THE INVENTION

The present invention, in some embodiments thereof, relates to a media session identification method for IP networks and, more particularly, but not exclusively, to a media session identification method that identifies media sessions from the flow of packets and assigns specific packets to the media sessions. It is noted that the term "session" includes streaming of data, such as in for example a video stream.

The continuous increase in IP based media traffic over the Internet and other networks, supported by the continuous increase in the various media communication applications, emphasizes the need for IP traffic control tools to cope with the increasingly congested networks. These IP traffic control tools are required by Internet service providers (ISPs), IP-Telephony providers (mobile and fixed) and by Enterprises for implementing traffic shaping measures such as availability of service and quality of service, for firewall enhancements, for providing media session logs supporting billing capabilities and for meeting and supporting lawful interception guidelines set by governments and governmental bodies.

A media session, such as a voice or video session, is expected to have a continuous stream of sampled data so it can be reconstructed at its destination to produce smooth sound or images or both. This means that a minimum amount of data bandwidth has to be sustained on the network. As media at either end is sampled and de-assembled or re-assembled by symmetrical session CODECs (coder & decoder) – data streaming must comply with a certain bandwidth demand and packet-rate so that the human ear or eye at the destination does not experience any information gaps or distortions.

It is desirable to identify packets as belonging to a session to group the succession of IP packets and also to identify a particular application or type that the session belongs to in order to apply provisioning, quality of service and control actions to the session or stream; applications that are real time sensitive such as Voice-over-IP and/or Video-over-IP tend also to be bandwidth availability sensitive, therefore maintaining the quality of service for such application sessions require the identification, and possibly the classification, of their traffic streams. It may also be

desirable to identify a session or a stream belonging to a particular application in order to implement and meet interception requirements by law enforcement authorities, as well as in the need to generate CDRs for billing and analysis purposes, and the like. In other cases, some applications may be perceived as prohibited or posing a security risk, that is creating 'security holes', and some networks may be interested in blocking such applications. Again, the best way to do so is to identify the session and the packets belonging to the session and then block packets belonging to the session. For example, many organizations treat Instant-Messaging (IM) applications as high security risks which might create a hole through which sensitive data can flow out of an organization. For those organizations, it is highly essential to identify data flow (e.g. file-transfers) within a media session.

Various methods for analyzing IP traffic are available. The traditional technologies for analyzing and identifying IP traffic (including IP media sessions) include packet header analysis. Packets whose headers indicate the same destination may be assumed to belong to the same session. Packet header analysis is however simplistic. The same user may be running several different sessions simultaneously and mere packet header analysis may not be able to distinguish between them. Thus there is also the so called 'Deep Packet Inspection' method, or the 'Packet Content Analysis'. These known technologies require digging into and analyzing the content, or Payload, of the packets, with the aim of extrapolating signatures or fingerprints of the payloads. The signatures can then be identified with a specific protocol or application. More often than not, the identification process includes analysis of additional factors from the packet 'Header' (e.g. addresses and port numbers).

There are several disadvantages of the Deep Packet Inspection approach, of which the major are known to be:

1. Alteration of Payloads: Packet Payloads can change due to changes in the application. Thus a signature that has been extrapolated and correlated to a specific protocol or application can be rendered invalid upon the alteration of the payload due say to a new version release.
2. Encryption of packet content: Certain media applications (e.g. Skype) encrypt the messages, which pose a difficulty in inspecting the Payload of its packets and obtaining a meaningful signature.

In other words, the deep packet inspection method is dependant on elements that can be encrypted or altered by the application and can therefore be initially unreadable or the reading can become invalid if the application alters its content sequence.

In order to at least partly overcome the above problems, it is also known to use Complete Packet Inspection (CPI), which combines header analysis and deep packet inspection, otherwise known as payload pattern search. The header analysis provides additional information that complements the payload pattern search. Complete packet inspection is relatively widely used and applications include network monitoring, application discovery, behavioral analysis, network security, policy enforcement, test and measurement, lawful interception, and trouble shooting.

Nevertheless, both deep packet inspection and complete packet analysis require analysis of multiple packets and their sequence down to the payload. Thus, using deep packet inspection/content inspection on any sizeable network requires strong powerful monitoring processing power as well as huge memory resources, as many thousands of IP sessions occur simultaneously. This renders the solution unfeasible in many cases. In other cases the traffic throughput rate is limited by the inspection capacity. Where the aim is to ensure quality of service for the IP sessions that require it, the very attempt to solve the problem may be making things worse.

State-full inspection Firewalls, Session Border Controllers (SBC) and billing mediation systems each require inspection for their own needs. Thus in some cases the interest may be in blocking the session, in other cases in prioritizing the session and in yet other cases the interest may lie in creating billing records (CDR) for the session. Due to the heavy processing requirement, inspection thus tends to be limited to a relatively small number of simultaneous IP-sessions (e.g. calls) that can be managed, and this prohibits any effective inspection at perhaps the one place it could be most effective, namely at the operator's high-speed backbones.

Some existing data security systems detect and prevent intrusion using simple predefined behavioristic rules and thresholds to alert for abnormal traffic behavior which may indicate possible attacks on the network (customarily implemented in Firewall technologies). Such suspicious behavior may include indications of denial of service (DoS) attacks.

One of the characteristics of a media session is the tendency to consist of a packet stream having a low variation in packet length and/or inter-arrival periods.

However, network delay & jittering as well as the fact that some codecs support silence suppression may lead to large inter-arrival period variations.

The existing technologies, including deep and complete packet inspections, do not help specifically in controlling these media sessions for the reasons given above, since the packets are not always recognized.

SUMMARY OF THE INVENTION

The present invention relates to the use of the regularity and similarity characteristics of packet traffic, belonging to a media session, to identify the packets belonging to a given media session, and subsequent identification of the kind of media session, so that the media session can be provisioned and/or controlled (e.g allocating appropriate resources or not allocating at all, as required). In general, the identification is probabilistic as opposed to definitive. Herein the media session may be identified on a number of levels from the most generic to the very specific. All the session identifications from the most generic to the most specific are referred to as the session type. A generic identification may refer to identification of the session type as being video or audio or music or the like, including the identification of interactions within such session, such as instant messaging, file transfer and application sharing. The more specific identifications may involve a specific end-device or application and the term type further includes anything in between. Packet identification or grouping, are terms used to refer to an identification of packets that belong together to a session type in a common session.

According to an aspect of some embodiments of the present invention there is provided electronic network apparatus for identifying media sessions over IP and network packets as belonging or not belonging to a media session, comprising:

a packet characteristic extraction unit configured for obtaining packet characteristics from a succession of packets, the characteristics comprising packet traffic characteristics;

a grouping unit associated with the packet characteristic extraction unit, configured to group together those packets having similar traffic characteristics as probably belonging to a common session, and

a session analyzer configured for analyzing the grouped packets for session characteristics, therewith to identify a session type.

The apparatus may comprise a resource allocator for allocating at least one member of the group consisting of resources, provisioning features and control features to the session.

In an embodiment the session type identification comprises identifying an application and/or end-device generating or managing the session.

In an embodiment, the session analyzer comprises a neural network, using characteristics automatically built into the neural network during a neural network training phase.

An embodiment comprises a thresholder for thresholding the traffic characteristics, and a packet session identifier configured to identify those packets whose characteristics are mutually within the thresholds for the grouping unit to group the packets as belonging to the common session.

In an embodiment, the traffic characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

In an embodiment, the grouping unit comprises a packet marker, associated with the packet session identifier, configured for inserting into a header of a respective packet an indication of the common session with which the respective packet has been identified.

An embodiment comprises a session analyzer associated with the packet marker, configured to obtain packets marked as belonging to the common session and to determine, from the packets, characteristics belonging to the common session, therefrom to identify a session type.

In an embodiment, the session analyzer is configured to obtain the characteristics belonging to the common session from parameter patterns common to the packets.

In an embodiment, the session analyzer is configured to use at least one member of the group consisting of:

- packet length
- inter-arrival period
- variance of inter-arrival period
- variance of length

- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period

In an embodiment, the session analyzer comprises a neural network, using characteristics automatically built into the neural network during a neural network training phase.

An embodiment comprises a resource allocator configured to allocate resources on a network according to the identified common session.

An embodiment comprises a resource allocator, configured to allocate resources on a network according to the identified session type

An embodiment comprises at least one of the packet session analyzer, the extraction unit and the grouping unit comprises a neural network.

5 According to a second aspect of the present invention there is provided a method of identifying session type, comprising

categorizing passing packets using traffic packet characteristics;

grouping together those packets having similar values of the traffic characteristics, and

10 analyzing the grouped packets for session characteristics,

thereby to identify a session type.

Unless otherwise defined, all technical and/or scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which the invention pertains. Although methods and materials similar or equivalent to those
15 described herein can be used in the practice or testing of embodiments of the invention, exemplary methods and/or materials are described below. In case of conflict, the patent specification, including definitions, will control. In addition, the materials, methods, and examples are illustrative only and are not intended to be necessarily limiting.

20 Implementation of the method and/or system of embodiments of the invention can involve performing or completing selected tasks manually, automatically, or a combination thereof. Moreover, according to actual instrumentation and equipment of embodiments of the method and/or system of the invention, several selected tasks could be implemented by hardware, by software or by firmware or by a combination
25 thereof using an operating system.

For example, hardware for performing selected tasks according to embodiments of the invention could be implemented as a chip or a circuit. As software, selected tasks according to embodiments of the invention could be implemented as a plurality of software instructions being executed by a computer
30 using any suitable operating system. In an exemplary embodiment of the invention, one or more tasks according to exemplary embodiments of method and/or system as described herein are performed by a data processor, such as a computing platform for executing a plurality of instructions. Optionally, the data processor includes a volatile

memory for storing instructions and/or data and/or a non-volatile storage, for example, a magnetic hard-disk and/or removable media, for storing instructions and/or data. Optionally, a network connection is provided as well. A display and/or a user input device such as a keyboard or mouse are optionally provided as well.

5

BRIEF DESCRIPTION OF THE DRAWINGS

Some embodiments of the invention are herein described, by way of example only, with reference to the accompanying drawings. With specific reference now to the drawings in detail, it is stressed that the particulars shown are by way of example and for purposes of illustrative discussion of embodiments of the invention. In this regard, the description taken with the drawings makes apparent to those skilled in the art how embodiments of the invention may be practiced.

10

In the drawings:

FIG. 1 is a simplified block diagram showing a packet and session identification apparatus according to a first embodiment of the present invention;

15

FIG. 2 is a simplified block diagram showing a general implementation of the apparatus of Fig. 1;

FIG. 3 is a simplified block diagram showing another embodiment of the present invention;

20

FIG. 4 is a simplified block diagram showing a hardware implementation of the embodiment of Fig. 3;

FIG. 5 is a simplified block diagram showing a software layer implementation of the embodiment of Fig. 3; and

FIG. 6 is a simplified flow chart showing a method of analyzing packets for media sessions according to an embodiment of the present invention.

25

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

The present invention, in some embodiments thereof, relates to IP traffic inspection by means of identifying those packets having similar traffic characteristics as probabilistically belonging to the same media session. Traffic characteristics relate to those parameters inherent to packets traffic flow as it travels from source to destination and includes features such as packet length, inter-arrival period, bandwidth and

30

statistical and other derivations thereof as well as certain header characteristics such as source address and destination address but excludes packet payload content whose inspection is common in deep packet inspection (packet content inspection) techniques. The traffic characteristics may also be used to identify the session type so that appropriate resources can be made available or not for the session, or other provisioning and control actions may be applied to the session.

Before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not necessarily limited in its application to the details of construction and the arrangement of the components and/or methods set forth in the following description and/or illustrated in the drawings and/or the Examples. The invention is capable of other embodiments or of being practiced or carried out in various ways.

Referring now to the drawings, Figure 1 illustrates electronic network apparatus 10 for identifying media sessions and network packets as belonging or not belonging to a media session, grouping, and for determining a session type. As explained the determinations need not be absolute but may be probabilistic. Apparatus 10 comprises a packet analyzer unit 12 and a session analyzer unit 14. A resource assignment unit 16 assigns, or for that matter limits or refuses, network resources to the identified media session so that individual packets are given a priority level according to the needs of the media session to which they are found to belong, or may provide other provisioning or control actions for the session.

The packet analyzer 12 analyzes incoming data packets and determines which packets belong to a common session. The packet analyzer 12 includes a packet characteristic extractor 18 which extracts readily available packet traffic characteristics such as packet length or inter-arrival period, or source or destination addresses or other traffic characteristics of the packets. Readily available characteristics are those characteristics that do not require deep analysis of the packet content. Preferably, characteristics that can be obtained from mere observable traffic behavior examination, without opening the packet, are used. The packet characteristic extraction unit obtains these packet characteristics from a succession of packets.

A thresholder 20 is connected to the packet characteristic extraction unit, and sets up thresholds based on the characteristics found by the extractor. Generally there is a certain amount of uniformity in packets belonging to the same session, thus they

tend to be approximately the same length and to turn up at approximately regular intervals. Thus thresholding for length or inter-arrival period or even better for both, allows for packets to be assigned to a common session with relatively high probability. A packet session identifier 22 uses the thresholds set up by the thresholder to identify
5 as belonging to a common session those packets whose characteristics are mutually within the thresholds.

As mentioned, effective characteristics include but are not limited to packet length and inter-arrival period.

A packet marker 24 may insert an indication of the common session with
10 which a given packet has been identified into its header. Thus packets believed to belong to the same session can be grouped together so that the session itself can be analyzed.

For the purpose of finding out information about the session, session analyzer
14 analyzes the grouped together packets to obtain characteristics that could provide
15 important information about the session type and its requirements. That is to say a session could be identified as being a video session and therefore having a real time quality of service requirement. If possible, an accurate session type, such as a video session using codec type X, or voice session using Skype™, is obtained.

In general a media stream tends to have a small packet rate variation, and also
20 relatively small packet length, or at least small variation in the packet length. . The method can thus inspect passing packets to see which of the passing packets correspond on this basis and group them together with high probability.

A good source of information that the session analyzer can use is the meta-level parameters which are often included in the packet headers.

25 The session analyzer may use the packet's traffic characteristics, such as packet length and/or inter-arrival period to indicate the session type.

In one embodiment, the session analyzer comprises a neural network. In this case the characteristics used for identifying the session type are automatically built into the neural network during the neural network training phase, and are not explicitly
30 programmed in.

The packets are now assigned to corresponding sessions, and resources are assigned to the session, so that each packet gets priority or otherwise, depending on the session to which it has been assigned. Thus a video session requiring real time

quality of service may receive high bandwidth and its packets may be given high priority. At the other extreme, a chat session may be regarded as a security risk and its packets may be assigned zero resources and dumped or simply blocked.

The present embodiments are now considered in greater detail. The present
5 embodiments identify and distinguish between different media sessions within IP
network traffic using certain packet related elements or characteristics, primarily but
not exclusively packet length and packet inter-arrival period. In practice the
methodology may not use these characteristics directly but rather may make use of a
range of statistical parameters which are derivatives thereof. The elements are
10 external elements that do not require opening of the packet payload, so that there is no
dependency on packet elements that can be altered, hidden or encrypted by the
application. That is to say encrypting the payload has no effect on the methodology
and updates to software versions are unlikely to change the packets so radically that
the session types, at least in terms of quality of service requirement, would not be
15 recognized

The algorithm expects the two parameters of packet length and packet inter-
arrival period to meet certain thresholds if indeed the packets belong to the same
session. Packets that belong to the same session generally have a constant average
bandwidth, or at least an average bandwidth that maintains continuity. The average
20 bandwidth is the average packet length divided by average inter-arrival period, and the
average bandwidth may be used by the method as a derivative of the above packet
characteristics to indicate belonging or not belonging to a session.

Thresholding of the packet length and packet inter-arrival period, or of a
derivative such as statistical variations, sets a basic acceptance criterion for a packet to
25 be considered as part of a media stream, against which each consecutive incoming IP
packet is examined. Those packets that meet the acceptance criteria are categorized
and marked, at high probability, as media session packets, while those packets that do
not meet the acceptance criteria are filtered out or ignored as appropriate.

Using these markings, the marked media session packets are assembled to
30 create the various media streams, which streams are subsequently analyzed using
predefined mathematical and statistical techniques for determining more specific
conclusions on the media session protocol and even the application or end-devices
being used.

Specific constant packet lengths and length-variation behaviors, along with specific packet-rate and rate-variation may further indicate standard and non-standard codecs, session protocols, media type and sometimes even the actual end-point media device being used.

5 Thus, a packet length histogram may be created by the algorithm and can be used to determine whether the media is using a Constant Bit Rate (CBR) Codec (e.g. G.723.1, G.729A) or a Variable Bit Rate (VBR) Codec (such as the GIPS codec). The G.729A codec for instance, uses constant packet length of 50/60/70 bytes and a corresponding packet inter-arrival period of 100/50/33 PPS (packets per second).

10 Reference is now made to Fig. 2, which is a simplified block diagram illustrating a more detailed embodiment of the apparatus of Fig. 1. Packets initially enter threshold filter 30. The filter can possibly contain a pre-filter stage in which it filters out those packets having a length and/or inter-arrival period and/or derivatives thereof which could not possibly represent a media session, that is anything whose
15 length and/or inter-arrival period and/or derivatives thereof is above or below a predefined maximum and minimum threshold. Such a prefiltering stage with preset thresholds filters out packets belonging to large file transfer actions or web browsing, or small TCP connection related and acknowledge and like packets.

Following the pre-filter stage there is a characteristic dependent stage in which
20 the packets are checked against characteristic dependent thresholds, for packet length and inter-arrival period to be within a small range, say 10%. Those packets within the threshold are marked as belonging to the media session with high probability.

More specifically, since IP media packets are entwined with data packets, the algorithm skips packets with unlikely data length or wrong packet rate, as compared
25 with a previous media suspected packet.

Those packets that pass the threshold filter may be fed into a cyclic buffer 32. The cyclic buffer 32 emulates a Jitter-Buffer at the receiving end and allows for bandwidth continuity verification. Consecutive Packets with bandwidth complying with the jitter-buffer's average bandwidth are accepted as potentially true media
30 session packets. A sequence of such packets may indicate a media session.

Packet length, inter-arrival period ("dt") and their derivatives may be accumulated by statistical accumulator 34 to create a statistical vector of session behavioral information. The derivatives may be statistical parameters such as:

- Average dt, Average length, Variance of dt & length, Covariance of dt & length
- Histograms of dt & lengths, Histogram matrixes of lengths variation vs. dt variation

5 Using the above derivatives, statistical behavioral acceptance criteria (SBAC) may be extrapolated, according to which SBAC media sessions are determined and categorized in SBAC decision maker 36. For example, for an incoming media stream of a given sort, the Average, Variance & Covariance of dt, length & bandwidth would not be expected to fluctuate over certain limits which are set by the SBAC. Thus the
10 sort of media stream can be derived.

 Reference is now made to Fig. 3, which is a simplified diagram showing a network probe according to a second embodiment of the present invention. A network adaptor
40 listens to all network traffic. A first level filter 42 then carries pre-filtering to remove irrelevant packets and first level filtering to extract those packets within the
15 length threshold of the suspected stream and.

 The extracted packets are passed to sliding window 44 to create a queue of those packets whose inter-arrival periods correspond, that is they arrive with a regular frequency and therefore could belong to the same media session.

 Series recognition filter 46 analyses the queue to detect a media session. Extractor
20 48 then extracts IP addresses, port, time stamps etc, to allow higher layers or third party equipment to handle the identified sessions.

 Reference is now made to Fig. 4, which is a simplified diagram showing an implementation of apparatus according to the present embodiments as standalone hardware. The network adaptor of Fig. 3 is implemented as an IP stack 50. The filter
25 itself 52 is implemented on a general purpose CPU or a specific DSP, and an additional network adapter 54 connects to a local IP network which runs supported applications 56 such as billing servers.

 Reference is now made to Fig. 5, which is a simplified block diagram illustrating an implementation of the present embodiments in software. In the software case the
30 filter 62 is a software layer between the network interface card (NIC) driver 60 and the application layer 64.

A further implementation uses Neural Networks. Neural networks and like algorithms, including pattern matching algorithms, can be used for either identification, classification or both phases.

5 A neural network is injected with a vector of statistical behavior of a sub-stream of packets. That is to say it is presented with statistical behavior of a sliding window portion of the media session. The vector may include both linear and non-linear (e.g. logarithmic, multiplication & power-function) statistics of accumulated information. The network is pre-trained (using supervised learning) so that it includes appropriate gains at each perceptron input. A hidden layer may be included within the
10 network for part of the non-linear input behaviors.

The neural network preferably has multiple outputs one for each required session type identification or classification. These may include generic types such as "video stream", or "voice stream" or "chat session", and specific application outputs such as Skype session, MSN session, as well as specific end-device outputs such as the
15 Cisco-ATA unit.

Each output preferably comprises a transient function, for example a Gaussian function, which produces a "1" to indicate a detection.

Neural networks being statistical or fuzzy, multiple outputs can become active – indicating that several networks may have detected the stream. In such as case, the
20 strongest output is used as the correct identification, as is known in the field of neural networks.

Furthermore, the neural network may use non-supervised training, for example Self-Organizing Maps ,SOM, to adapt itself and increase accuracy during operation.

Once a session is identified and categorized, the algorithm generates events and/or
25 alerts for each media session, which can be passed on to higher layers or to third party devices. The events or alerts may include:

- The sending and receiving IP addresses. These may be extracted from the source and destination fields in the packet header. Of course in the case of conference sessions there may be more than two such addresses. It is noted that end-users
30 with fixed (i.e. static) IP address, may use similar media traffic in the future as well, so that there may be some benefit to caching these IP-addresses for recognition later on. The cached addresses could be saved by the algorithm filter

or by the upper layer for a certain duration and marked as "suspected IP-addresses" for future inspection.

- IP-Port numbers associated with the session can be extracted from "Source Port" and "Destination Port" fields in the header. Note that some applications (e.g. Skype) tend to use the same Port-number for future media sessions, so that the Port-numbers could usefully be cached, along with the suspect IP-addresses as described above – to accelerate the detection process and/or increase detection probability factor for future sessions.
- "Session Start" and "Session End" time stamps (to milli-seconds resolution) can be recorded to indicate call duration. Such is useful where the primary motivation of monitoring the session is for billing purposes, for example in billing mediation systems.
- Session media type information, including media classification: voice call, video call etc may be recorded.
- Data transfer within a media session, may be identified, say by detecting sharp fluctuations in Bandwidth at various times during a media session. The durations or the bandwidth may be recorded as required.
- Session protocol type indicating the application or end-device being used if available may be recorded. An indication may be provided as to which standard if the session is a standard based session, that is based on Codecs conforming to a given standard. If possible an indication of the exact Codec used may be provided. Likewise an indication of a non-standard Codec based session, e.g. Skype, may be provided as an event.

The identification engine may be implemented in any suitable form. The implementation may include sequential logic using hardware or software modules to implement the above described features. Alternatively, the identification engine may be implemented in whole or in part by a Neural Network, whether pre-trained or self-trained. Other artificial intelligence mechanisms may be used in place of neural networks and the system may use a general purpose CPU or dedicated DSP components. Alternatively any combination of the above may be used.

Reference is now made to Fig. 6, which is a simplified flow chart illustrating operation of a method according to the presently preferred embodiments. A method of allocating communication resources to media sessions in accordance with session type,

comprises a first stage 60 of categorizing passing packets using external packet characteristics, such as length, inter-arrival period, or derivatives thereof.

A second stage 62 involves grouping together those packets having similar values of the external characteristics. Upper and lower thresholds are used based on the premise that packets of the same session vary only by small amounts. The thresholds may be dynamic since larger changes in the packets may occur over longer timescales.

A third stage 64 involves analyzing those packets which have been grouped together as having a high probability of belonging to the same session, for session characteristics. The session characteristics allow a session type to be identified and then in stage 66, resources can be assigned accordingly.

In one alternative, packets may be marked so that the network resource management can identify the relevant packets for resource allocation.

Advantages of the above embodiments include the possibility of inspection of high bandwidth IP traffic to allow media session detection using low computing resources. The system allows ubiquitous implementation of the identification technology on large and small network structures.

The present embodiments may be used with applications such as Session Border Controllers, Firewalls & billing mediation servers. The present embodiments allow media sessions to be filtered out and identified so that the application need only analyze relevant media traffic. Prior art versions of these applications had to filter out the packets of interest from the total high bandwidth traffic, meaning they had to inspect all the passing traffic.

In the claims that follow, the term "session managing entity refers to any application or endpoint device or terminal unit which manages or generates a session.

It is expected that during the life of a patent maturing from this application many relevant Internet Protocol transport variations will be developed and the scope of the term Internet Protocol is intended to include all such new technologies *a priori*.

The terms "comprises", "comprising", "includes", "including", "having" and their conjugates mean "including but not limited to". This term encompasses the terms "consisting of" and "consisting essentially of".

As used herein, the singular form "a", "an" and "the" include plural references unless the context clearly dictates otherwise. For example, the term "a compound" or

"at least one compound" may include a plurality of compounds, including mixtures thereof.

It is appreciated that certain features of the invention, which are, for clarity, described in the context of separate embodiments, may also be provided in combination in a single embodiment. Conversely, various features of the invention, which are, for brevity, described in the context of a single embodiment, may also be provided separately or in any suitable subcombination or as suitable in any other described embodiment of the invention. Certain features described in the context of various embodiments are not to be considered essential features of those embodiments, unless the embodiment is inoperative without those elements.

Although the invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art. Accordingly, it is intended to embrace all such alternatives, modifications and variations that fall within the spirit and broad scope of the appended claims.

All publications, patents and patent applications mentioned in this specification are herein incorporated in their entirety by reference into the specification, to the same extent as if each individual publication, patent or patent application was specifically and individually indicated to be incorporated herein by reference. In addition, citation or identification of any reference in this application shall not be construed as an admission that such reference is available as prior art to the present invention. To the extent that section headings are used, they should not be construed as necessarily limiting.

WHAT IS CLAIMED IS:

1. Electronic network apparatus for identifying media sessions over IP and network packets as belonging or not belonging to a media session, comprising:

a packet characteristic extraction unit configured for obtaining packet characteristics from a succession of packets, said characteristics comprising packet traffic characteristics;

a grouping unit associated with said packet characteristic extraction unit, configured to group together those packets having similar traffic characteristics as probably belonging to a common session, and

a session analyzer configured for analyzing said grouped packets for session characteristics, therewith to identify a session type.

2. The apparatus of claim 1 further comprising a resource allocator for allocating at least one member of the group consisting of resources, provisioning features and control features to said session.

3. The apparatus of claim 1, wherein said session type identification comprises identifying a session managing entity generating or managing said session.

4. The apparatus of claim 1, wherein said session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase.

5. Apparatus according to claim 1, further comprising a thresholder for thresholding said traffic characteristics, and a packet session identifier configured to identify those packets whose characteristics are mutually within said thresholds for said grouping unit to group said packets as belonging to said common session.

6. The apparatus of claim 1, wherein said traffic characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

7. The apparatus of claim 1, wherein said grouping unit comprises a packet marker, associated with said packet session identifier, configured for inserting into a header of a respective packet an indication of said common session with which said respective packet has been identified.

8. The apparatus of claim 7, further comprising a session analyzer associated with said packet marker, configured to obtain packets marked as belonging to said common session and to determine, from said packets, characteristics belonging to said common session, therefrom to identify a session type.

9. The apparatus of claim 8, wherein said session analyzer is configured to obtain said characteristics belonging to said common session from parameter patterns common to said packets.

10. The apparatus of claim 8, wherein said session analyzer is configured to use at least one member of the group consisting of:

- packet length
- inter-arrival period
- variance of inter-arrival period
- variance of length
- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following:
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length

- vii. a statistical derivative obtained from multi records of packet length
- viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period

11. The apparatus of claim 8, wherein said session analyzer comprises a neural network, using characteristics automatically built into said neural network during a neural network training phase.

12. The apparatus of claim 1, further comprising a resource allocator configured to allocate resources on a network according to said identified common session.

13. The apparatus of claim 8, further comprising a resource allocator, configured to allocate resources on a network according to said identified session type

14. The apparatus of claim 1, wherein at least one of said packet session analyzer, said extraction unit and said grouping unit comprises a neural network.

15. A method of identifying session type, comprising categorizing passing packets using traffic packet characteristics;

grouping together those packets having similar values of said traffic characteristics, and

analyzing said grouped packets for session characteristics,
thereby to identify a session type.

16. The method of claim 15 wherein said identifying a session type comprises identifying a session managing entity generating or managing said session.

17. The method of claim 15 wherein said identifying a session type is followed by at least one of the group comprising: providing provisioning and providing control actions to the session.

18. Method according to claim 15, further comprising thresholding said traffic characteristics, and identifying those packets whose characteristics are mutually within said thresholds for said grouping.

19. The method of claim 15, wherein said characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.

20. The method of claim 15, further comprising inserting into a header of a respective packet an indication of said common session with which said respective packet has been identified.

21. The method of claim 15, comprising obtaining said characteristics belonging to said common session from parameter patterns common to said packets.

22. The method of claim 15, comprising using at least one member of the group consisting of:

- packet length
- inter-arrival period
- variance of inter-arrival period
- variance of length

- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period.

23. The method of claim 15, comprising using a neural network and characteristics automatically built into said neural network during a neural network training phase.

24. The method of claim 16, further comprising using a neural network and characteristics automatically built into said neural network during a neural network training phase.

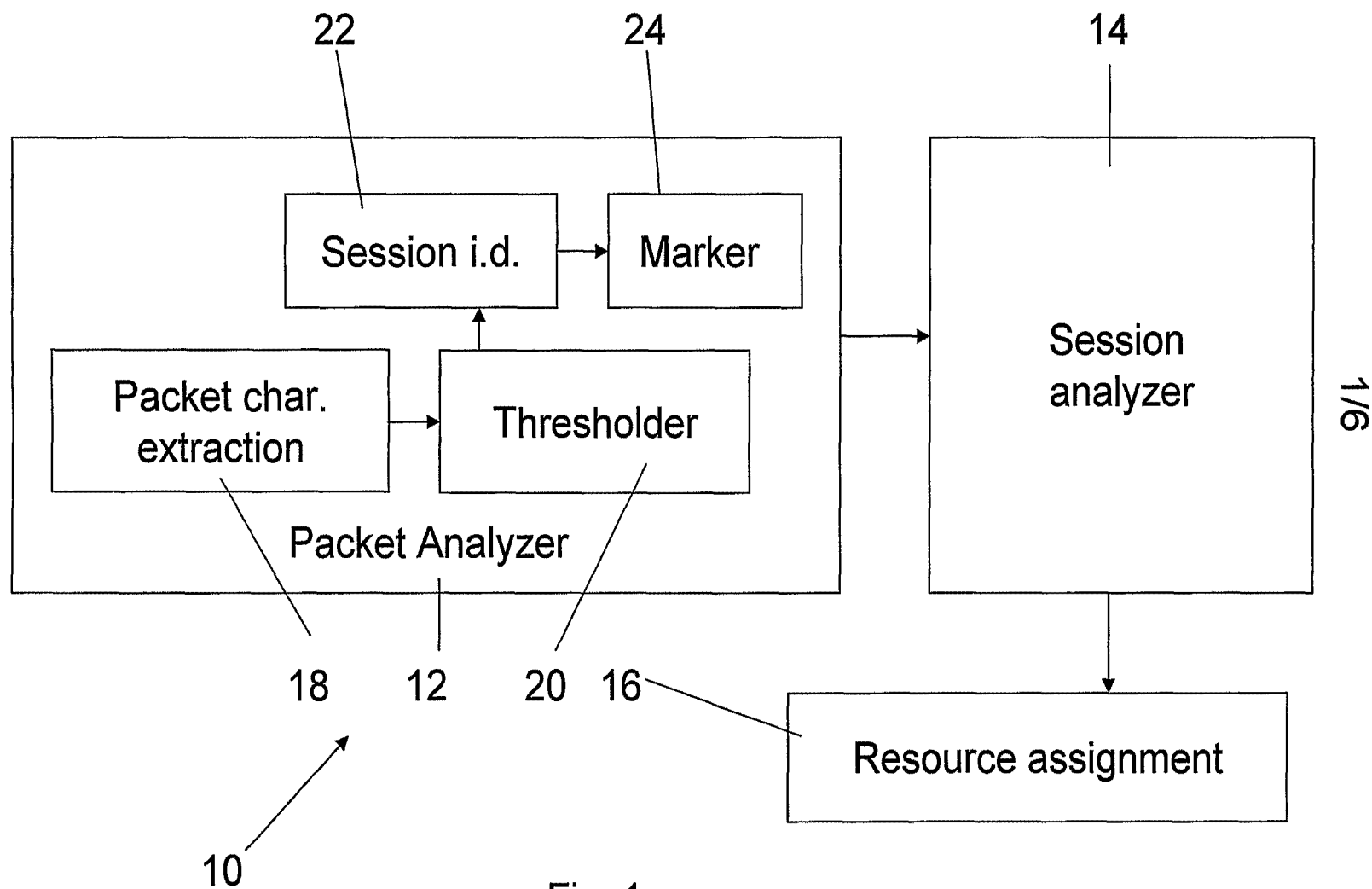
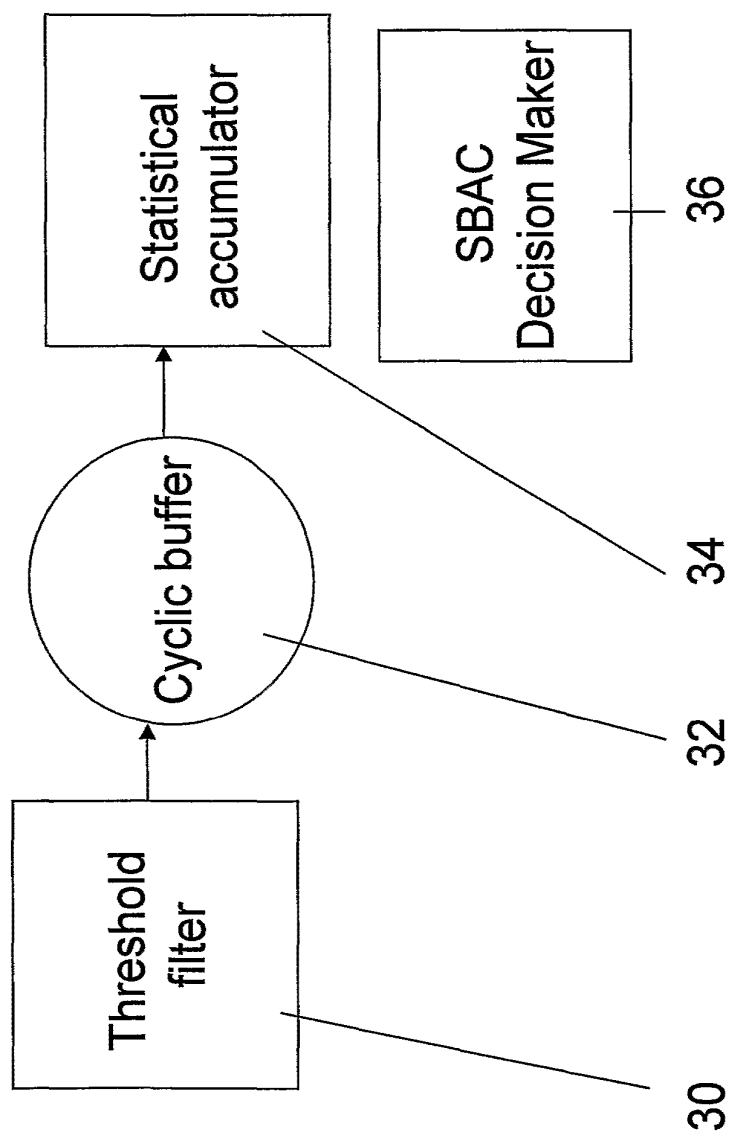


Fig. 1

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Fig. 2



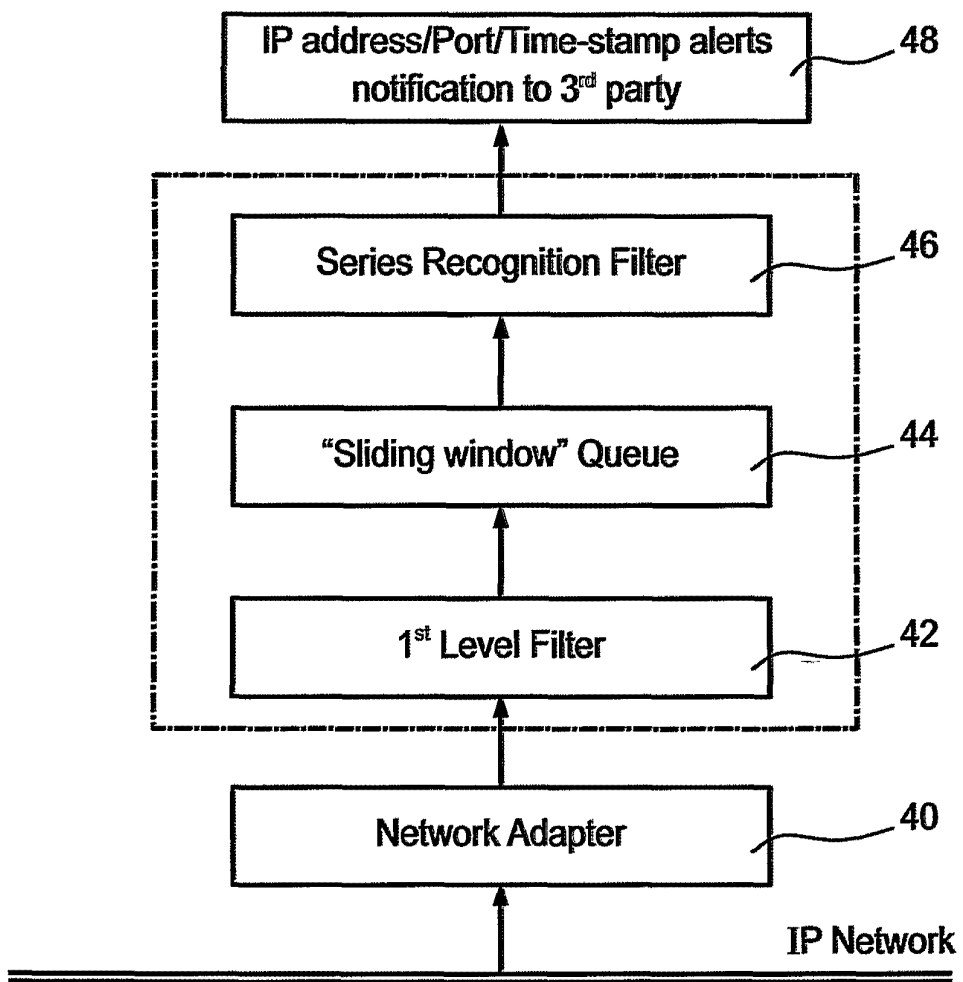


Fig. 3

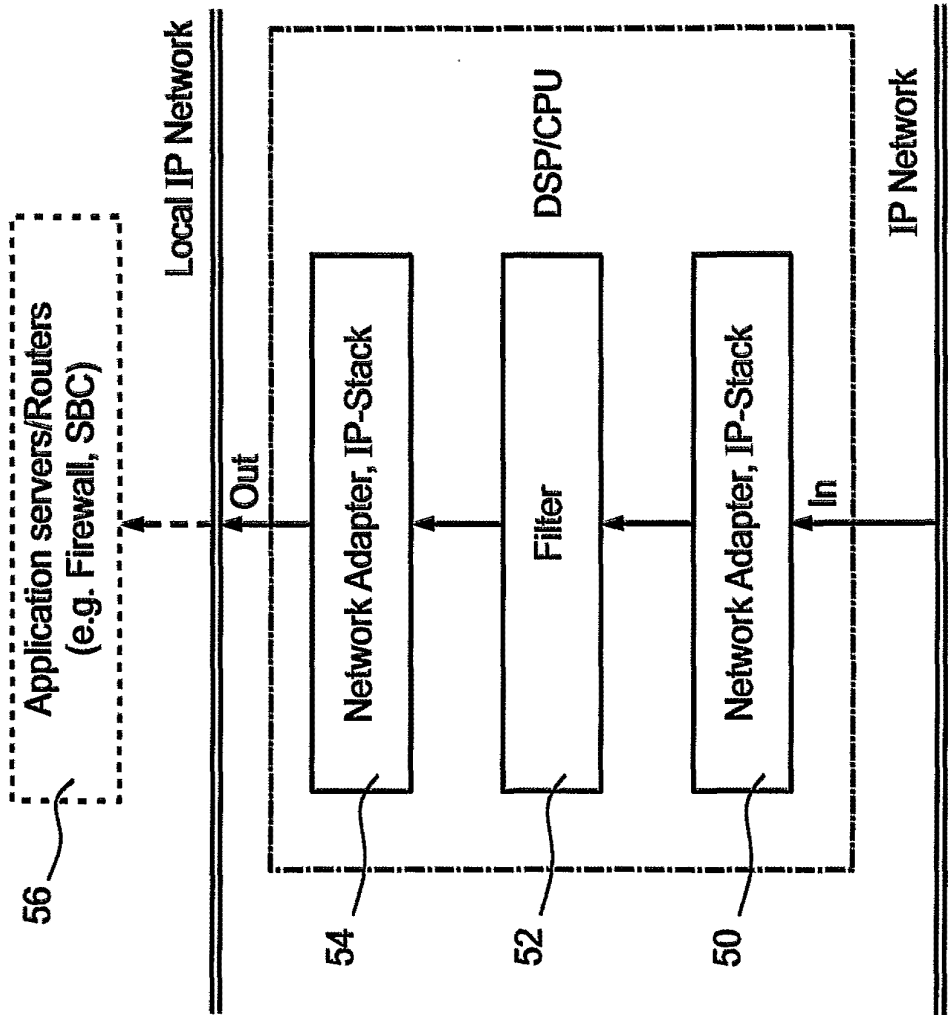


Fig. 4

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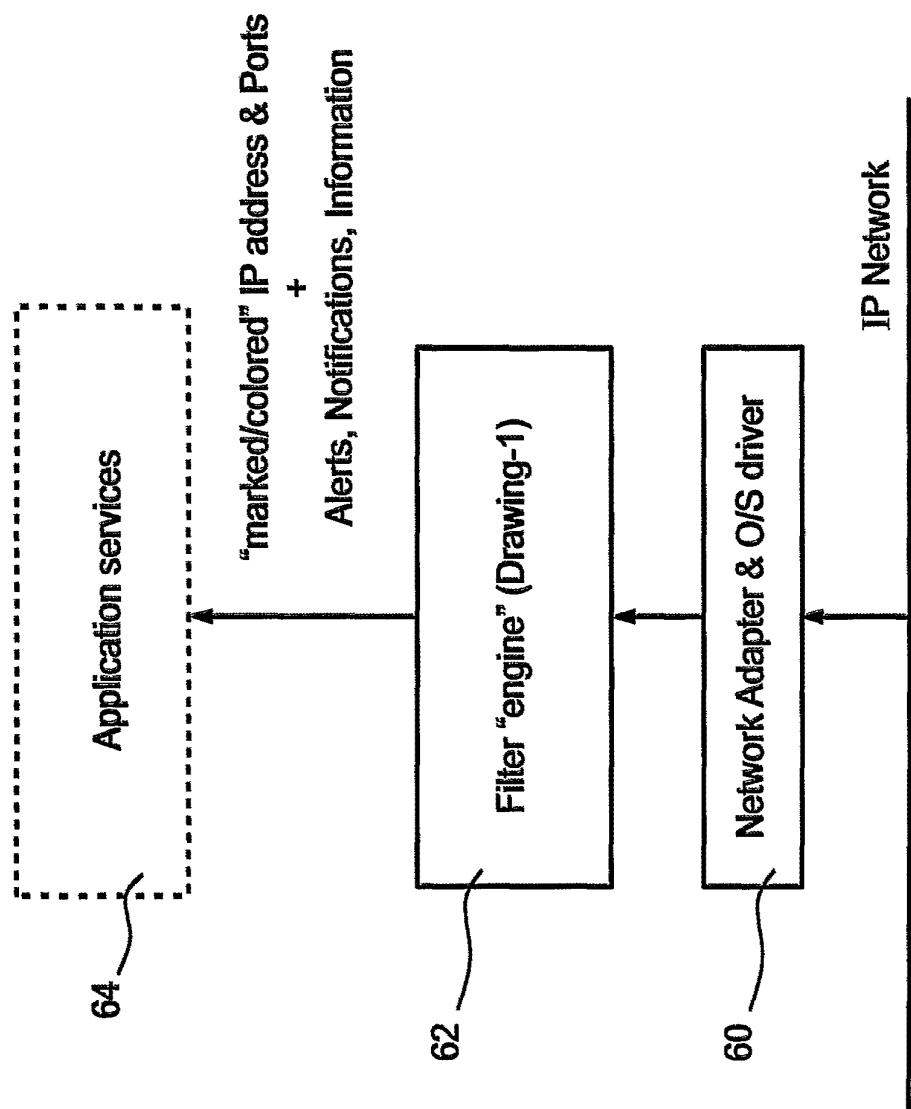


Fig. 5

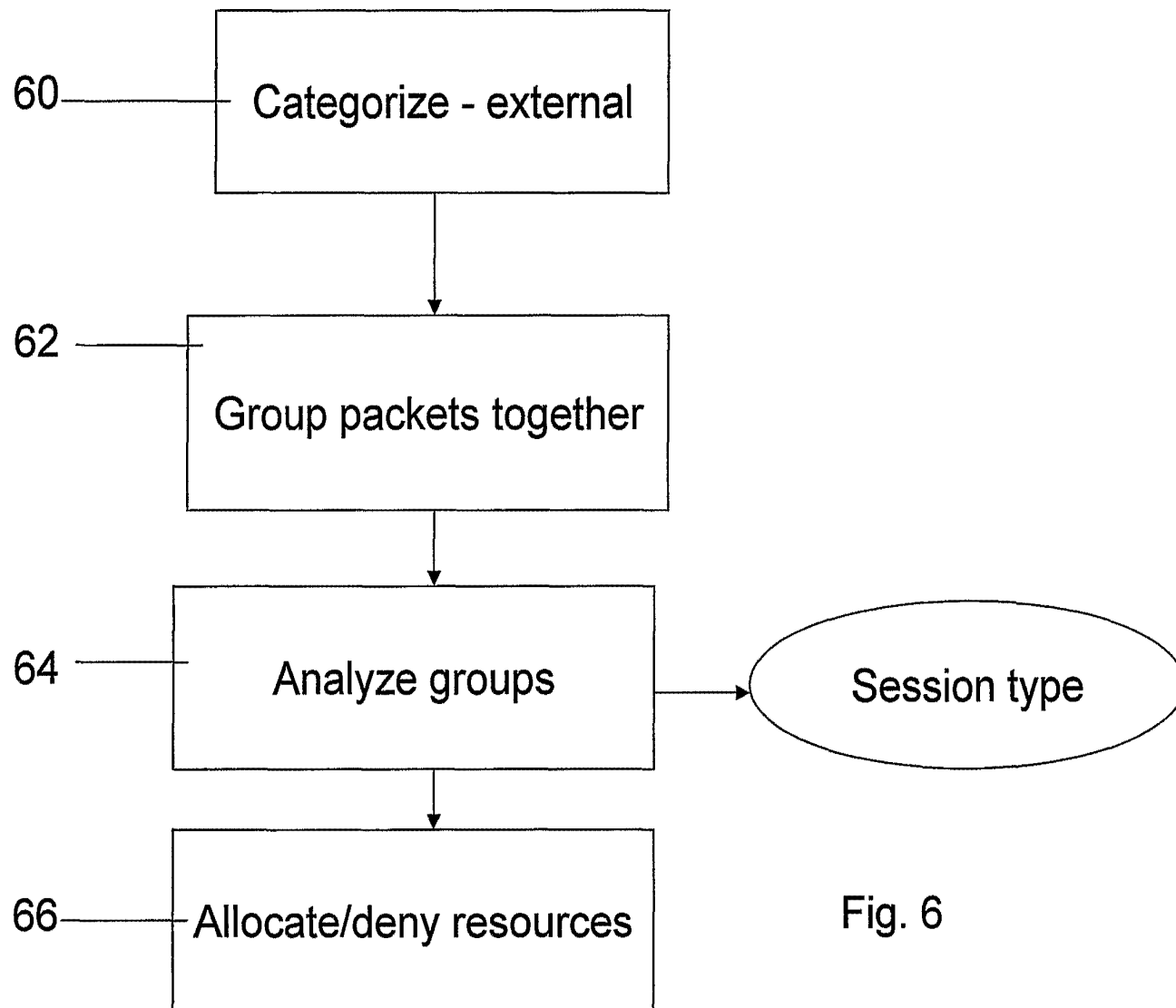


Fig. 6

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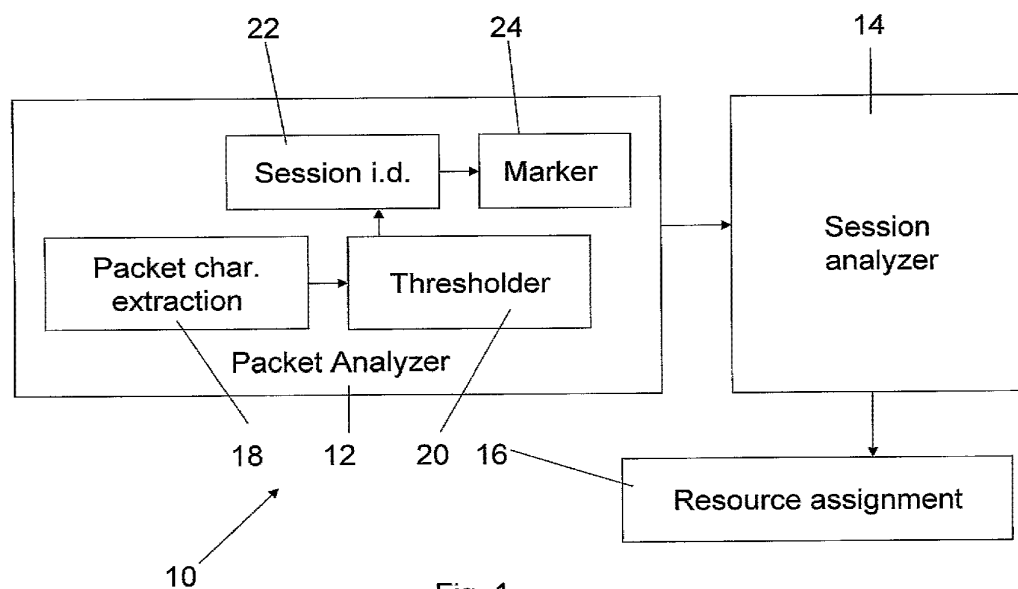


Fig. 1

(57) Abstract: A method of allocating, restricting or refusing communication resources to media sessions in accordance with individual session or session type, comprises: categorizing passing packets using packet traffic characteristics such as packet length or inter-arrival period; grouping together those packets having similar traffic characteristics, and analyzing the grouped packets for session characteristics, thereby to identify a session type and allocate resources to the session or provisioning or like actions or services.

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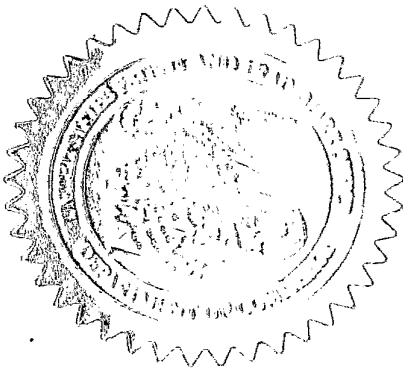
APPLICATION NUMBER: 60/856,795


FILING DATE: November 06, 2006

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (b)(2).

Docket Number		32962		Type a plus sign (+) inside this box ->	+
INVENTOR(s) / APPLICANT(s)					
LAST NAME	FIRST NAME	MIDDLE INITIAL	RESIDENCE (CITY AND EITHER STATE OR FOREIGN COUNTRY)		
GRON	Avi		Moshav Yahad - Doar Na Misgav, Israel		
TITLE OF THE INVENTION (280 characters max)					
MEDIA SESSION IDENTIFICATION METHOD IN IP NETWORKS					
CORRESPONDENCE ADDRESS					
Martin D. Moynihan PRTSI, Inc. P.O. Box 16446 Arlington					
STATE	VIRGINIA	ZIP CODE	22215	COUNTRY	USA
ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> 4 pages of specification			<input type="checkbox"/> Assignment to:		
<input type="checkbox"/> - pages of sequence listing			<input checked="" type="checkbox"/> 2 Claims		
<input checked="" type="checkbox"/> 3 sheet of drawings			<input type="checkbox"/> Application Data Sheet		
<input checked="" type="checkbox"/> 7 total pages			<input checked="" type="checkbox"/> Applicant is entitled to Small Entity Status under 37 CFR 1.9 and 37 CFR 1.27		
THE FILING FEE HAS BEEN CALCULATED AS SHOWN BELOW:					
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Provisional Application Filing Fee			\$ 100		\$ 200
Provisional Application Size Fee (Per 50 Pages Over 100)	\$ 125		\$ 0	\$ 250	
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METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT					
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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No ☐ Yes, the name of the US Government agency and the Government contract number are: _____

Respectfully submitted,

SIGNATURE Martin D. Moynihan

November 6, 2006

Date

40,338

REGISTRATION NO.
(if appropriate)

TYPED or PRINTED NAME Martin D. Moynihan

☐ Additional inventors are being named on separately numbered sheets attached hereto

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Patent: media session identification method in IP networksInventor: Avi Oron,Abstract:

Method for identifying, differentiating and classifying various media sessions in IP networks.

Background of the invention:

As networks, and especially the Internet, get more and more congested, Internet service providers (ISPs), IP-Telephony providers and Enterprises are searching for cost effective methods to maintain service quality and availability by protocol classification.

Since Voice-Over-IP and Video-over-IP based services highly depends on bandwidth availability, it is necessary to identify media sessions and support their routing, delay and bandwidth priority needs over other data based traffic which are less real-time sensitive.

Common protocol identification methods include analyzing packet content by state-full inspection of specific fields within each consecutive packet, trying to correlate to a known sequence which represents a specific protocol. This method limits the traffic rate which can be analyzed or alternatively would require an enormous computing power which makes the solution not feasible.

State-full inspection: Firewalls, Session Border Controllers (SBC) and billing mediation systems uses the above method each for its own application need (i.e. prioritizing, blocking, creating billing CDRs). As a result, they are all limited to a relatively small number of simultaneous calls that can be inspected which prohibits them of probing at the operator's high speed backbones.

Moreover, the content inspection method cannot identify non-standard based media protocol sessions (e.g. Skype soft-phone) as their IP headers may not contain any identifiable fields, their data structures may change from time to time with the release of new versions, and their data content is usually encrypted.

A media session (e.g. Voice, Video, Fax) must have a continuous streaming of sampled data so it could be reconstructed to the relevant human identifiable form at its destination. This means that a minimum amount of data bandwidth has to be sustained on the network. As media on both ends is sampled and re-assembled by symmetrical session CODECs (coder & decoder) – data streaming must comply with their bandwidth demand and packet-rate so that the human ear or eye at the destination will not experience any information gaps or distortions.

This result in a packet stream having a low variation in packet length and packet rate (excluding network delay & jittering, and in some codecs - silence suppression gaps).

Summary of the invention:

The present invention describes an algorithm and a method of identifying any media session within IP network traffic by inspecting packets length and rates behavior only. A two dimensional unique pattern within the traffic defines an IP media session of a specific type.

The simplicity of this method enables high bandwidth IP traffic inspection and media session detection using low computing resources.

Due to the fact that the sampled media packet streaming has a small packet-length and packet-rate variation – the algorithm inspects all packet traffic to detect series of compliant packets which represent, with high probability, a media stream.

This "filter algorithm" then results in an output to a higher-layer (or 3rd party devices) which includes:

- Two IP-addresses (extracted from "Source IP" and "Destination IP") of the parties which participates in the media session (Voice, Video, Fax etc.). Note that end-users with fixed (i.e. static) IP address will probably use media traffic in the future as well, these IP-addresses could be cached (i.e. saved by the filter or by the upper layer) for a certain duration and marked as "suspected IP-addresses" for future inspection.
- IP-Ports number (extracted from "Source Port" and "Destination Port") of the above parties are using for the session. Note that as some applications (e.g. Skype) tend to use the same Port-number for future media sessions, these Port-numbers could be cached, along with the "suspected IP-addresses" as described above – to accelerate the detection process or/and increase detection probability factor.
- "Session Start" and "Session End" time stamps (milli-seconds resolution) to indicate call duration (e.g. for billing mediation systems).
- Session media type information, including media classification: voice call, video call etc.
- Session protocol type indicating whether it is a "standard based" session (i.e. standard Codecs including, in some cases the exact Codec used) or "non-standard based" session (e.g. Skype)

The filter algorithm first filters out packet having a length which could not represent a media session (i.e. over or under pre-defined length threshold). This phase will filter out a lot of data packet including, for example, large file transfer and web surfing packets (e.g. > 1000 bytes) and small TCP connection related and acknowledge packets (e.g. <60 bytes).

Next phase of this filter algorithm detects a series of packets with low-packet length variation (e.g. delta length < 10%) and a packet-rate within a specific range (e.g. 30 PPS) - and marks them as a "media session" with high probability.

More specifically, since IP media packets are entwined with data packets, the algorithm skips packets with either "wrong" packet length (i.e. unaccepted length variation from previous suspected media packet) or "wrong" packet rate (i.e. delta time between packet arrival which is too small/big, which represents packet rates which cannot be a media stream).

Specific constant packets lengths and length-variation behaviors, along with specific packet-rate and rate-variation may further indicate standards and non-standard codecs, session protocol, media type (e.g. video, audio) and sometime even end-point gateway device.

By analyzing marked packets and creating a packet-length histogram – the algorithm detects whether the media is using a standard Codec (with fixed packet length e.g. G.723.1, G.729A, T.38 fax) or a non-standard Codec (with low-variation packet length e.g. Skype codec). For example: G.729A uses constant packet length of 50/60/70 bytes and packet-rate of 100/50/33 PPS (packets per seconds) accordingly.

The filter "engine" will be implemented by either a CPU sequential logic software/module implementing the above described algorithm, by Neural Network (pre-trained and self-trained) software/module using CPU or DSP components – or as a combination of these two modules.

For a neural network implementation, the training phase of the network will be done injecting multiple IP-streams (sampled on a real network), in parallel, into both the logic software and into the neural network software and providing feedback (i.e. training) from the logic module into the neural module. This training process will be done repeatedly until the Neural network module will settle and result the same output as the logic module.

The suggested method allows SBC, Firewalls & billing mediation server to analyze only relevant media traffic which was filtered out from the total high bandwidth traffic it had to inspect alternatively.

Drawing Description:

Drawing-1 describes a network probe [A] (e.g. network adapter in promiscuous mode) "listens" to all network traffic. First level filter [B] passes only packets having length of a specific range (i.e. packets with length between two thresholds) into packet-queue [C].

The packet-queue contains a "sliding window" period of packets to be examined.

The "series recognition filter" [D] then analyzes the queue, trying to detect a "media series".

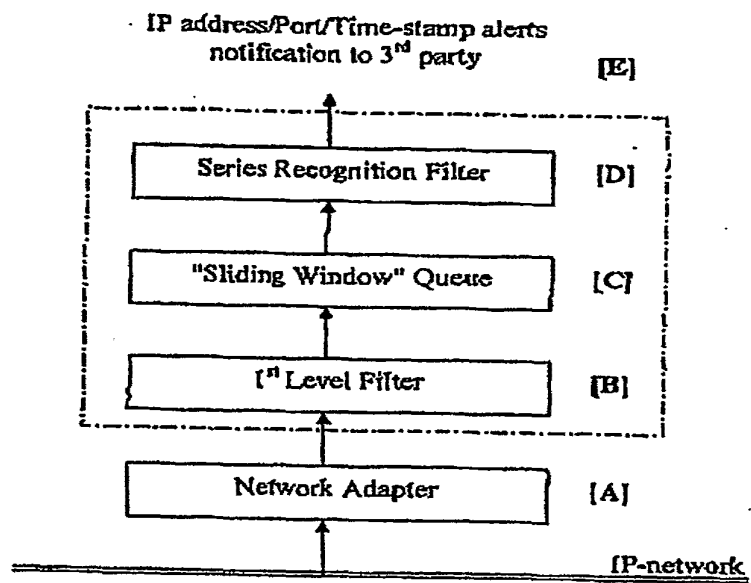
IP-address, IP-port and time-stamps are extracted from "Marked packets" IP headers [E] to allow higher-level application servers and routers to handles those packets differently and have full media call information.

The filter engine can be either a stand-alone device with "IP Network input" interface and "IP Network Output" interface [Drawing-2] or as a software layer between the NIC (Network Interface Card) driver and the application layer [Drawing-3].

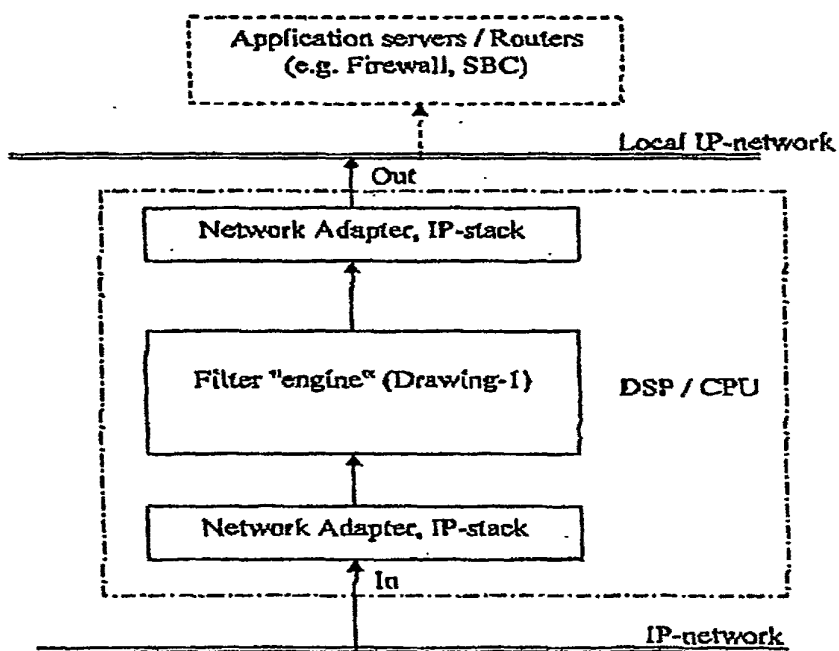
In both scenarios the output of the filter can be alerts with detailed information (as described above), "marked packets" by modifying "coloring" fields (e.g. "red" for Skype, "yellow" for G.239A) in the packet header so that the application layer will know to treat it separately – or a combination of the two.

Claims:

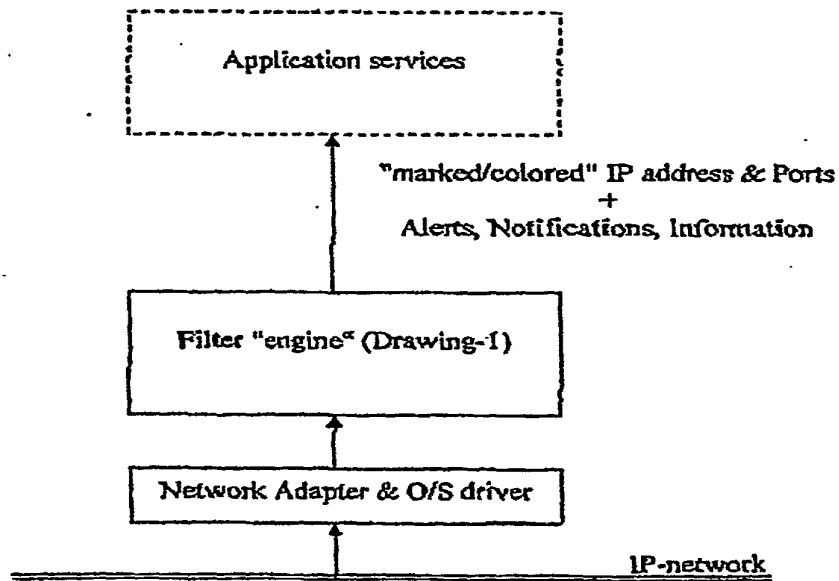
1. Method for identification, differentiation or classification of media sessions in IP networks, substantially as hereinbefore described with reference to the accompanying drawings.
2. Apparatus for identification, differentiation or classification of media sessions in IP networks, substantially as hereinbefore described with reference to the accompanying drawings.



Drawing 1



Drawing 2



Drawing 3

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 12/513,510		Filing Date 05/05/2009		<input type="checkbox"/> To be Mailed	
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(Column 1)			(Column 2)			SMALL ENTITY <input checked="" type="checkbox"/> OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)			
<input checked="" type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	82		N/A				
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A				
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$	=	OR	X \$	=			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		X \$	=			
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	05/05/2009	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 24	Minus	** 24	= 0	X \$26 =	0	OR	X \$	=
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0	X \$110 =	0	OR	X \$	=
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))									
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	
AMENDMENT	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$	=	OR	X \$	=
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	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
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