

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT2601318

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
ROBERT PAUL MORRIS	09/05/2013
RECEIVING PARTY DATA	
Name:	SITTING MAN, LLC
Street Address:	712 LATTA ST
City:	RALEIGH
State/Country:	NORTH CAROLINA
Postal Code:	27607
PROPERTY NUMBERS Total: 48	
Property Type	Number
Application Number:	12688996
Application Number:	13023883
Patent Number:	8422858
Application Number:	13790082
Application Number:	12696854
Application Number:	12689168
Application Number:	12868767
Application Number:	13045556
Application Number:	12689177
Application Number:	12955993
Patent Number:	8346853
Application Number:	13685739
Application Number:	12714063
Application Number:	12705638
Patent Number:	8219606

CH \$1920.00 12688996

Application Number:	13477402
Application Number:	12857836
Application Number:	12857847
Application Number:	12758125
Application Number:	12956008
Application Number:	12788373
Application Number:	13023916
Application Number:	12857857
Application Number:	12758828
Patent Number:	8233482
Application Number:	13531544
Application Number:	12819214
Patent Number:	8331372
Application Number:	13663513
Application Number:	12830385
Application Number:	12789538
Application Number:	12789550
Application Number:	12789568
Application Number:	12819215
Patent Number:	8447819
Application Number:	13867040
Application Number:	12833016
Application Number:	12830389
Application Number:	12830388
Application Number:	12857851
Application Number:	12830392
Application Number:	13025939
Application Number:	13025944
Application Number:	13024444
Application Number:	13023932
Application Number:	13023952
Application Number:	13024466
Application Number:	12788381

CORRESPONDENCE DATA

Fax Number:

Email: pcalwell@thecaldwellfirm.com

Correspondence will be sent via US Mail when the email attempt is unsuccessful.

Correspondent Name: PATRICK E. CALDWELL, ESQ.

Address Line 1: PO BOX 59655

Address Line 4: DALLAS, TEXAS 75229

NAME OF SUBMITTER:

PATRICK E. CALDWELL, ESQ.

Signature:

/Patrick E. Caldwell/

Date:

11/03/2013

This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 9

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ASSIGNMENT OF PATENT RIGHTS

For valuable consideration, the receipt and sufficiency of which is hereby acknowledged, on this 5th day of September, 2013, Robert Paul Morris of Wake County, Raleigh, North Carolina, a person, (“**Assignor**”), hereby sells, assigns, and transfers to Sitting Man, LLC, a Delaware limited liability company (“**Assignee**”), the full extent of all right, title, and interest in and to any and all of the following (collectively, the “**Rights**”):

1. The patents, provisional patent applications and patent applications listed in the table below (individually and collectively referred to herein as the “**Patents**”);
2. All inventions claimed or described in the Patents (collectively, the “**Inventions**”);
3. All rights with respect to the Inventions, including all U.S. patents or other governmental grants or issuances that may be granted with respect to the Inventions or from any direct or indirect divisionals, continuations, continuations-in-part, or other patent applications claiming priority rights from the Patents (“**Potential Patents**”);
4. All reissues, reexaminations, extensions, registrations, or any and all priority patent application(s) of the Patents or Potential Patents;
5. All non-United States patents, patent applications, and counterparts relating to any or all of the Inventions, the Patents, or Potential Patents, including, without limitation, certificates of invention, utility models, industrial design protection, design patent protection, and other governmental grants or issuances (“**Foreign Rights**”), and including the right to file foreign applications directly in the name of Assignee, its successors and assigns;
6. The right to claim priority rights deriving from the Patents;
7. All causes of action and remedies related to the Patents, the Inventions, Potential Patents, or Foreign Rights (including, without limitation, the right to sue for past, present, or future infringement, misappropriation or violation of rights related to any of the foregoing and the right to collect royalties and other payments under or on account of any of the foregoing); and
8. Any and all other rights and interests arising out of, in connection with, or in relation to, the Patents, the Inventions, Potential Patents, or Foreign Rights.

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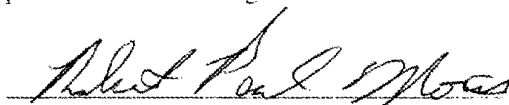
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8,447,819	07-09-2010	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR PROCESSING A REQUEST FOR A RESOURCE IN A COMMUNICATION Robert Paul Morris
13/867,040	04-20-2013	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR PROCESSING A REQUEST FOR A RESOURCE IN A COMMUNICATION Robert Paul Morris
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12/830,388	07-05-2010	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SELECTING A DATA SOURCE BASED ON A CHANNEL IDENTIFIER Robert Paul Morris
12/857,851	08-17-2010	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SELECTING A RESOURCE BASED ON A MEASURE OF A PROCESSING COST Robert Paul Morris
12/830,392	07-05-2010	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR CONFIGURING A CONTEXTUAL CHANNEL IDENTIFIER Robert Paul Morris

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13/025,939	02-11-2011	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR PROVIDING STEERING-CONTROL FEEDBACK TO AN OPERATOR OF AN AUTOMOTIVE VEHICLE Robert Paul Morris
13/025,944	02-11-2011	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR MANAGING ATTENTION OF A USER OF A PORTABLE ELECTRONIC DEVICE Robert Paul Morris
13/024,444	02-10-2011	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR MANAGING OPERATION OF A PORTABLE ELECTRONIC DEVICE Robert Paul Morris
13/023,932	02-09-2011	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR ALTERING ATTENTION OF AN AUTOMOTIVE VEHICLE OPERATOR Robert Paul Morris
13/023,952	02-09-2011	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR MANAGING ATTENTION OF AN OPERATOR AN AUTOMOTIVE VEHICLE Robert Paul Morris
13/024,466	02-10-2011	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR MANAGING OPERATION OF AN AUTOMOTIVE VEHICLE Robert Paul Morris

Assignors will not sign any writing or do any act conflicting with this Assignment, and, without further compensation, will sign all documents and do such additional acts as Assignee, its successors, legal representatives, and assigns deem necessary or desirable to perfect enjoyment of the Rights, conduct proceedings regarding the Rights (including any litigation or interference proceedings), or perfect or defend title to the Rights. Assignors request the respective patent office

or governmental agency in each jurisdiction to issue any and all patents, certificates of invention, utility models, or other governmental grants or issuances that may be granted upon any of the Rights in the name of the Assignee, as the assignee to the entire interest therein.

The terms and conditions of this Assignment will inure to the benefit of Assignee, its successors, legal representatives, and assigns and will be binding upon Assignors, their successors, legal representatives and assigns.



Name: Robert Paul Morris
(Signature MUST be attested)

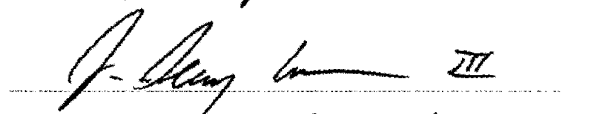
ATTESTATION OF SIGNATURE PURSUANT TO 28 U.S.C. § 1746

The undersigned witnessed the signature of Robert Paul Morris to the above Assignment of Patent Rights and makes the following statements:

1. I am over the age of 18 and competent to testify as to the facts in this Attestation block if called upon to do so.
2. Robert Paul Morris is personally known to me (or proved to me on the basis of satisfactory evidence) and appeared before me on _____, 2013 to execute the above Assignment of Patent Rights.
3. Robert Paul Morris subscribed to the above Assignment of Patent Rights.

I declare under penalty of perjury under the laws of the United States of America that the statements made in the three (3) numbered paragraphs immediately above are true and correct.

EXECUTED on Sept 27, 2013


Print Name: J. Deacy



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/714,454	02/27/2010	Robert Paul Morris	

92045
The Caldwell Firm, LLC
PO Box 59655
Dept. SVIPGP
Dallas, TX 75229

CONFIRMATION NO. 6771
POA ACCEPTANCE LETTER



Date Mailed: 10/25/2013

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/23/2013.

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.

/dtvernon/

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



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12/714,454	02/27/2010	Robert Paul Morris	0120-SP

92924
Small Pond Associates, LLC
Robert Paul Morris
712 Latta Street
Raleigh, NC 27607

CONFIRMATION NO. 6771
POWER OF ATTORNEY NOTICE



OC000000064607999

Date Mailed: 10/25/2013

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/23/2013.

- 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).

/dtvernon/

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

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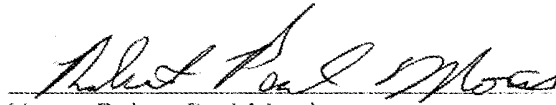
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12/830,389	07-05-2010	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR PROCESSING A CONTEXTUAL CHANNEL IDENTIFIER Robert Paul Morris
12/830,388	07-05-2010	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SELECTING A DATA SOURCE BASED ON A CHANNEL IDENTIFIER Robert Paul Morris
12/857,851	08-17-2010	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SELECTING A RESOURCE BASED ON A MEASURE OF A PROCESSING COST Robert Paul Morris
12/830,392	07-05-2010	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR CONFIGURING A CONTEXTUAL CHANNEL IDENTIFIER Robert Paul Morris

Patent or Application No.	Filing Date	Title of Patent and First Named Inventor
13/025,939	02-11-2011	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR PROVIDING STEERING-CONTROL FEEDBACK TO AN OPERATOR OF AN AUTOMOTIVE VEHICLE Robert Paul Morris
13/025,944	02-11-2011	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR MANAGING ATTENTION OF A USER OF A PORTABLE ELECTRONIC DEVICE Robert Paul Morris
13/024,444	02-10-2011	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR MANAGING OPERATION OF A PORTABLE ELECTRONIC DEVICE Robert Paul Morris
13/023,932	02-09-2011	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR ALTERING ATTENTION OF AN AUTOMOTIVE VEHICLE OPERATOR Robert Paul Morris
13/023,952	02-09-2011	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR MANAGING ATTENTION OF AN OPERATOR AN AUTOMOTIVE VEHICLE Robert Paul Morris
13/024,466	02-10-2011	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR MANAGING OPERATION OF AN AUTOMOTIVE VEHICLE Robert Paul Morris

Assignors will not sign any writing or do any act conflicting with this Assignment, and, without further compensation, will sign all documents and do such additional acts as Assignee, its successors, legal representatives, and assigns deem necessary or desirable to perfect enjoyment of the Rights, conduct proceedings regarding the Rights (including any litigation or interference proceedings), or perfect or defend title to the Rights. Assignors request the respective patent office

or governmental agency in each jurisdiction to issue any and all patents, certificates of invention, utility models, or other governmental grants or issuances that may be granted upon any of the Rights in the name of the Assignee, as the assignee to the entire interest therein.

The terms and conditions of this Assignment will inure to the benefit of Assignee, its successors, legal representatives, and assigns and will be binding upon Assignors, their successors, legal representatives and assigns.



Name: Robert Paul Morris
(Signature MUST be attested)

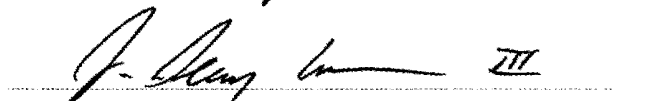
ATTESTATION OF SIGNATURE PURSUANT TO 28 U.S.C. § 1746

The undersigned witnessed the signature of Robert Paul Morris to the above Assignment of Patent Rights and makes the following statements:

1. I am over the age of 18 and competent to testify as to the facts in this Attestation block if called upon to do so.
2. Robert Paul Morris is personally known to me (or proved to me on the basis of satisfactory evidence) and appeared before me on _____, 2013 to execute the above Assignment of Patent Rights.
3. Robert Paul Morris subscribed to the above Assignment of Patent Rights.

I declare under penalty of perjury under the laws of the United States of America that the statements made in the three (3) numbered paragraphs immediately above are true and correct.

EXECUTED on Sept 27, 2013


Print Name: J. Deary

Electronic Acknowledgement Receipt

EFS ID:	17226386
Application Number:	12714454
International Application Number:	
Confirmation Number:	6771
Title of Invention:	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION
First Named Inventor/Applicant Name:	Robert Paul Morris
Customer Number:	92045
Filer:	Patrick Edgar Caldwell
Filer Authorized By:	
Attorney Docket Number:	
Receipt Date:	25-OCT-2013
Filing Date:	27-FEB-2010
Time Stamp:	10:49:15
Application Type:	Utility under 35 USC 111(a)

Payment information:

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	Morris-SittingMan_Assignment_vF_9-5-13.pdf	769618 5dd85c282cf6ef37223a412e0cec878eb779f594	no	9

Warnings:

Information:

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:



Practitioners associated with the Customer Number:

92045

OR



Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:



The address associated with Customer Number:

92045

OR

☐ Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone	Email		

Assignee Name and Address:

Sitting Man, LLC
712 Latta St
Raleigh, NC 27607

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	/Robert Paul Morris/	Date
Name	Robert Paul Morris	Telephone
Title	Managing Member	

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

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.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Robert Paul Morris

Application No./Patent No.: 8,219,606

Filed/Issue Date: 07-10-2012

Titled: **METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION**

Sitting Man, LLC

, a Limited Liability Company

(Name of Assignee)

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

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)
the patent application/patent identified above, by virtue of either:

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 therefore is attached.

OR

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Robert Paul Morris

To: Sitting Man, LLC

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

2. 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.

3. 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(b)(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.

/Robert Paul Morris/

10/17/2013

Signature

Date

Robert Paul Morris

Managing Member

Printed or Typed Name

Title

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.

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:	17202349
Application Number:	12714454
International Application Number:	
Confirmation Number:	6771
Title of Invention:	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION
First Named Inventor/Applicant Name:	Robert Paul Morris
Customer Number:	92924
Filer:	Patrick Edgar Caldwell
Filer Authorized By:	
Attorney Docket Number:	0120-SP
Receipt Date:	23-OCT-2013
Filing Date:	27-FEB-2010
Time Stamp:	10:56:00
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	Morris_POA_pre_2012.pdf	435724 16c4e6143c6e06d8305afa69a2cfd95096a8d40	no	2

Warnings:

Information:

2	Assignee showing of ownership per 37 CFR 3.73.	PMOR0120_373b.pdf	423120	no	2
			d2b3e2c1b59a7b5da0987cf5c013c14073811528		
Warnings:					
Information:					
Total Files Size (in bytes):				858844	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



UNITED STATES PATENT AND TRADEMARK OFFICE

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.
12/714,454	07/10/2012	8219606	0120	6771

92924 7590 06/20/2012
OoOT
Robert Paul Morris
712 Latta Street
Raleigh, NC 27607

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 296 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):

Robert Paul Morris, Raleigh, NC;

Change(s) applied
to document,

/T.R./

6/6/2012

Application No. 12/714,454

Paper filed April 15, 2012

Amendment after Notice of Allowance mailed February 23, 2012

Docket No. 0120

Page 5 of 14

for detection of the first idle time period by first node **602**, a duration of time, a generator for determining a duration of time, and/or an input for determining a duration of time.

Please replace paragraphs ⁰¹²⁶~~0127~~ with the following:

[0127] Moreover, the methods described herein may be embodied in executable instructions stored in a computer readable storage medium for use by or in connection with an instruction execution machine, system, apparatus, or device, such as a computer-based or processor-containing machine, system, apparatus, or device. As used herein, a "computer readable storage medium" may include one or more of any suitable media for storing the executable instructions of a computer program in one or more of an electronic, magnetic, optical, and electromagnetic, ~~and infrared~~ form, such that the instruction execution machine, system, apparatus, or device may read (or fetch) the instructions from the computer readable storage medium and execute the instructions for carrying out the described methods. A non-exhaustive list of conventional exemplary computer readable storage media includes a portable computer diskette; a random access memory (RAM); a read only memory (ROM); an erasable programmable read only memory (EPROM or Flash memory); optical storage devices, including a portable compact disc (CD), a portable digital video disc (DVD), a high definition DVD (HD-DVD.TM.), a Blu-ray.TM. disc; and the like.

Change(s) applied
to document,

/T.R./

6/6/2012

Please replace paragraphs 0098 with the following:

[0098] In a further aspect, in response to detecting the expiration of a timer set as described above, a TCP keep-alive packet may be sent by first node **602** to determine whether the TCP connection is active and/or to keep the TCP connection active. When the keep-alive packet is sent, an acknowledgment timer may be set. If a timeout of the acknowledgment timer is detected indicating no TCP packet has been received acknowledging the keep-alive packet, the first idle time period may be detected in response to and/or otherwise based on the timeout of the acknowledgment timer.

0114

Please replace paragraphs ~~0115~~ with the following:

[0115] In Fig. 5, ITP option handler component **562** is operatively coupled to packet handler component **516**. The TCP packet, including the ITP header sent by first node **602**, may be received, and identified as a TCP packet by net in-port component **560** operating in second node **604**. As illustrated in Fig. 5, net in-port component **560** and/or an analog of net in-port component **560** may provide and/or otherwise identify the received packet to packet handler component **516**. Packet handler component **516** may detect various portions of the TCP packet according to the TCP packet **802** structure as illustrated in Fig. 8. Alternatively, packet handler component **516** may provide some or all of the packet to various components in TCP layer component **506** to identify portions of the packet according to the TCP specification and/or according to a particular implementation.

0116

Please replace paragraphs ~~0117~~ with the following:

[0117] In various aspects, ITP option handler component **562** operating in second node **604** may detect and/or otherwise determine a duration of time ~~for~~ associated with detection of the idle time period by first node **602**, a duration generator, and/or a parameter for a duration generator. The first idle time period header may identify metadata including and/or identifying,

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12/714,454	
	Filing Date		2010-02-27	
	First Named Inventor	Robert Paul Morris		
	Art Unit	2457		
	Examiner Name	Meky		
	Attorney Docket Number	0120		

U.S. PATENTS							Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	
	1						

If you wish to add additional U.S. Patent citation information please click the Add button.

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U.S. PATENT APPLICATION PUBLICATIONS							Remove
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	
	1	20090252072	A1	2009-10-08	~~Helena~~ Lind et al.		

Change(s) applied to document, R.M.L./

If you wish to add additional U.S. Published Application citation information please click the Add button.

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4/10/2012

FOREIGN PATENT DOCUMENTS								Remove
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

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NON-PATENT LITERATURE DOCUMENTS			Remove
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵

PART B - FEE(S) TRANSMITTAL

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

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.

03/04 1596 02/27/2012
 Robert Paul Morris
 712 Latta Street
 Raleigh, NC 27607

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.

Robert Paul Morris (Applicant's name)
 Robert Paul Morris (Signature)
 5-22-2012 (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/714,454	02/27/2012	Robert Paul Morris	6126	6774

TITLE OF INVENTION, METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDELE TCP CONNECTION

APPN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PRIV. PAID ISSUE FEE	TOTAL FEES DUE	DATE DUE
nonprovisional	YES	\$870	\$300	\$0	\$1170	05/23/2012

INVENTOR	ART ID#	CLASSIFICATION
MEIKY, MOUSTAFA M	2497	709-201660

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.333).
☐ Change of correspondence address for Change of Correspondence Address form PTO/SB/122 attached.
☐ "Fee Address" indication for "Fee Address" Indication form PTO/SB/17 Rev 03-02 or more recent) attached. Use of a Customer Number is required.

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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(c)(2).

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Authorized Signature: Robert Paul Morris Date: 5-22-2012
 Typed or printed name: Robert Paul Morris Registration No. _____

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Electronic Patent Application Fee Transmittal				
Application Number:		12714454		
Filing Date:		27-Feb-2010		
Title of Invention:		METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION		
First Named Inventor/Applicant Name:		Robert Paul Morris		
Filer:		Robert Paul Morris		
Attorney Docket Number:		0120		
Filed as Small Entity				
Utility under 35 USC 111(a) 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

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

Electronic Acknowledgement Receipt

EFS ID:	12833846
Application Number:	12714454
International Application Number:	
Confirmation Number:	6771
Title of Invention:	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION
First Named Inventor/Applicant Name:	Robert Paul Morris
Customer Number:	92924
Filer:	Robert Paul Morris
Filer Authorized By:	
Attorney Docket Number:	0120
Receipt Date:	22-MAY-2012
Filing Date:	27-FEB-2010
Time Stamp:	14:07:01
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 1170
RAM confirmation Number	390
Deposit Account	505171
Authorized User	MORRIS,ROBERT PAUL

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Post Allowance Communication - Incoming	0120-CommentsOnReasonsForAllowance.pdf	69278	no	1
			1eaf506d7c41dbcd4283647950830fa859498caf		
Warnings:					
Information:					
2	Issue Fee Payment (PTO-85B)	0120-PTOL-85B-IssueFeePayment.pdf	295101	no	1
			22528b9a7d1e2bea336d46fd1ff0644a580d3b17		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	31383	no	2
			0ba9e0b817a72411605f0d9d14434b50510814bf		
Warnings:					
Information:					
Total Files Size (in bytes):			395762		
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Application No. 12/714,454
Paper filed May 18, 2012

Docket No. 0120
Page 1 of 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Robert Paul Morris
Application No.: 12/714,454
Filed: 02/27/2010
For Methods, Systems, and Computer Program
Products for Sharing Information for Detecting
an Idle TCP Connection

Mail Stop: ISSUE FEE
T.C/Art Unit: 2457
Examiner: Meky, Moustafa M.
Confirmation No.: 6771

COMMENTS OF STATEMENT OF REASONS FOR ALLOWANCE

Mail Stop: ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Notice of Allowance mailed February 23, 2012, the Applicants traverse the Examiner's statement to the extent it differs from a mere restatement of the claim language. Applicants further traverse the Examiner's statement and reasoning insofar as they would lead to or suggest, if at all, an interpretation of the claimed invention different from the full extent of claim scope afforded thereto by the established law in the absence of the statement of the reasons for allowance.

Respectfully submitted,

/Robert Paul Morris/
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Inventor

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/714,454	02/27/2010	Robert Paul Morris	0120	6771
92924	7590	04/20/2012		
OoOT Robert Paul Morris 712 Latta Street Raleigh, NC 27607			EXAMINER MEKY, MOUSTAFA M	
			ART UNIT 2457	PAPER NUMBER
			NOTIFICATION DATE 04/20/2012	DELIVERY MODE ELECTRONIC

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

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

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

paul.morris@nc.rr.com
rpmorris@yahoo.com

Response to Rule 312 Communication	Application No. 12/714,454	Applicant(s) MORRIS, ROBERT PAUL
	Examiner MOUSTAFA M. MEKY	Art Unit 2457
-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address -- 1. ☒ The amendment filed on <u>04/15/2012</u> under 37 CFR 1.312 has been considered, and has been: a) ☐ entered. b) ☒ entered as directed to matters of form not affecting the scope of the invention. c) ☐ disapproved because the amendment was filed after the payment of the issue fee. Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue. d) ☐ disapproved. See explanation below. e) ☐ entered in part. See explanation below.		
		/MOUSTAFA M MEKY/ Primary Examiner, Art Unit 2457

Application No. 12/714,454

Paper filed April 15, 2012

Amendment after Notice of Allowance mailed February 23, 2012

Docket No. 0120

Page 1 of 14

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Mail Stop: Amendment

Robert Paul Morris

T.C/Art Unit: 2457

Application No.:12/714,454

Examiner: Moustafa M. Meky

Filed: 02/27/2010

Confirmation No.: 6671

For: Methods, Systems, and Computer

Program Products for Sharing Information for

Detecting an Idle TCP Connection

AMENDMENT AFTER ALLOWANCE UNDER 37 C.F.R. §1.312

Mail Stop: Amendment Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

This paper is responsive to the Notice of Allowance mailed 02/23/2012, for which a statutory period for payment of an issue fee is set to expire on 05/23/2012. Entry and favorable consideration of the following Amendments and Remarks is respectfully requested.

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

Amendments to the Claims are reflected in the Listing of Claims that begins on page 6 of this paper.

Remarks begin on page 12 of this paper.

Amendments to the Specification:

Note: Amendments to the spec are strikethrough deletions and underline insertions. Only a marked up copy is required.

Please replace paragraphs 0051-0052 with the following:

[0051] Analogously, TCP layer component **506** interprets data received from IP layer component **514** via net in-port component **560**. The data is interpreted as TCP data and TCP packets are detected in the received data by net in-port component **560** and/or packet handler component **516**. Fig. 5 illustrates TCP layer component **506** includes packet handler component **516** to strip off and/or otherwise process TCP layer specific data. Packet handler component **516** interoperates with application out-port (app out-port) component **524** to transfer data in the TCP packet included in a TCP data stream to sockets component **518**, application protocol layer **520**, network application **504**, and/or other components associated with the local endpoint of the TCP connection. Detailed information on the operation of the TCP is included in RFC 793.

[0052] With reference to the method illustrated in Fig. 2, block **202** illustrates the method includes receiving, by a first node, first idle information for detecting a first idle time period during which no TCP packet including data in a first data stream sent in a~~the~~ TCP connection by a second node is received by the first node. Accordingly, a system for sharing information for detecting an idle TCP connection includes means for receiving, by a first node, first idle information for detecting a first idle time period during which no TCP packet including data in a first data stream sent in a~~the~~ TCP connection by a second node is received by the first node. For example, as illustrated in Fig. 4a, idle time period policy component **450** is configured for receiving, by a first node, first idle information for detecting a first idle time period during which no TCP packet including data in a first data stream sent in a~~the~~ TCP connection by a second node is received by the first node.

Please replace paragraphs 0076-0077 with the following:

[0076] In an aspect, an ITP header may be included in a packet exchanged during setup of a TCP connection. RFC 793 describes a “three-way handshake” for establishing a TCP connection. Other message exchanges may be used in setting up a TCP connection as those skilled in the art will understand. Such other exchanges are not currently supported by the TCP as described in RFC 793. The specified “three-way handshake” and other patterns of message exchange for setting up a TCP connection include packets that are considered to be in the TCP connection for purposes of this disclosure. Including an ITP header may be restricted to packets exchanged in connection setup, excluded from packets exchanged during connection establishment, or allowed in one or more packets exchanged during connection establishments and in packets exchanged after connection setup.

[0077] In an aspect, when connection state component **558** and/or ITP policy component **550** determine an ITP header should be included in a TCP packet based on received idle information, packet generator component **552** may include the ITP header in a next TCP packet generated in response to data received via application in-port component **522** for sending to first node **602**. In another aspect, packet generator component **552** may send the ITP header in a TCP packet in the TCP connection with no data included in the TCP data stream sent by first node **602** to second node **604**. Such a packet is referred to as an empty packet. Packet generator component **554** may send the empty TCP packet when TCP layer component **506** has no ~~for~~ data from an application in second node **604** to send in the TCP data stream to first node **602**.

Please replace paragraphs 0079 with the following:

[0079] Fig. 8 also illustrates a format for an exemplary ITP header **820**. A KIND field **822**~~location~~ is specified for including an identifier indicating that the option is an idle time period (ITP) option in an ITP header. Identifiers for option headers are currently under the control of the Internet Assigned Numbers Authority (IANA). Length field **824** identifies a length of an ITP header. An ITP data field **826** is specified for including ITP header information for detecting an idle time period as described herein.

Please replace paragraphs 0098 with the following:

[0098] In a further aspect, in response to detecting the expiration of a timer set as described above, a TCP keep-alive packet may be sent by first node **602** to determine whether the TCP connection is active~~on~~ and/or to keep the TCP connection active. When the keep-alive packet is sent, an acknowledgment timer may be set. If a timeout of the acknowledgment timer is detected indicating no TCP packet has been received acknowledging the keep-alive packet, the first idle time period may be detected in response to and/or otherwise based on the timeout of the acknowledgment timer.

Please replace paragraphs 0115 with the following:

[0115] In Fig. 5, ITP option handler component **562** is operatively coupled to packet handler component **516**. The TCP packet, including the ITP header sent by first node **602**, may be received, and identified as a TCP packet by net in-port component **560** operating in second node **604**. As illustrated in Fig. 5, net in-port component **560** and/or an analog of net in-port component **560** may provide and/or otherwise identify the received packet to packet handler component **516**. Packet handler component **516** may detect various portions of the TCP packet according to the TCP~~G~~ packet **802** structure as illustrated in Fig. 8. Alternatively, packet handler component **516** may provide some or all of the packet to various components in TCP layer component **506** to identify portions of the packet according to the TCP specification and/or according to a particular implementation.

Please replace paragraphs 0117 with the following:

[0117] In various aspects, ITP option handler component **562** operating in second node **604** may detect and/or otherwise determine a duration of time ~~for~~ associated with detection of the idle time period by first node **602**, a duration generator, and/or a parameter for a duration generator. The first idle time period header may identify metadata including and/or identifying,

for detection of the first idle time period by first node **602**, a duration of time, a generator for determining a duration of time, and/or an input for determining a duration of time.

Please replace paragraphs 0127 with the following:

[0127] Moreover, the methods described herein may be embodied in executable instructions stored in a computer readable storage medium for use by or in connection with an instruction execution machine, system, apparatus, or device, such as a computer-based or processor-containing machine, system, apparatus, or device. As used herein, a "computer readable storage medium" may include one or more of any suitable media for storing the executable instructions of a computer program in one or more of an electronic, magnetic, optical, and electromagnetic, ~~and infrared~~ form, such that the instruction execution machine, system, apparatus, or device may read (or fetch) the instructions from the computer readable storage medium and execute the instructions for carrying out the described methods. A non-exhaustive list of conventional exemplary computer readable storage media includes a portable computer diskette; a random access memory (RAM); a read only memory (ROM); an erasable programmable read only memory (EPROM or Flash memory); optical storage devices, including a portable compact disc (CD), a portable digital video disc (DVD), a high definition DVD (HD-DVD.TM.), a Blu-ray.TM. disc; and the like.

Claims:

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

Listing of Claims:

1. (Original) A method for sharing information for detecting an idle TCP connection, the method comprising:

receiving, by a second node from a first node, a first transmission control protocol (TCP) packet in a TCP connection;

detecting a first idle time period header, in the first packet, identifying metadata for a first idle time period, detectable by the first node, during which no TCP packet including data in a first TCP data stream sent in the TCP connection by the second node is received by the first node; and

modifying, based on the metadata, by the second node a timeout attribute associated with the TCP connection.

2. (Original) The method of claim 1 wherein the timeout attribute is an attribute of at least one of a TCP keep-alive option, a TCP user timeout, a retransmission timeout, and an acknowledgment timeout.

3. (Original) The method of claim 1 wherein the TCP connection is identified by a first connection endpoint and a second connection endpoint, and the second node includes at least one of the second connection endpoint and a second proxy endpoint representing the second connection endpoint.

4. (Original) The method of claim 1 wherein the metadata identifies, for the first idle time period, at least one of a duration of time, a generator for determining a duration of time, and an input for determining a duration of time.

5. (Original) The method of claim 4 wherein the modifying is based on the at least one of the durations of time.
6. (Original) The method of claim 1 wherein the first idle time period includes a time period during which the second node has sent acknowledgment for all data in a second TCP data stream sent in the TCP connection from the first node to the second node.
7. (Original) The method of claim 1 the first idle time period header is based on a previous idle time period header identified in a previous TCP packet in the TCP connection sent by the second node to the first node prior to receiving the first TCP packet.
8. (Original) The method of claim 1 further comprises:
 - detecting a timeout based on the modified timeout attribute; and
 - in response to detecting the timeout, sending an empty TCP packet in the TCP connection to the first node.
9. (Original) The method of claim 1 further comprising sending a second TCP packet in the connection by the second node to the first node including a second idle period header for detecting by the first node the first idle time period based on the second idle time period header.
10. (Original) The method of claim 9 wherein the second idle time period header is based on the first idle time period header.
11. (Currently Amended) A method for sharing information for detecting an idle TCP connection, the method comprising:
 - receiving, by a first node, first idle information for detecting a first idle time period during which no TCP packet including data in a first data stream sent in ~~the~~a TCP connection by a second node is received by the first node;
 - generating a TCP packet including a first idle time period header identifying metadata for the first idle time period based on the first idle information;

sending the TCP packet in the TCP connection to the second node to provide the metadata for the first idle time period to the second node;

detecting the first idle time period based on the first idle information; and

deactivating the TCP connection in response to detecting the first idle time period.

12. (Original) The method of claim 11 wherein the first idle time period header is further based on a previous idle time period header identified in a previous TCP packet in the TCP connection received from the second node by the first node prior to sending the first TCP packet.

13. (Original) The method of claim 11 further comprising modifying, based on the first idle information, at least one of a keep-alive option, a TCP user timeout, a retransmission timeout, an acknowledgment timeout, and another timeout associated with the TCP connection.

14. (Original) The method of claim 11 further comprising:

detecting a keep-alive timeout based on a duration of time identified by the first idle information; and

sending to the second node a TCP keep-alive packet to at least one of determine whether the TCP connection is active and keep the TCP connection active.

15. (Original) The method of claim 11 wherein detecting the first idle time period includes detecting a time period, in the first idle time period, during which the first node has received acknowledgment for all data in a second TCP data stream sent in the TCP connection by the first node to the second node.

16. (Original) The method of claim 11 further comprises:

receiving an empty TCP packet from the second node including no data in the first TCP data stream; and

resetting detecting of the first idle time period in response to receiving the empty TCP packet.

17. (Original) The method of claim 11 wherein detecting the first idle time period comprises:

receiving from the second node a second TCP packet in the TCP connection;
identifying in the second TCP packet a second idle time period header for detecting by the first node the first idle time period; and
detecting the first idle time period based on the second idle time period header and the first idle information.

18. (Original) The method of claim 11 wherein deactivating includes at least one of closing the connection, sending a TCP packet including a reset indication to the first node, and releasing a resource previously allocated for the connection by the first node.

19. (Currently Amended) A system for sharing information for detecting an idle TCP connection, the system comprising:

an execution environment including an instruction processing unit ~~configured to process,~~ wherein an instruction included in at least one of a net in-port component, an idle time period option handler component, and an option attribute handler component is executed by the instruction processing unit;

the net in-port component configured for receiving, by a second node from a first node, a first transmission control protocol (TCP) packet in a TCP connection;

the idle time period option handler component configured for detecting a first idle time period header, in the first packet, identifying metadata for a first idle time period, detectable by the first node, during which no TCP packet including data in a first TCP data stream sent in the TCP connection by the second node is received by the first node; and

the option attribute handler component configured for modifying, based on the metadata, by the second node a timeout attribute associated with the TCP connection.

20. (Currently Amended) A system for sharing information for detecting an idle TCP connection, the system comprising:

an execution environment including an instruction processing unit ~~configured to process,~~ wherein an instruction included in at least one of an idle time period policy component, a packet

generator component, a net out-port component, an idle time period monitor, and a connection state component is executed by the instruction processing unit;

the idle time period policy component configured for receiving, by a first node, first idle information for detecting a first idle time period during which no TCP packet including data in a first data stream sent in ~~the~~ a TCP connection by a second node is received by the first node;

the packet generator component configured for generating a TCP packet including a first idle time period header identifying metadata for the first idle time period based on the first idle information;

the net out-port component configured for sending the TCP packet in the TCP connection to the second node to provide the metadata for the first idle time period to the second node;

the idle time period monitor component configured for detecting the first idle time period based on the first idle information; and

the connection state component configured for deactivating the TCP connection in response to detecting the first idle time period

21. (Currently Amended) A computer readable storage medium embodying a computer program, executable by a machine, for sharing information for detecting an idle TCP connection, the computer program comprising executable instructions for:

receiving, by a second node from a first node, a first transmission control protocol (TCP) packet in a TCP connection;

detecting a first idle time period header, in the first packet, identifying metadata for a first idle time period, detectable by the first node, during which no TCP packet including data in a first TCP data stream sent in the TCP connection by the second node is received by the first node; and

modifying, based on the metadata, by the second node a timeout attribute associated with the TCP connection.

22. (Currently Amended) A computer readable storage medium embodying a computer program, executable by a machine, for sharing information for detecting an idle TCP connection, the computer program comprising executable instructions for:

- receiving, by a first node, first idle information for detecting a first idle time period during which no TCP packet including data in a first data stream sent in ~~the~~a TCP connection by a second node is received by the first node;

- generating a TCP packet including a first idle time period header identifying metadata for the first idle time period based on the first idle information;

- sending the TCP packet in the TCP connection to the second node to provide the metadata for the first idle time period to the second node;

- detecting the first idle time period based on the first idle information; and

- deactivating the TCP connection in response to detecting the first idle time period.

REMARKS:

Status Summary

Claims 1-22 are allowed in the present application, of which claims 1, 11, 19, 20, 21, and 22 are presented in independent form. Claims 11, 19, 20, 21, and 22 are currently amended. All amendments to the specification and the claims are made in response to a review of the specification and claims performed after receiving the notice of allowance.

Amendments to the Specification

With respect to paragraph 0079 of the specification, as currently amended paragraph 0079 recites “field 822” rather than “location”. The amendment is supported at least by Fig. 8 and the use of the term “field” in the remainder of paragraph 0079 itself.

With respect to paragraph 0127 of the specification, as amended paragraph 0127 recites “a computer readable storage medium” rather than “a computer readable medium”. This amendment is supported by at least the original paragraph 0127, which includes the inventor’s own definition of “computer readable medium” which specifically recites that a “computer readable medium” is for *storing* executable instructions. As amended, paragraph 0127 no longer recites “infrared” as type of computer readable storage medium given that the recitation is unnecessary given the remainder of the recited forms.

The remainder of the amendments to the specifications correct punctuation, grammar, and spelling errors discovered in the applicants review of the present application after receiving the notice of allowance.

Amendments to the Claims

With respect to claims 11, 20, and 22; “the TCP connection” in the first element of each claim now recites “a TCP connection”. The amendments merely establish “a TCP connection” in the respective first claim elements of claims 11, 20, and 22, rather than in the respective preambles, as the antecedent for subsequent respective references to the TCP connection. Thus, no additional search or examination is required, as result of these amendment. The applicant submits that the amendments have no effect on the reasons the claims are patentable.

Additionally, with respect to claims 19 and 20, the first element of each original claim 19 and 20 recited an "instruction processing unit configured to process an instruction". Applicant is aware that "configured to" language may be interpreted as means plus function. The respective amendments to claim 19 and 20 are intended to clarify that a means plus function interpretation is unintended. The current amendments each recite "... an instruction included in at least one of a ...is executed by the instruction processing unit", rather than merely reciting that the IPU is configured to process such an instruction. Applicant submits that no additional search or examination is required, as result of these amendments, and submits that the amendments have no effect on the reasons the claims are patentable.

Claims 21 and 22 as currently amended recite "computer readable storage medium" rather than "computer readable medium" as in the original claims. The respective amendments to claims 21 and 22 clarify that "computer readable medium" encompasses only storage media. The amendment is supported by at least paragraph 0127 in the original specification of the present application and as amended above. Thus no additional search or examination is required, as result of these amendments, and the amendments have no effect on the reasons the claims are patentable.

In accordance with the provisions of 37 C.F.R. §1.312, this amendment is being filed before or with the payment of the issue fee, and may be entered without withdrawing the application from issue.

CONCLUSION

In view of the above, it is respectfully submitted that the present application remains in condition for allowance. Entry and favorable consideration of the above amendments and remarks is respectfully requested. The Examiner is respectfully requested to telephone the undersigned inventor prior to the end of the statutory period for payment of the issue fee (5/23/2012) at the below-listed number if, after reviewing the above amendments and Remarks, the Examiner believes outstanding matters remain.

Application No. 12/714,454

Paper filed April 15, 2012

Amendment after Notice of Allowance mailed February 23, 2012

Docket No. 0120

Page 14 of 14

DEPOSIT ACCOUNT

The Commissioner is hereby authorized to charge any additional fees, or credit any overpayment, associated with the filing of this paper to Deposit Account No. 50-5171

Respectfully submitted,

/Robert Paul Morris/

Robert Paul Morris

Inventor

Date: April 15, 2012

Customer No: 92924

712 Latta

Raleigh, North Carolina 27518

919.828.1792

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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						Application or Docket Number 12714454			
Substitute for Form PTO-875									
APPLICATION AS FILED – PART I									
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)			
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		N/A				
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		N/A				
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	=	X	=			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X	=	X	=			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			N/A		N/A				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL		TOTAL				
APPLICATION AS AMENDED – PART II									
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDI-TIONAL FEE (\$)	RATE (\$)	ADDI-TIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 22	Minus	** 22	= 0	X 30 =	0	X	=
	Independent (37 CFR 1.16(h))	* 6	Minus	*** 6	= 0	X 125 =	0	X	=
	Application Size Fee (37 CFR 1.16(s))								
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		N/A	
					TOTAL ADD'L FEE	0	TOTAL ADD'L FEE		
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDI-TIONAL FEE (\$)	RATE (\$)	ADDI-TIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	*	Minus	**	=	X	=	X	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X	=	X	=
	Application Size Fee (37 CFR 1.16(s))								
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		N/A	
					TOTAL ADD'L FEE	0	TOTAL ADD'L FEE		
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.									

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.

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:	12544096
Application Number:	12714454
International Application Number:	
Confirmation Number:	6771
Title of Invention:	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION
First Named Inventor/Applicant Name:	Robert Paul Morris
Customer Number:	92924
Filer:	Robert Paul Morris
Filer Authorized By:	
Attorney Docket Number:	0120
Receipt Date:	15-APR-2012
Filing Date:	27-FEB-2010
Time Stamp:	14:12:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		0120- AmendmentAfterAllowance. pdf	207317 f4c72d2f7d67b65cc9ad0f40162a7d50737ff 7a7	yes	14

Multipart Description/PDF files in .zip description					
Document Description			Start	End	
Amendment after Notice of Allowance (Rule 312)			1	1	
Specification			2	5	
Claims			6	11	
Applicant Arguments/Remarks Made in an Amendment			12	14	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	0120-FeeWrkSheet-sb0006.pdf	158522	no	2
			45fd1932b520869ea350acc334f4ccefad68325f		
Warnings:					
Information:					
Total Files Size (in bytes):			365839		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



UNITED STATES PATENT AND TRADEMARK OFFICE

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

92924 7590
Robert Paul Morris
712 Latta Street
Raleigh, NC 27607

02/23/2012

EXAMINER

MEKY, MOUSTAFA M

ART UNIT

PAPER NUMBER

2457

DATE MAILED: 02/23/2012

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/714,454	02/27/2010	Robert Paul Morris	0120	6771

TITLE OF INVENTION: METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION

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	05/23/2012

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)

92924 7590 02/23/2012
Robert Paul Morris
712 Latta Street
Raleigh, NC 27607

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.
12/714,454	02/27/2010	Robert Paul Morris	0120	6771

TITLE OF INVENTION: METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION

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	05/23/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
MEKY, MOUSTAFA M	2457	709-201000

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.

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/714,454	02/27/2010	Robert Paul Morris	0120	6771

92924	7590	02/23/2012
Robert Paul Morris 712 Latta Street Raleigh, NC 27607		

EXAMINER	
MEKY, MOUSTAFA M	

ART UNIT	PAPER NUMBER
2457	

DATE MAILED: 02/23/2012

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 302 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 302 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.
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public 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)	
	12/714,454	MORRIS, ROBERT PAUL	
	Examiner	Art Unit	
	MOUSTAFA M. MEKY	2457	

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

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the filing date 02/27/2010.

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 1-22.

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. ☒ Notice of References Cited (PTO-892) 2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>02/27/2010</u> 4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	5. ☐ Notice of Informal Patent Application 6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____. 7. ☐ Examiner's Amendment/Comment 8. ☒ Examiner's Statement of Reasons for Allowance 9. ☐ Other _____.
---	---

/ MOUSTAFA M MEKY/ Primary Examiner, Art Unit 2457	
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REASONS FOR ALLOWANCE

1. The following is an examiner's statement of reasons for allowance: None of the prior art of record taken singularly or in combination teaches or suggests detecting a first idle time period header by a second node in a received TCP packet in a TCP connection from a first node, identifying metadata for a first idle time period detectable by the first node during which no TCP packet including data in a first TCP data stream in the TCP connection by the second node is received by the first node.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MOUSTAFA M. MEKY whose telephone number is (571)272-4005. The examiner can normally be reached on flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Etienne can be reached on 571-272-4001. 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.

/MOUSTAFA M MEKY/
Primary Examiner, Art Unit 2457

02/16/2012

Notice of References Cited	Application/Control No. 12/714,454		Applicant(s)/Patent Under Reexamination MORRIS, ROBERT PAUL	
	Examiner MOUSTAFA M. MEKY		Art Unit 2457	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-8,073,964	12-2011	Dunk, Craig Allan	709/232
*	B	US-2005/0054347	03-2005	Kakani, Naveen Kumar	455/452.1
*	C	US-2010/0057844	03-2010	Johnson, R. Brent	709/203
*	D	US-7,404,210	07-2008	Lin, Dong	726/22
*	E	US-7,720,989	05-2010	Dunk, Craig Allan	709/232
*	F	US-7,426,569	09-2008	Dunk, Craig Allan	709/232
*	G	US-7,684,346	03-2010	Valli, Jyrki	370/252
*	H	US-6,412,006	06-2002	Naudus, Stanley T.	709/227
*	I	US-7,729,271	06-2010	Tsuchiya et al.	370/252
	J	US-			
	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.

Issue Classification 	Application/Control No. 12714454	Applicant(s)/Patent Under Reexamination MORRIS, ROBERT PAUL
	Examiner MOUSTAFA M MEKY	Art Unit 2457

ORIGINAL						INTERNATIONAL CLASSIFICATION												
CLASS		SUBCLASS				CLAIMED					NON-CLAIMED							
709		201				G	0	6	F	15 / 16 (2006.01.01)								
CROSS REFERENCE(S)																		
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																	
709	224	232																

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		17												
	2		18												
	3		19												
	4		20												
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	15														
	16														

NONE		Total Claims Allowed:	
		22	
(Assistant Examiner)	(Date)		
/MOUSTAFA M MEKY/ Primary Examiner.Art Unit 2457	02/16/2012	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2



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BIB DATA SHEET

CONFIRMATION NO. 6771

SERIAL NUMBER 12/714,454	FILING or 371(c) DATE 02/27/2010 RULE	CLASS 709	GROUP ART UNIT 2457	ATTORNEY DOCKET NO. 0120		
APPLICANTS Robert Paul Morris, Raleigh, NC; ** CONTINUING DATA ***** ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** SMALL ENTITY ** 03/10/2010						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /MOUSTAFA M MEKY/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY NC	SHEETS DRAWINGS 8	TOTAL CLAIMS 22	INDEPENDENT CLAIMS 6
ADDRESS Robert Paul Morris 712 Latta Street Raleigh, NC 27607 UNITED STATES						
TITLE METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION						
FILING FEE RECEIVED 844	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

<i>Index of Claims</i> 	Application/Control No. 12714454	Applicant(s)/Patent Under Reexamination MORRIS, ROBERT PAUL
	Examiner MOUSTAFA M MEKY	Art Unit 2457

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

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM			DATE							
Final	Original	02/16/2012								
	1	=								
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WEST Search History for Application 12714454

Creation Date: 2012021615:07

Prior Art Searches

Query	DB	Op.	Plur.	Thes.	Date
idle adj2 (time or period or interval or duration)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
((deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(idle adj2 (time or period or interval or duration)) with ((deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5))	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5)) same (packet or frame)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame)) same tcp	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
US-20110213893-A1.did.	PGPB	ADJ	YES		02-14-2012
		ADJ	YES		02-14-2012

(idle adj2 (time or period or interval or duration)) same ((deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5))	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD				
(idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame)) not (idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5)) same (packet or frame)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame)) same tcp	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp) not (idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame)) not (idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) not idle adj2 (time or period or interval or duration) same	PGPB, USPT, USOC, EPAB,	ADJ	YES		02-14-2012

(deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp) not (idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame))	JPAB, DWPI, TDBD				
no adj3 (packet or data)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(no adj3 (packet or data)) adj5 (sent or received or acknowledg\$5)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(idle adj2 (time or period or interval or duration)) same (no adj3 (packet or data) adj5 (sent or received or acknowledg\$5))	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
keep adj1 alive	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5)) same (keep adj1 alive)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5)) not (idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) same keep adj1 alive	PGPB, USPT, USOC, EPAB, JPAB,	ADJ	YES		02-14-2012

)	DWPI, TDBD				
(idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) not idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) same keep adj1 alive) not (idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) not idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) same keep adj1 alive not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp) not (idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) not idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) same keep adj1 alive not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp not idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp) not (idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) not idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp not idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012

or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame))					
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(idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) not idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) same keep adj1 alive not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp not idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp not idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) not idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame))	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012

or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame)) not ((deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) not idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) same keep adj1 alive not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp not idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) not idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame))					
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near3 (connection or communicat\$5) same (packet or frame) not (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) not idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) same keep adj1 alive not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp not idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp not idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame)) same tcp					
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frame) not (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) not idle adj2 (time or period or interval or duration) same no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) same keep adj1 alive not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp not idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp not idle adj2 (time or period or interval or duration) same (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame) same tcp not idle adj2 (time or period or interval or duration) with (deactivat\$5 or clos\$5 or terminat\$5) near3 (connection or communicat\$5) same (packet or frame)) same connection					
(no adj3 (packet or data) adj5 (sent or received or acknowledg\$5)) same (keep adj1 alive)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) same keep adj1 alive) same connection	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
(no adj3 (packet or data) adj5 (sent or received or acknowledg\$5) same keep adj1 alive same connection) same tcp	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-14-2012
idel adj2 (time or period or interval or duration)		ADJ	YES		02-16-2012

	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD				
idle adj2 (time or period or interval or duration)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-16-2012
(idle adj2 (time or period or interval or duration)) near3 header	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-16-2012
inactive adj2 (time or period or interval or duration)	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-16-2012
(inactive adj2 (time or period or interval or duration)) near3 header	PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD	ADJ	YES		02-16-2012

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12/714,454	
	Filing Date		2010-02-27	
	First Named Inventor	Robert Paul Morris		
	Art Unit	2457		
	Examiner Name	Meky		
	Attorney Docket Number	0120		

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	1	20090252072	A1	2009-10-08	Helena		

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

Application Number	12/714,454
Filing Date	2010-02-27
First Named Inventor	Robert Paul Morris
Art Unit	2457
Examiner Name	Meky
Attorney Docket Number	0120

1	Postel, John (ed.), Editor; "Transmission Control Protocol - DARPA Internet Protocol Specification", RFC 793, USC/ Information Sciences Institute, http://tools.ietf.org/rfc/rfc793.txt , September 1981	☐
2	Eggert, L., Gont, F., "TCP User Timeout Option", RFC 5482, Internet Engineering Task Force (IETF), http://tools.ietf.org/rfc/rfc5482.txt , March 2009,	☐
3	Nagle, John, "Congestion Control in IP/TCP Internetworks", RFC 896, Ford Aerospace and Communications Corporation, http://tools.ietf.org/rfc/rfc896.txt , January 1984	☐
4	Mathis, M., Mahdave, J., Floyd, S., Romanow, A., "TCP Selective Acknowledgement Options", RFC 2018, Internet Engineering Task Force, http://tools.ietf.org/rfc/rfc2018.txt , October 1996	☐
5	Allman, M., Paxson, V., Stevens, W., "TCP Congestion Control", RFC 2581, Internet Engineering Task Force, http://tools.ietf.org/rfc/rfc2581 , April 1999	☐
6	Koziero, Charles M., TCP Connection Management and Problem Handling, the Connection Reset Function, and TCP "Keepalives", The TCP/IP Guide, p. 3, http://www.tcpipguide.com/free/t_TCPConnectionManagementandProblemHandlingtheConnec-3.htm , accessed February 2010, (c) 2003-2010	☐
7	Busatto, Fabio, "TCP Keepalive Overview", TCP Keepalive HOWTO, Section 2, http://ltdp.org/HOWTO/html_single/TCP-Keepalive-HOWTO/#overview , accessed January 2010, May 2007	☐

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Search Notes 	Application/Control No. 12714454	Applicant(s)/Patent Under Reexamination MORRIS, ROBERT PAUL
	Examiner MOUSTAFA M MEKY	Art Unit 2457

SEARCHED			
Class	Subclass	Date	Examiner
709	200-203, 217-227	02/14/2012	MMM
709	232	02/16/2012	MMM

SEARCH NOTES			
Search Notes		Date	Examiner
WEST (ALL FILES)		02/14/2012	MMM
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709	201, 224, 232	02/16/2012	MMM

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/714,454	02/27/2010	Robert Paul Morris	0120

92924
Robert Paul Morris
712 Latta Street
Raleigh, NC 27607

CONFIRMATION NO. 6771
PUBLICATION NOTICE



0000000049630080

Title:METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION

Publication No.US-2011-0213820-A1

Publication Date:09/01/2011

NOTICE OF PUBLICATION OF APPLICATION

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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
12/714,454	02/27/2010	2447	844	0120	22	6

CONFIRMATION NO. 6771

92924

Robert Paul Morris
712 Latta Street
Raleigh, NC 27607

FILING RECEIPT



OC000000040522735

Date Mailed: 03/11/2010

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)

Robert Paul Morris, Raleigh, NC;

Power of Attorney: None

Domestic Priority data as claimed by applicant

Foreign Applications

If Required, Foreign Filing License Granted: 03/10/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/714,454**

Projected Publication Date: 09/01/2011

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING
INFORMATION FOR DETECTING AN IDLE TCP CONNECTION

Preliminary Class

709

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		2010-02-27
	First Named Inventor	Robert Paul Morris	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	0120	

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Application Number		
Filing Date		2010-02-27
First Named Inventor	Robert Paul Morris	
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Attorney Docket Number	0120	

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2	Eggert, L., Gont, F., "TCP User Timeout Option", RFC 5482, Internet Engineering Task Force (IETF), http://tools.ietf.org/rfc/rfc5482.txt , March 2009,	☐
3	Nagle, John, "Congestion Control in IP/TCP Internetworks", RFC 896, Ford Aerospace and Communications Corporation, http://tools.ietf.org/rfc/rfc896.txt , January 1984	☐
4	Mathis, M., Mahdave, J., Floyd, S., Romanow, A., "TCP Selective Acknowledgement Options", RFC 2018, Internet Engineering Task Force, http://tools.ietf.org/rfc/rfc2018.txt , October 1996	☐
5	Allman, M., Paxson, V., Stevens, W., "TCP Congestion Control", RFC 2581, Internet Engineering Task Force, http://tools.ietf.org/rfc/rfc2581 , April 1999	☐
6	Koziero, Charles M., TCP Connection Management and Problem Handling, the Connection Reset Function, and TCP "Keepalives", The TCP/IP Guide, p. 3, http://www.tcpipguide.com/free/t_TCPConnectionManagementandProblemHandlingtheConnec-3.htm , accessed February 2010, (c) 2003-2010	☐
7	Busatto, Fabio, "TCP Keepalive Overview", TCP Keepalive HOWTO, Section 2, http://ltdp.org/HOWTO/html_single/TCP-Keepalive-HOWTO/#overview , accessed January 2010, May 2007	☐

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

Application Number	
Filing Date	2010-02-27
First Named Inventor	Robert Paul Morris
Art Unit	
Examiner Name	
Attorney Docket Number	0120

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Signature	/Robert Paul Morris/	Date (YYYY-MM-DD)	2010-02-27
Name/Print	Robert Paul Morris	Registration Number	

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First Named Inventor/Applicant Name:		Robert Paul Morris		
Filer:		Robert Paul Morris		
Attorney Docket Number:		0120		
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Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
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Utility Examination Fee	2311	1	110	110
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EFS ID:	7104083
Application Number:	12714454
International Application Number:	
Confirmation Number:	6771
Title of Invention:	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION
First Named Inventor/Applicant Name:	Robert Paul Morris
Customer Number:	92924
Filer:	Robert Paul Morris
Filer Authorized By:	
Attorney Docket Number:	0120
Receipt Date:	27-FEB-2010
Filing Date:	
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3	Application Data Sheet	0120-ADS.pdf	1364671	no	4
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Warnings:					
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ABSTRACT

Methods and systems are described for sharing information for detecting an idle TCP connection. In one aspect, a second node receives a packet in a TCP connection. A header in the packet is detected identifying metadata for a period, detectable by a first node, during which no packet including data is received in the connection by the first node. The second node modifies a timeout associated with the connection based on the metadata. In another aspect, a first node receives information for detecting a period during which no packet including data sent in the TCP connection by a second node is received by the first node. A packet is generated including a header identifying metadata for the period based on the information, and sent to the second node. The period is detected based on the information. The connection is deactivated in response to detecting the period.

I CLAIM:

1. A method for sharing information for detecting an idle TCP connection, the method comprising:

receiving, by a second node from a first node, a first transmission control protocol (TCP) packet in a TCP connection;

detecting a first idle time period header, in the first packet, identifying metadata for a first idle time period, detectable by the first node, during which no TCP packet including data in a first TCP data stream sent in the TCP connection by the second node is received by the first node; and

modifying, based on the metadata, by the second node a timeout attribute associated with the TCP connection.

2. The method of claim 1 wherein the timeout attribute is an attribute of at least one of a TCP keep-alive option, a TCP user timeout, a retransmission timeout, and an acknowledgment timeout.

3. The method of claim 1 wherein the TCP connection is identified by a first connection endpoint and a second connection endpoint, and the second node includes at least one of the second connection endpoint and a second proxy endpoint representing the second connection endpoint.

4. The method of claim 1 wherein the metadata identifies, for the first idle time period, at least one of a duration of time, a generator for determining a duration of time, and an input for determining a duration of time.

5. The method of claim 4 wherein the modifying is based on the at least one of the durations of time.

6. The method of claim 1 wherein the first idle time period includes a time period during which the second node has sent acknowledgment for all data in a second TCP data stream sent in the TCP connection from the first node to the second node.

7. The method of claim 1 the first idle time period header is based on a previous idle time period header identified in a previous TCP packet in the TCP connection sent by the second node to the first node prior to receiving the first TCP packet.

8. The method of claim 1 further comprises:
detecting a timeout based on the modified timeout attribute; and
in response to detecting the timeout, sending an empty TCP packet in the TCP connection to the first node.

9. The method of claim 1 further comprising sending a second TCP packet in the connection by the second node to the first node including a second idle period header for detecting by the first node the first idle time period based on the second idle time period header.

10. The method of claim 9 wherein the second idle time period header is based on the first idle time period header.

11. A method for sharing information for detecting an idle TCP connection, the method comprising:

receiving, by a first node, first idle information for detecting a first idle time period during which no TCP packet including data in a first data stream sent in the TCP connection by a second node is received by the first node;

generating a TCP packet including a first idle time period header identifying metadata for the first idle time period based on the first idle information;

sending the TCP packet in the TCP connection to the second node to provide the metadata for the first idle time period to the second node;

detecting the first idle time period based on the first idle information; and

deactivating the TCP connection in response to detecting the first idle time period.

12. The method of claim 11 wherein the first idle time period header is further based on a previous idle time period header identified in a previous TCP packet in the TCP connection received from the second node by the first node prior to sending the first TCP packet.

13. The method of claim 11 further comprising modifying, based on the first idle information, at least one of a keep-alive option, a TCP user timeout, a retransmission timeout, an acknowledgment timeout, and another timeout associated with the TCP connection.

14. The method of claim 11 further comprising:

detecting a keep-alive timeout based on a duration of time identified by the first idle information; and

sending to the second node a TCP keep-alive packet to at least one of
determine whether the TCP connection is active and keep the TCP connection active.

15. The method of claim 11 wherein detecting the first idle time period includes detecting a time period, in the first idle time period, during which the first node has received acknowledgment for all data in a second TCP data stream sent in the TCP connection by the first node to the second node.

16. The method of claim 11 further comprises:
receiving an empty TCP packet from the second node including no data in the first TCP data stream; and
resetting detecting of the first idle time period in response to receiving the empty TCP packet.

17. The method of claim 11 wherein detecting the first idle time period comprises:
receiving from the second node a second TCP packet in the TCP connection;
identifying in the second TCP packet a second idle time period header for detecting by the first node the first idle time period; and
detecting the first idle time period based on the second idle time period header and the first idle information.

18. The method of claim 11 wherein deactivating includes at least one of closing the connection, sending a TCP packet including a reset indication to the first node, and releasing a resource previously allocated for the connection by the first node.

19. A system for sharing information for detecting an idle TCP connection, the system comprising:

an execution environment including an instruction processing unit configured to process an instruction included in at least one of a net in-port component, an idle time period option handler component, and an option attribute handler component;

the net in-port component configured for receiving, by a second node from a first node, a first transmission control protocol (TCP) packet in a TCP connection;

the idle time period option handler component configured for detecting a first idle time period header, in the first packet, identifying metadata for a first idle time period, detectable by the first node, during which no TCP packet including data in a first TCP data stream sent in the TCP connection by the second node is received by the first node; and

the option attribute handler component configured for modifying, based on the metadata, by the second node a timeout attribute associated with the TCP connection.

20. A system for sharing information for detecting an idle TCP connection, the system comprising:

an execution environment including an instruction processing unit configured to process an instruction included in at least one of an idle time period policy component, a packet generator component, a net out-port component, an idle time period monitor, and a connection state component;

the idle time period policy component configured for receiving, by a first node, first idle information for detecting a first idle time period during which no TCP packet

including data in a first data stream sent in the TCP connection by a second node is received by the first node;

the packet generator component configured for generating a TCP packet including a first idle time period header identifying metadata for the first idle time period based on the first idle information;

the net out-port component configured for sending the TCP packet in the TCP connection to the second node to provide the metadata for the first idle time period to the second node;

the idle time period monitor component configured for detecting the first idle time period based on the first idle information; and

the connection state component configured for deactivating the TCP connection in response to detecting the first idle time period

21. A computer readable medium embodying a computer program, executable by a machine, for sharing information for detecting an idle TCP connection, the computer program comprising executable instructions for:

receiving, by a second node from a first node, a first transmission control protocol (TCP) packet in a TCP connection;

detecting a first idle time period header, in the first packet, identifying metadata for a first idle time period, detectable by the first node, during which no TCP packet including data in a first TCP data stream sent in the TCP connection by the second node is received by the first node; and

modifying, based on the metadata, by the second node a timeout attribute associated with the TCP connection.

22. A computer readable medium embodying a computer program, executable by a machine, for sharing information for detecting an idle TCP connection, the computer program comprising executable instructions for:

receiving, by a first node, first idle information for detecting a first idle time period during which no TCP packet including data in a first data stream sent in the TCP connection by a second node is received by the first node;

generating a TCP packet including a first idle time period header identifying metadata for the first idle time period based on the first idle information;

sending the TCP packet in the TCP connection to the second node to provide the metadata for the first idle time period to the second node;

detecting the first idle time period based on the first idle information; and

deactivating the TCP connection in response to detecting the first idle time period.

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0120
		Application Number	
Title of Invention	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

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

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Prefix	Given Name	Middle Name	Family Name	Suffix	
	Robert	Paul	Morris		
Residence Information (Select One)		☒ US Residency ☐ Non US Residency ☐ Active US Military Service			
City	Raleigh	State/Province	NC	Country of Residence i	US
Citizenship under 37 CFR 1.41(b) i		US			
Mailing Address of Applicant:					
Address 1	712 Latta Street				
Address 2					
City	Raleigh	State/Province	NC		
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Customer Number	92924		
Email Address	paul.morris@nc.rr.com	Add Email	Remove Email

Application Information:

Title of the Invention	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION		
Attorney Docket Number	0120	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	8	Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0120
		Application Number	
Title of Invention	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION		

Publication Information:

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

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Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

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This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).			
			Remove
Application Number	Country ⁱ	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			☒ Yes ☐ No
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Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.	
Assignee 1	Remove

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0120
		Application Number	
Title of Invention	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION		

If the Assignee is an Organization check here. ☐				
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Signature:

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Signature	/Robert Paul Morris/		Date (YYYY-MM-DD)	2010-02-27
First Name	Robert	Last Name	Morris	Registration Number

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

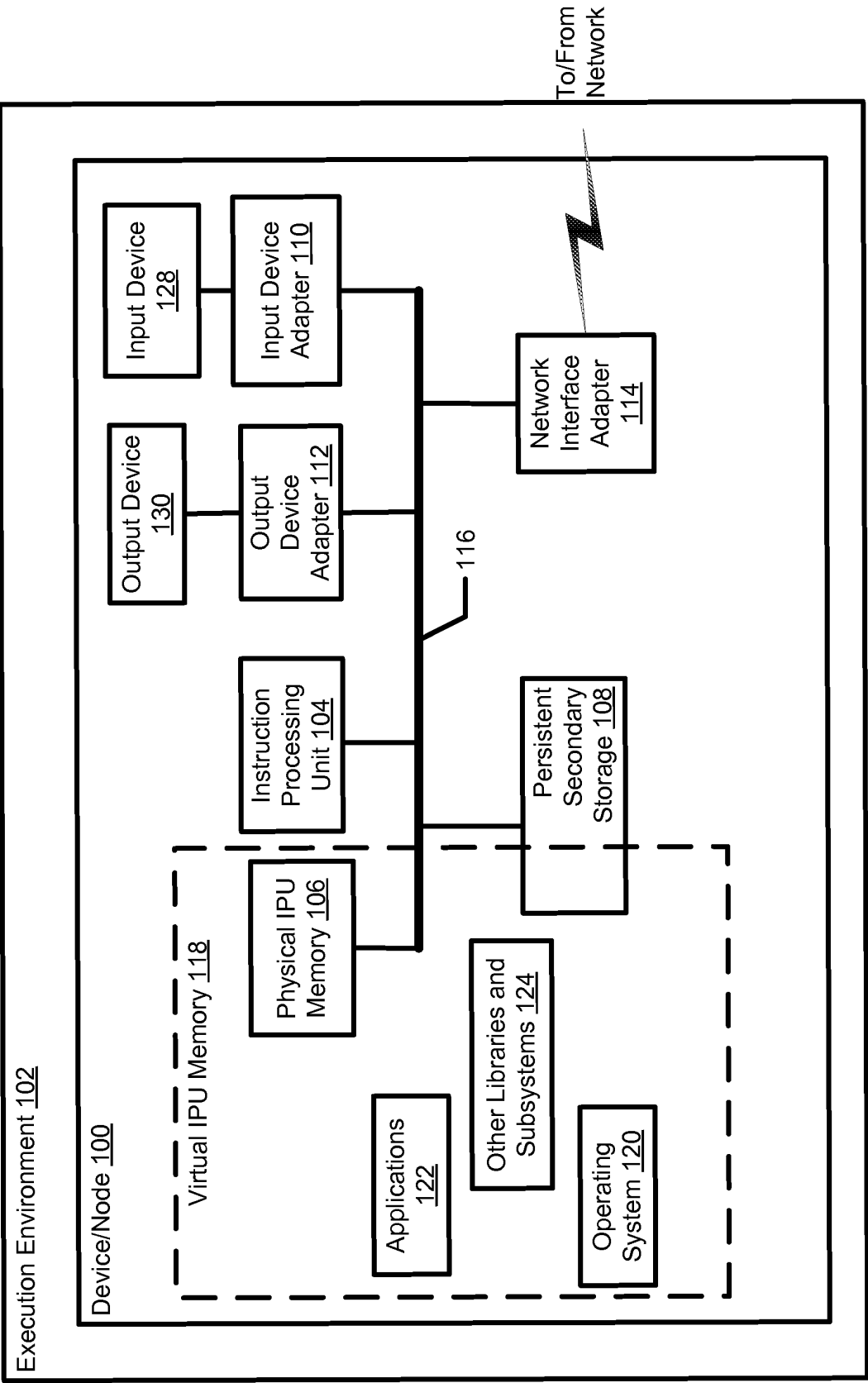


Fig. 1

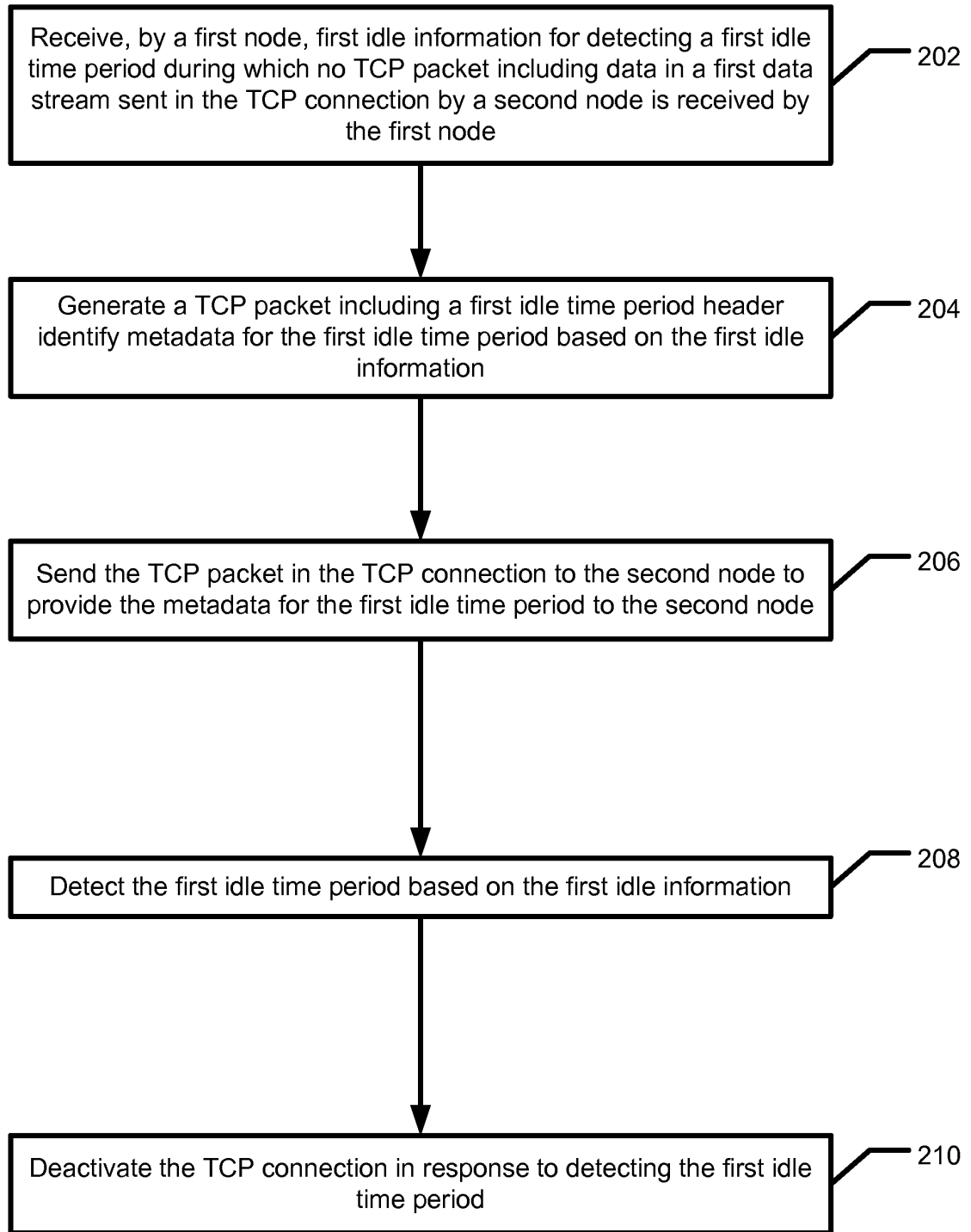


Fig. 2

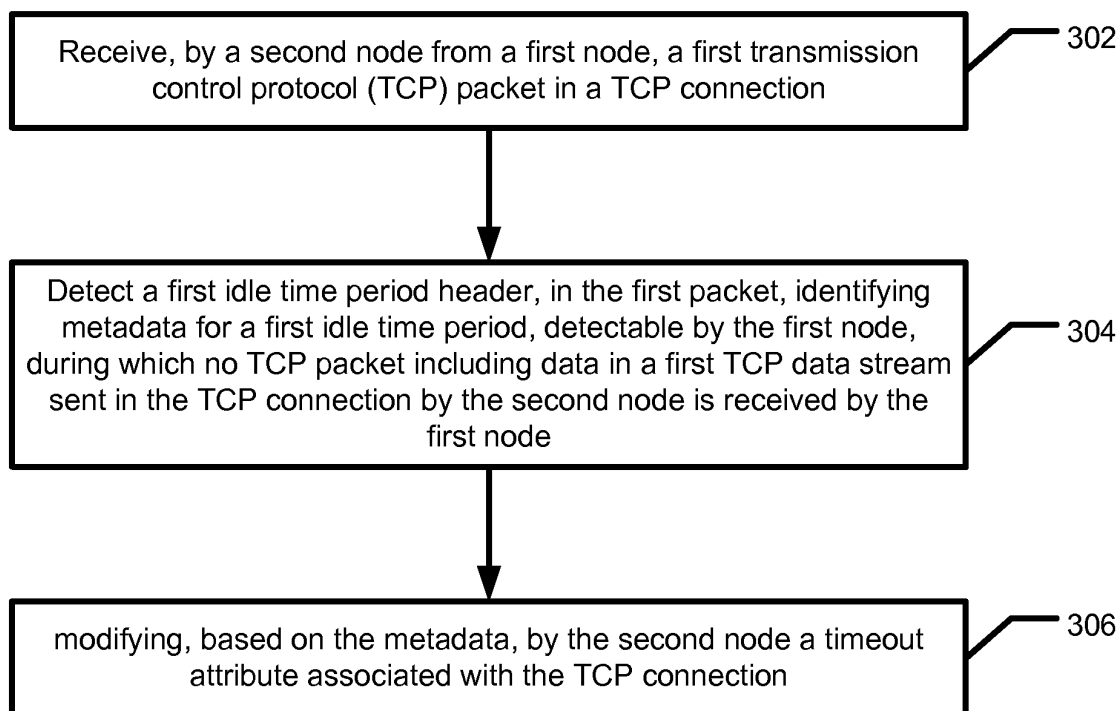


Fig. 3

+

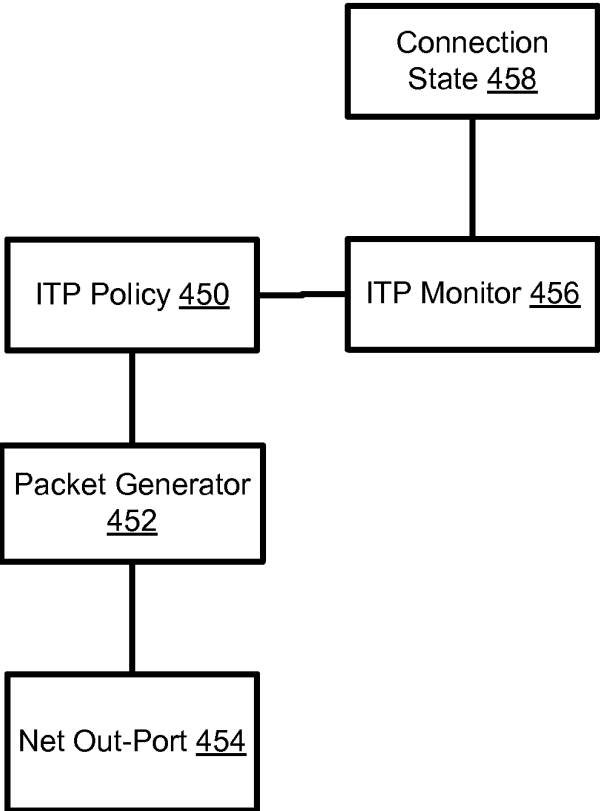


Fig. 4a

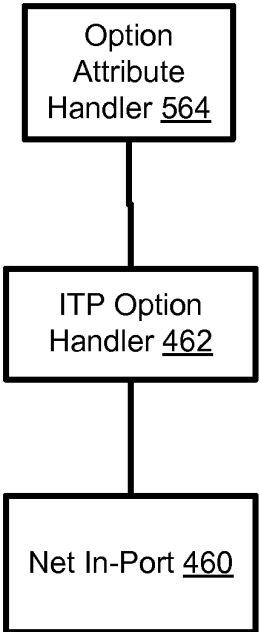


Fig. 4b

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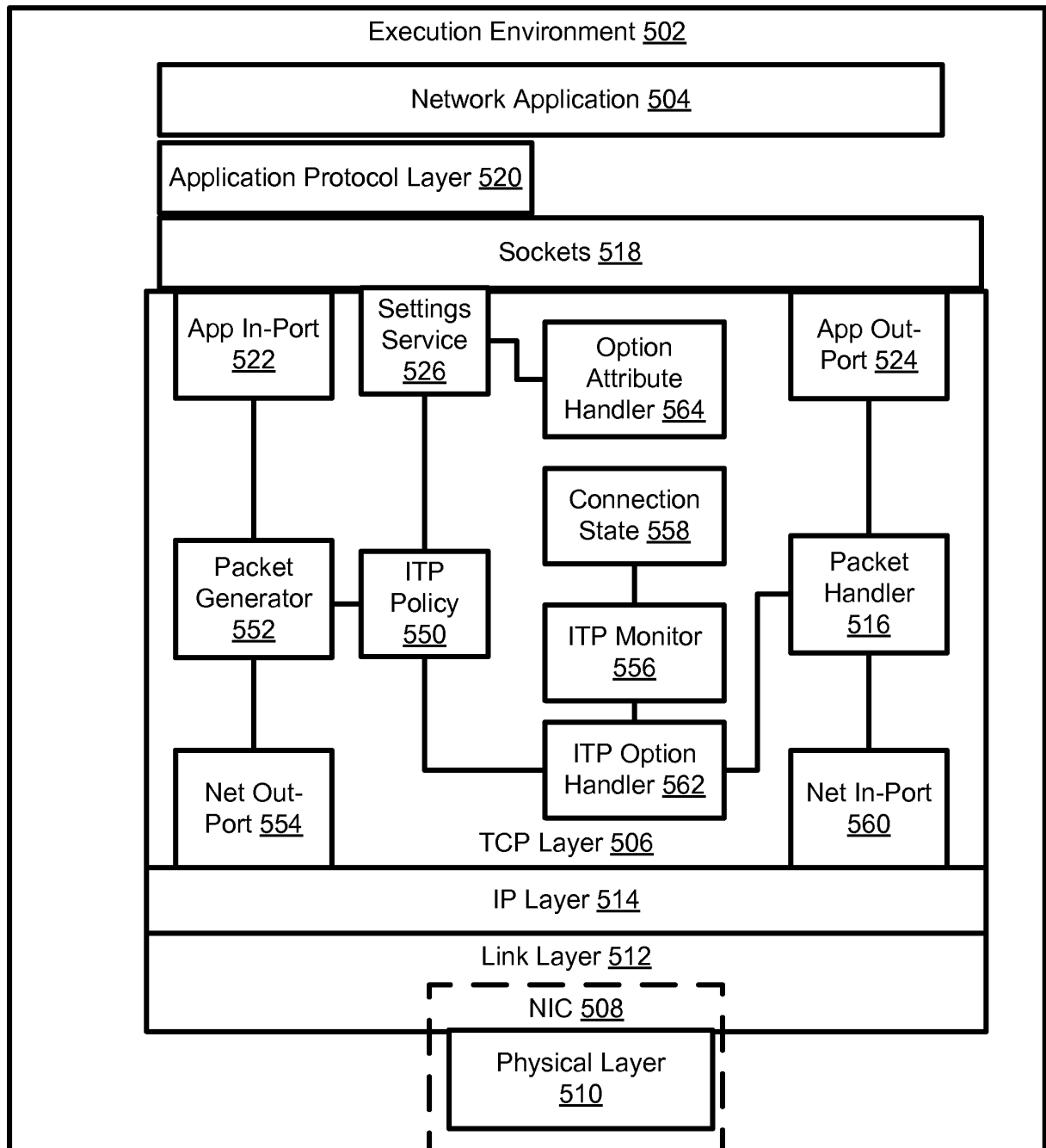


Fig. 5

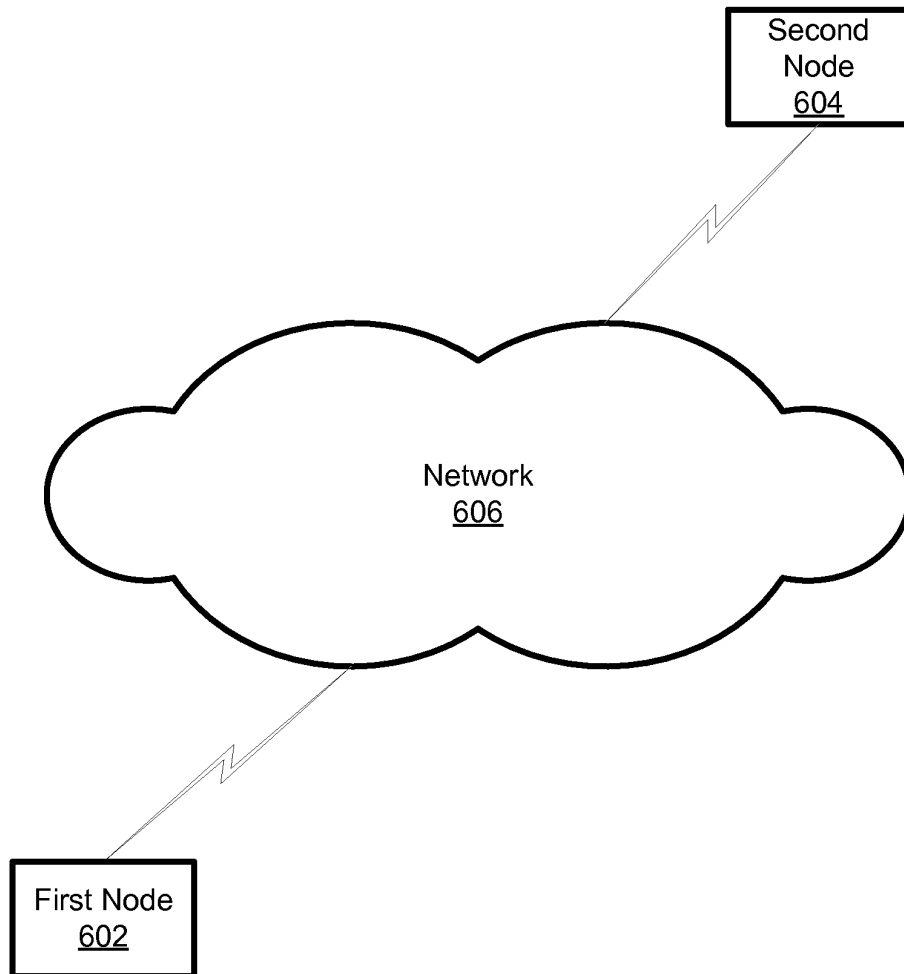


Fig. 6

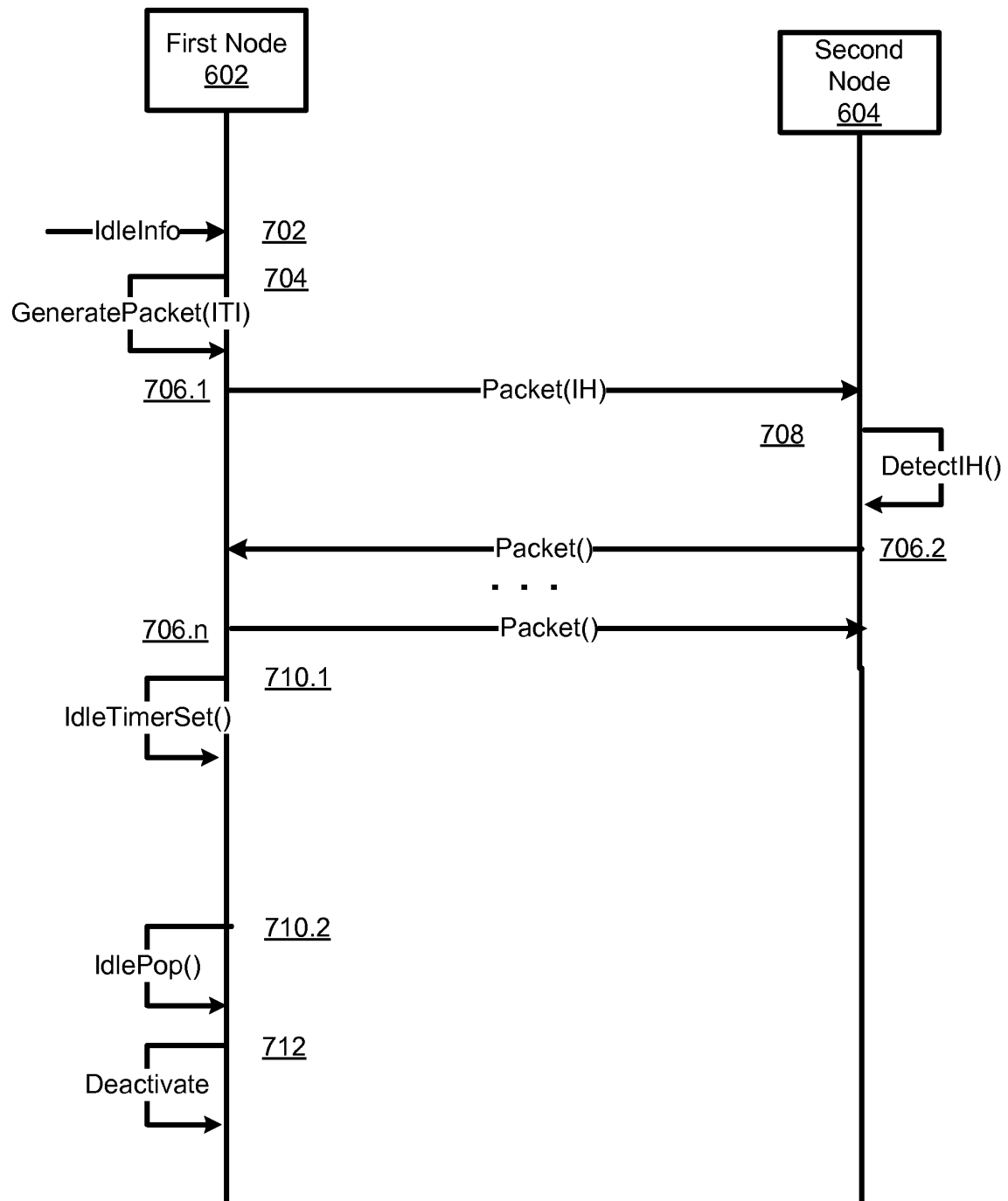
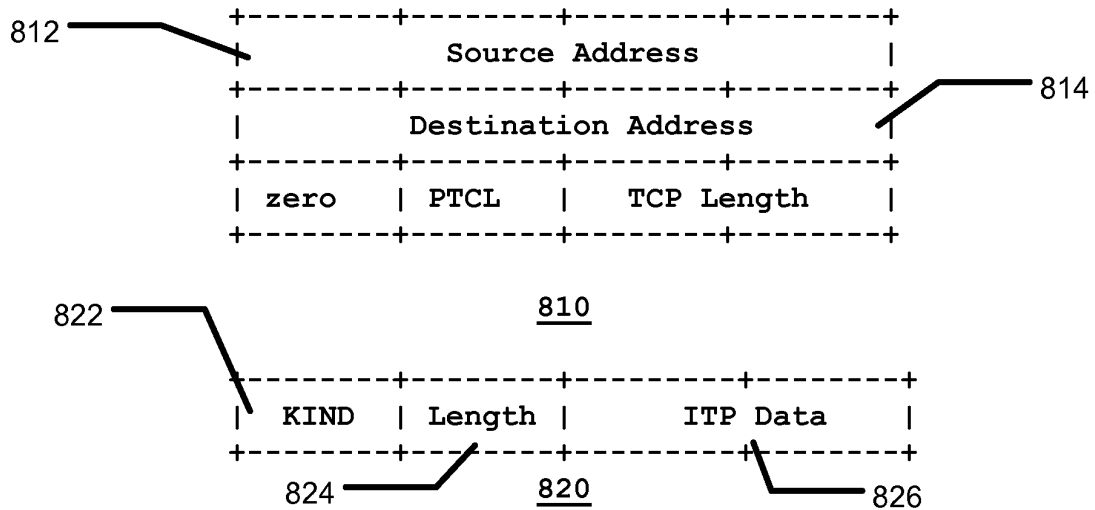
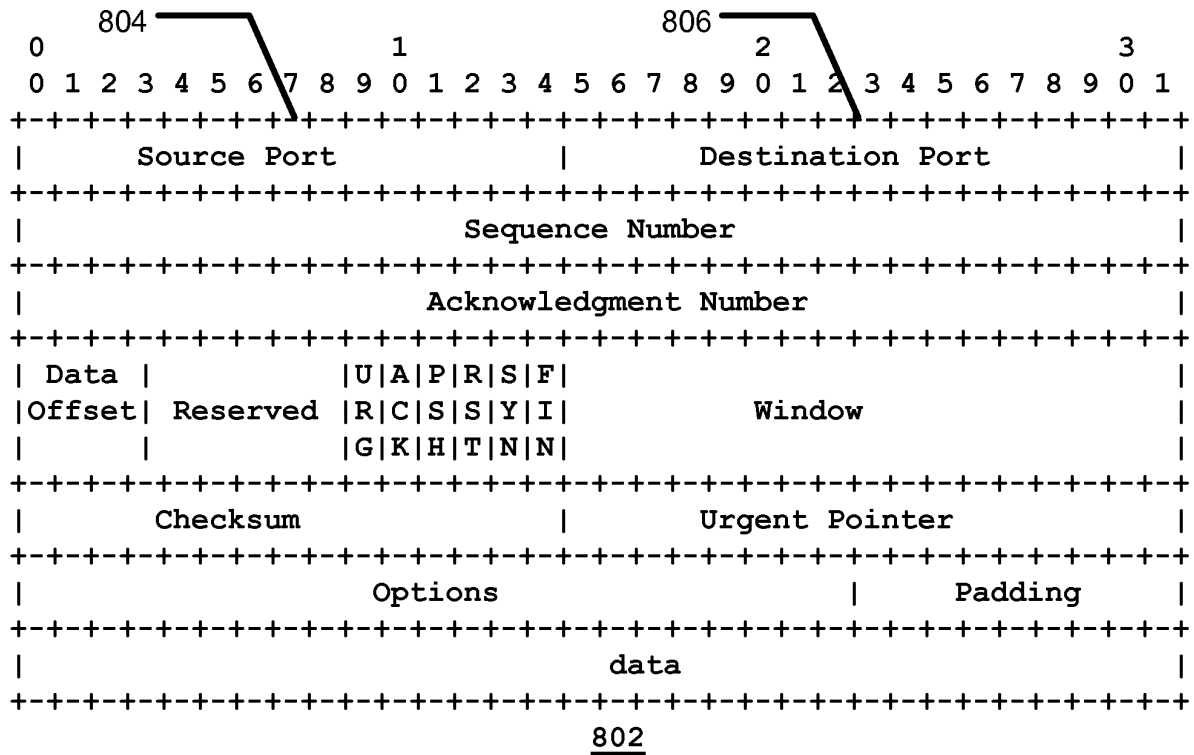


Fig. 7



Figures are adapted from RFC 793

Fig. 8

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

Title of Invention	METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION
---------------------------	---

As the below named inventor(s), I/we declare that:

This declaration is directed to:

- ☒ The attached application, or
- ☐ Application No. _____ filed on _____
- ☐ As amended on _____ (if applicable);

I/we believe that I/we am/are the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought;

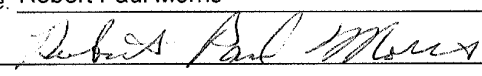
I/we have reviewed and understand the contents of the above-identified application, including the claims, as amended by any amendment specifically referred to above;

I/we acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me/us to be material to patentability as defined in 37 CFR 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.

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FULL NAME OF INVENTOR(S)	
Inventor one: <u>Robert Paul Morris</u>	Date: <u>2010/02/27</u>
Signature: <u></u>	Citizen of: <u>US</u>
Inventor two: _____	Date: _____
Signature: _____	Citizen of: _____
☐ Additional inventors or a legal representative are being named on _____ additional form(s) attached hereto.	

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METHODS, SYSTEMS, AND COMPUTER PROGRAM PRODUCTS FOR SHARING INFORMATION FOR DETECTING AN IDLE TCP CONNECTION

RELATED APPLICATIONS

[0001] This application is related to the following commonly owned U.S. Patent Applications, the entire disclosure of each being incorporated by reference herein: Application No. 12/714,063 (Docket No 0110) filed on 2010/02/26, entitled "Methods, Systems, and Program Products for Detecting an Idle TCP Connection".

BACKGROUND

[0002] Various implementations of the transmission control protocol (TCP) in network nodes support a number of options that are not negotiated or even communicated between or among any of the nodes. Some of these options are included in the specification of the TCP while others are not. For example, the TCP keep-alive option is supported by a number of implementations of the TCP. It is not, however, part of the TCP specification as described in "Request for Comments" (RFC) document RFC 793 edited by John Postel, titled "Transmission Control Protocol, DARPA Internet Program Internet Protocol Specification" (September 1981), which is incorporated here in its entirety by reference. One, both, or neither node including an endpoint in a TCP connection may support a keep-alive option for the connection. Each node supports or does not support keep-alive for a TCP connection based on each node's requirements without consideration for the other node in the TCP connection.

[0003] With respect to the keep-alive option, some argue that it is unnecessary and that it can waste network bandwidth. Some of these critics point out that a keep-alive packet can bring down a TCP connection. Further, since nodes including endpoints in a TCP connection do not cooperate in supporting the keep-alive option, the nodes may operate in opposition to one another and/or may waste resources by duplicating function, according to critics of the keep-alive option.

[0004] Proponents of the keep-alive option claim there is a benefit to detecting a dead peer/partner endpoint sooner. A node providing TCP keep-alive can also indirectly detect when a network is so congested that two nodes with endpoints in a TCP connection are effectively disconnected. Proponents argue that keep-alive can keep an inactive TCP connection open. For example, some network nodes such as firewalls are configured to close TCP connections determined to be idle or inactive in order to recover resources. Keep-alive can prevent this. This is good from the perspective of the node sending keep-alive packets, but the keep-alive packets might cause the firewall to waste resources and possibly block or terminate TCP connections with other nodes.

[0005] TCP keep-alive and the debate of its benefits and faults have been around for decades. To date no mechanism to allow two TCP connection endpoints to cooperate in supporting the keep-alive option has been proposed or implemented. The broader issue of enabling cooperation and negotiation between nodes in a TCP connection in detecting and managing idle, underactive, and/or dead TCP connections remains unaddressed.

[0006] Accordingly, there exists a need for methods, systems, and computer program products for sharing information for detecting an idle TCP connection.

SUMMARY

[0007] The following presents a simplified summary of the disclosure in order to provide a basic understanding to the reader. This summary is not an extensive overview of the disclosure and it does not identify key/critical elements of the invention or delineate the scope of the invention. Its sole purpose is to present some concepts disclosed herein in a simplified form as a prelude to the more detailed description that is presented later.

[0008] Methods and systems are described for sharing information for detecting an idle TCP connection. In one aspect, a method includes receiving, by a second node from a first node, a first transmission control protocol (TCP) packet in a TCP connection. The method further includes detecting a first idle time period header, in the first packet, identifying metadata for a first idle time period, detectable by the first node, during which no TCP packet including data in a first TCP data stream sent in the TCP connection by the second node is received by the first node. The method still further includes modifying, based on the metadata, by the second node a timeout attribute associated with the TCP connection.

[0009] Further, a system for sharing information for detecting an idle TCP connection is described. The system includes an execution environment including an instruction

processing unit configured to process an instruction included in at least one of a net in-port component, an idle time period option handler component, and an option attribute handler component. The system includes the net in-port component configured for receiving, by a second node from a first node, a first transmission control protocol (TCP) packet in a TCP connection. The system further includes the idle time period option handler component configured for detecting a first idle time period header, in the first packet, identifying metadata for a first idle time period, detectable by the first node, during which no TCP packet including data in a first TCP data stream sent in the TCP connection by the second node is received by the first node. The system still further includes the option attribute handler component configured for modifying, based on the metadata, by the second node a timeout attribute associated with the TCP connection

[0010] In another aspect, a method for sharing information for detecting an idle TCP connection is described that includes receiving, by a first node, first idle information for detecting a first idle time period during which no TCP packet including data in a first data stream sent in the TCP connection by a second node is received by the first node. The method further includes generating a TCP packet including a first idle time period header identifying metadata for the first idle time period based on the first idle information. The method still further includes sending the TCP packet in the TCP connection to the second node to provide the metadata for the first idle time period to the second node. The method also includes detecting the first idle time period based on

the first idle information. The method additionally includes deactivating the TCP connection in response to detecting the first idle time period.

[0011] Still further, a system for sharing information for detecting an idle TCP connection is described. The system includes an execution environment including an instruction processing unit configured to process an instruction included in at least one of an idle time period policy component, a packet generator component, a net out-port component, an idle time period monitor component, and a connection state component. The system includes the idle time period policy component configured for receiving, by a first node, first idle information for detecting a first idle time period during which no TCP packet including data in a first data stream sent in the TCP connection by a second node is received by the first node. The system includes the packet generator component configured for generating a TCP packet including a first idle time period header identifying metadata for the first idle time period based on the first idle information. The system still further includes the net out-port component configured for sending the TCP packet in the TCP connection to the second node to provide the metadata for the first idle time period to the second node. The system includes the idle time period monitor component configured for detecting the first idle time period based on the first idle information. The system includes the connection state component configured for deactivating the TCP connection in response to detecting the first idle time period.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Objects and advantages of the present invention will become apparent to those skilled in the art upon reading this description in conjunction with the accompanying drawings, in which like reference numerals have been used to designate like or analogous elements, and in which:

[0013] Fig. 1 is a block diagram illustrating an exemplary hardware device included in and/or otherwise providing an execution environment in which the subject matter may be implemented;

[0014] Fig. 2 is a flow diagram illustrating a method for sharing information for detecting an idle TCP connection according to an aspect of the subject matter described herein;

[0015] Fig. 3 is a flow diagram illustrating another method for sharing information for detecting an idle TCP connection according to another aspect of the subject matter described herein;

[0016] Fig. 4 is a block a diagram illustrating an arrangement of components for sharing information for detecting an idle TCP connection according to a further aspect of the subject matter described herein;

[0017] Fig. 5 is a block diagram illustrating an arrangement of components for sharing information for detecting an idle TCP connection according to still another aspect of the subject matter described herein;

[0018] Fig. 6 is a network diagram illustrating an exemplary system for sharing information for detecting an idle TCP connection according to an aspect of the subject matter described herein;

[0019] Fig. 7 is a message flow diagram illustrating an exemplary data and execution flow for sharing information for detecting an idle TCP connection according to an aspect of the subject matter described herein; and

[0020] Fig. 8 is a diagram illustrating a structure for a packet transmitted via a network according to an aspect of the subject matter described herein.

DETAILED DESCRIPTION

[0021] An exemplary device included in an execution environment that may be configured according to the subject matter is illustrated in Fig. 1. An execution environment includes an arrangement of hardware and, optionally, software that may be further configured to include an arrangement of components for performing a method of the subject matter described herein.

[0022] An execution environment includes and/or is otherwise provided by one or more devices. An execution environment may include a virtual execution environment including software components operating in a host execution environment. Exemplary devices included in or otherwise providing suitable execution environments for configuring according to the subject matter include personal computers, notebook

computers, tablet computers, servers, hand-held and other mobile devices, multiprocessor devices, distributed devices, consumer electronic devices, and/or network-enabled devices. Those skilled in the art will understand that the components illustrated in Fig. 1 are exemplary and may vary by particular execution environment.

[0023] Fig. 1 illustrates hardware device **100** included in execution environment **102** which includes instruction-processing unit (IPU) **104**, such as one or more microprocessors; physical IPU memory **106** including storage locations identified by addresses in a physical memory address space of IPU **104**; persistent secondary storage **108**, such as one or more hard drives and/or flash storage media; input device adapter **110**, such as key or keypad hardware, keyboard adapter, and/or mouse adapter; output device adapter **112**, such as a display or audio adapter for presenting information to a user; a network interface, illustrated by network interface adapter **114**, for communicating via a network such as a LAN and/or WAN; and a communication mechanism that couples elements **104-114**, illustrated as bus **116**. Elements **104-114** may be operatively coupled by various means. Bus **116** may comprise any type of bus architecture, including a memory bus, a peripheral bus, a local bus, and/or a switching fabric.

[0024] IPU **104** is an instruction execution machine, apparatus, or device. Exemplary IPUs include one or more microprocessors, digital signal processors (DSP), graphics processing units (GPU), application-specific integrated circuits (ASIC), and/or field programmable gate arrays (FPGA).

[0025] IPU **104** may access machine code instructions and data via one or more memory address spaces in addition to the physical memory address space. A memory address space includes addresses identifying locations in an IPU memory. IPU **104** may have more than one IPU memory. Thus, IPU **104** may have more than one memory address space. IPU **104** may access a location in an IPU memory by processing an address identifying the location. The processed address may be in an operand of a machine code instruction and/or may be identified in a register or other portion of IPU **104**.

[0026] Fig. 1 illustrates virtual IPU memory **118** spanning at least part of physical IPU memory **106** and at least part of persistent secondary storage **108**. Virtual memory addresses in a memory address space may be mapped to physical memory addresses identifying locations in physical IPU memory **106**. An address space for identifying locations in a virtual IPU memory is referred to as a virtual memory address space; its addresses are referred to as virtual memory addresses; and its IPU memory is known as a virtual IPU memory or virtual memory. The term IPU memory may refer to physical IPU memory **106** and/or virtual IPU memory **118** depending on the context in which the term is used.

[0027] Various types of memory technologies may be included in physical IPU memory **106**. Exemplary memory technologies include static random access memory (SRAM) and/or dynamic RAM (DRAM) including variants such as dual data rate synchronous DRAM (DDR SDRAM), error correcting code synchronous DRAM (ECC SDRAM),

and/or RAMBUS DRAM (RDRAM). Physical IPU memory **106** may include volatile memory as illustrated in the previous sentence and/or may include nonvolatile memory such as nonvolatile flash RAM (NVRAM) and/or read-only memory (ROM).

[0028] Persistent secondary storage **108** may include one or more flash memory storage devices, one or more hard disk drives, one or more magnetic disk drives, and/or one or more optical disk drives. Persistent secondary storage may include removable media. The drives and their associated computer-readable storage media provide volatile and/or nonvolatile storage for computer readable instructions, data structures, program components, and other data for execution environment **102**.

[0029] Execution environment **102** may include software components stored in persistent secondary storage **108**, in remote storage accessible via a network, and/or in an IPU memory. Fig. 1 illustrates execution environment **102** including operating system **120**, one or more applications **122**, other program code and/or data components illustrated by other libraries and subsystems **124**.

[0030] Execution environment **102** may receive user-provided information via one or more input devices illustrated by input device **128**. Input device **128** provides input information to other components in execution environment **102** via input device adapter **110**. Execution environment **102** may include an input device adapter for a keyboard, a touch screen, a microphone, a joystick, a television receiver, a video camera, a still camera, a document scanner, a fax, a phone, a modem, a network adapter, and/or a pointing device, to name a few exemplary input devices.

[0031] Input device **128** included in execution environment **102** may be included in device **100** as Fig. 1 illustrates or may be external (not shown) to device **100**. Execution environment **102** may include one or more internal and/or external input devices. External input devices may be connected to device **100** via corresponding communication interfaces such as a serial port, a parallel port, and/or a universal serial bus (USB) port. Input device adapter **110** receives input and provides a representation to bus **116** to be received by IPU **104**, physical IPU memory **106**, and/or other components included in execution environment **102**.

[0032] Output device **130** in Fig. 1 exemplifies one or more output devices that may be included in and/or may be external to and operatively coupled to device **100**. For example, output device **130** is illustrated connected to bus **116** via output device adapter **112**. Output device **130** may be a display device. Exemplary display devices include liquid crystal displays (LCDs), light emitting diode (LED) displays, and projectors. Output device **130** presents output of execution environment **102** to one or more users. In some embodiments, an output device is a device such as a phone, a joystick, and/or a touch screen. In addition to various types of display devices, exemplary output devices include printers, speakers, tactile output devices such as motion producing devices, and other output devices producing sensory information detectable by a user.

[0033] A device included in or otherwise providing an execution environment may operate in a networked environment communicating with one or more devices (not

shown) via one or more network interfaces. The terms “communication interface” and “network interface” are used interchangeably. Fig. 1 illustrates network interface adapter **114** as a network interface included in execution environment **102** to operatively couple device **100** to a network. The terms “network node” and “node” in this document both refer to a device having a network interface operatively coupled to a network.

[0034] Exemplary network interfaces include wireless network adapters and wired network adapters. Exemplary wireless networks include a BLUETOOTH network, a wireless 802.11 network, and/or a wireless telephony network (e.g., a cellular, PCS, CDMA, and/or GSM network). Exemplary wired networks include various types of LANs, wide area networks (WANs), and personal area networks (PANs). Exemplary network adapters for wired networks include Ethernet adapters, Token-ring adapters, FDDI adapters, asynchronous transfer mode (ATM) adapters, and modems of various types. Exemplary networks also include intranets and internets such as the Internet.

[0035] Fig. 2 is a flow diagram illustrating a first method for sharing information for detecting an idle TCP connection according to an exemplary aspect of the subject matter described herein. Fig. 3 is a flow diagram illustrating a second method for sharing information for detecting an idle TCP connection according to an exemplary aspect of the subject matter described herein. Fig. 4a is a block diagram illustrating a system for sharing information for detecting an idle TCP connection according to the first method in Fig. 2. Fig. 4b is a block diagram illustrating a system for sharing information for detecting an idle TCP connection according to the second method in Fig.

3. It is expected that many, if not most, systems configured to perform one of the methods illustrated in Fig. 2 and Fig. 3 will also be configured to perform the other method.

[0036] A system for sharing information for detecting an idle TCP connection according to the method illustrated in Fig. 2 includes an execution environment, such as execution environment **102** in Fig. 1, including an instruction processing unit, such as IPU **104**, configured to process an instruction included in at least one of an idle time period policy component **450**, a packet generator component **452**, and a net out-port component **454**, a idle time period monitor component **456**, and a connection state component **458** illustrated in Fig. 4a.

[0037] A system for sharing information for detecting an idle TCP connection performing the method illustrated in Fig. 3 includes an execution environment, such as execution environment **102** in Fig. 1, including an instruction processing unit, such as IPU **104**, configured to process an instruction included in at least one of a net in-port component **460**, an idle time period option handler component **462**, an option attribute handler component **464** illustrated in Fig. 4b.

[0038] Components illustrated in Fig. 4a may be adapted for performing the method illustrated in Fig. 2 in a number of execution environments. Components illustrated in Fig. 4b may be adapted for performing the method illustrated in Fig. 3 in a number of execution environments. Fig. 5 is a block diagram illustrating adaptations and/or analogs of the components of Fig. 4a and Fig. 4b in exemplary execution environment

502 including or otherwise provided by one or more nodes. The method depicted in Fig. 2 and the method depicted in Fig. 3 may be carried out by some or all of the exemplary components and/or their analogs.

[0039] The components illustrated in Fig. 4 and Fig. 5 may be included in or otherwise may be combined with some or all of the components of Fig. 1 to create a variety of arrangements of components according to the subject matter described herein.

[0040] Fig. 6 illustrates first node **602** and second node **604** as exemplary devices included in and/or otherwise adapted for providing a suitable execution environment, such as execution environment **502** illustrated in Fig. 5, for an adaptation of the arrangement of components in Fig. 4a and an adaptation of the arrangement of components in Fig. 4b. As illustrated in Fig. 6, first node **602** and second node **604** are operatively coupled to network **606** via respective network interfaces enabling first node **602** and second node **604** to communicate. Fig. 7 is a message flow diagram illustrating an exemplary exchange of messages within and between first node **602** and second node **604** according to the subject matter described herein.

[0041] As stated, the various adaptations of the arrangements of components in Fig. 4a and in Fig. 4b described herein are not exhaustive.

[0042] In Fig. 5, execution environment **502** illustrates a network application **504** operating in a node configured to communicate with one or more other nodes via the TCP supported by TCP layer component **506**. For example, first node **602** may be

included in and/or provide execution environment **502**. Network application **504** may be a first application configured to communicate with an application operating in second node **604** via network **606**. Second node **604** may be included in and/or provide another instance of execution environment **502**. The operation of both first node **602** and second node **604** are described with respect to execution environment **502**. For ease of illustration, both first node **602** and second node **604** are configured with adaptations of the arrangement in Fig 4a and the arrangement in Fig. 4b. As such, the description of components and corresponding operations with respect to execution environment **502** in Fig. 5 is applicable to both first node **602** and second node **604** in Fig. 6.

[0043] In Fig. 5, network interface card (NIC) **508** is an exemplification of a network interface illustrated in Fig. 1 by network interface adapter **114**. NIC **508** includes a physical layer component **510** operatively coupling execution environment **502** to one or more physical media for carrying communication signals. The media may be wired, such as an Ethernet LAN operating over CAT 6 cabling, or may be wireless such as an 802.11n LAN. Other exemplary physical layer protocols and corresponding media are identified above.

[0044] NIC **508** may also include a portion of link layer component **512**. Link layer component **512** may provide for communication between two nodes in a point-to-point communication and/or two nodes in a local area network (LAN). Exemplary link layers and, their protocols have been described above including FDDI, ATM, and Ethernet. A

portion of link layer component **512** is external to NIC **508**. The external portion may be realized as a device driver for NIC **508**.

[0045] Link layer component **512** may receive data formatted as one or more internet protocol (IP) packets from internet protocol (IP) layer component **514**. Link layer component **512** packages data from IP layer component **514** according to the particular link layer protocol supported. Analogously, link layer component **512** interprets data, received as signals transmitted by the physical media operatively coupled to physical layer component **510**, according to a particular link layer protocol supported. Link layer component **512** may strip off link layer specific data and transfer the payload of link layer transmissions to IP layer component **514**.

[0046] IP layer component **514** illustrated in Fig. 5 is configured to communicate with one or more remote nodes over a LAN and/or a network of networks such as an intranet or the Internet. IP layer component **514** may receive data formatted as TCP packets from TCP layer component **506**. IP layer component **514** packages data from TCP layer component **506** into IP packets for transmission across a network. The network may be and/or may include an internet. Analogously, IP layer component **514** interprets data, received from link layer component **512** as IP protocol data and detects IP packets in the received data. IP layer component **514** may strip off IP layer specific data and transfer the payload of one or more IP packets to TCP layer component **506**.

[0047] In Fig. 5, IP layer component **514** is operatively coupled to TCP layer component **506**. TCP layer component **506** is configured to provide a TCP connection

over network **606** for sending and/or receiving packets included in the TCP connection between two nodes exemplified by first node **602** and second node **604**.

[0048] In a TCP connection including first node **602** and second node **604**, first node **602** may include a first TCP connection endpoint and second node **604** may include a second TCP connection endpoint. The first and second TCP connection endpoints identify the TCP connection. The TCP connection may have other identifiers, in addition to the included endpoints.

[0049] Components of execution environment **502**, in an aspect, may interoperate with TCP layer component **506** directly. In another aspect, one or more components, such as network application **504**, may interoperate with TCP layer component **506** indirectly. Network application **504** may exchange data with TCP layer component **506** via sockets component **518** and/or an analog of sockets component **518**. Alternatively or additionally, network application **504** may communicate with a remote node via an application protocol layer illustrated by application protocol layer component **520**. Many application protocols currently exist and new application protocols will be developed. Exemplary application layer protocols include hypertext transfer protocol (HTTP), file transfer protocol (FTP), and extensible messaging and presence protocol (XMPP).

[0050] TCP layer component **506** in Fig. 5 may receive data from any of various sources for transmitting in corresponding TCP connections to various corresponding identified TCP connection endpoints in one or more network nodes. Fig. 5 illustrates application in-port (app in-port) component **522** providing an interface component for

receiving data to transmit in a TCP connection. Fig. 5 illustrates TCP layer component **506** includes packet generator component **552** configured to package data received by application in-port component **522** for transmitting in one or more TCP packets. The one or more TCP packets are provided to IP layer component **514** via net out-port component **554** exemplifying an output interface component.

[0051] Analogously, TCP layer component **506** interprets data received from IP layer component **514** via net in-port component **560**. The data is interpreted as TCP data and TCP packets are detected in the received data by net in-port component **560** and/or packet handler component **516**. Fig. 5 illustrates TCP layer component **506** includes packet handler component **516** to strip off and/or otherwise process TCP layer specific data. Packet handler component **516** interoperates with application out-port (app out-port) component **524** to transfer data in the TCP packet included in a TCP data stream to sockets component **518**, application protocol layer **520**, network application **504**, and/or other components associated with the local endpoint of the TCP connection. Detailed information on the operation of TCP is included in RFC 793.

[0052] With reference to the method illustrated in Fig. 2, block **202** illustrates the method includes receiving, by a first node, first idle information for detecting a first idle time period during which no TCP packet including data in a first data stream sent in the TCP connection by a second node is received by the first node. Accordingly, a system for sharing information for detecting an idle TCP connection includes means for receiving, by a first node, first idle information for detecting a first idle time period during

which no TCP packet including data in a first data stream sent in the TCP connection by a second node is received by the first node. For example, as illustrated in Fig. 4a, idle time period policy component **450** is configured for receiving, by a first node, first idle information for detecting a first idle time period during which no TCP packet including data in a first data stream sent in the TCP connection by a second node is received by the first node.

[0053] Fig. 5 illustrates idle time period (ITP) policy component **550** as an adaptation of and/or analog of ITP policy component **450** in Fig. 4a. One or more idle time period policy components **550** operate in execution environment **502**.

[0054] Message **702** in Fig. 7 illustrates a communication including and/or otherwise identifying idle information received by ITP policy component **550**. Message **702** may take various forms in various aspects. Exemplary forms for message **702** include a function/method invocation, a message passed via a message queue, data transmitted via a pipe, a message received via a network, and/or a communication via a shared location in IPU memory and/or secondary storage.

[0055] Idle information may be received from a configuration storage location for TCP layer component **506** in an IPU memory and/or in secondary storage **108**. The configured idle information may be maintained and/or otherwise managed by settings service component **526** configured to maintain and/or manage various options or settings for TCP layer component **506** and/or one or more TCP connections.

[0056] In an aspect, network application **504** provides idle information to ITP policy component **550** via settings service component **526** interoperating with sockets component **518**. Sockets component **518** and/or TCP layer component **506** may support TCP options applicable globally for some or all TCP connections and/or may support TCP options on a per connection basis. Per connection TCP options may override global TCP options if global options are also supported. In another aspect, idle information may be received from and/or otherwise received based on information via application protocol layer **520**, via sockets component **518**, and/or directly from network application **504**.

[0057] Application protocol layer **520** may provide idle information to ITP policy component **550** via settings service component **526** and, optionally, via sockets component **518**. Idle information provided by application protocol layer **520** may be based on data received from network application **504**, based on a particular configuration of application protocol layer **520**, and/or received from a user and/or administrator of one or both of network application **504** and application protocol layer **520**.

[0058] In an aspect, the idle information received may be based on a previous ITP header identified in a packet in the TCP connection received by first node **602** from second node **604**. The previous packet may be received by net in-port component **560**. The previous ITP header may be detected by ITP option handler component **562** interoperating with packet handler component **516**. Idle information may be identified

and/or otherwise determined by ITP option handler component **562**. ITP policy component **550** may interoperate with ITP option handler component **562** to receive the idle information.

[0059] Idle information received, determined, and/or otherwise identified may include and/or identify a duration of time for detecting an idle time period. The duration may be specified according to various measures of time including seconds, minutes, hours, and/or days.

[0060] Alternatively or additionally, idle information may include and/or identify a generator for determining a duration of time for detecting an idle time period. An exemplary generator may include a formula, an expression, a function, a policy, and/or other mechanism for generating and/or otherwise identifying a duration of time.

[0061] In an aspect, one or more algorithms for generating a duration of time for detecting an idle time period may be associated with identifiers. The algorithm identifiers may be standardized within a group of nodes including first node **602** and second node **604**. The received idle information may include and/or reference an algorithm identifier. First node **602** and second node **604** may each maintain an association between one or more of the algorithm identifiers and a duration generator such as a function and/or a class configured to perform the identified algorithm.

[0062] A duration generator may determine the duration of time for detecting an idle time period based on one or more attributes accessible to one or both of first node **602**

and second node **604**. Exemplary attributes include a measure of network latency, a measure of network congestion, an indication of the availability of a particular resource, a user specified attribute, a security attribute, an energy usage attribute, a user attribute such as role of the user, and/or a measure of bandwidth supported by NIC **508** and/or a physical network medium operatively coupled to NIC **508**.

[0063] Alternatively or additionally, idle information may include a parameter such as one or more of the attributes identified in the previous paragraph for use in a duration generator for determining a duration of time for measuring and/or otherwise detecting an idle time period.

[0064] A TCP connection may be identified by its endpoints. First node **602** and/or second node **604** may include an endpoint of the TCP connection. Alternatively or additionally, first node **602** and/or second node **604** may include a proxy endpoint representing an endpoint in a TCP connection. Nodes, that provide a network address translation (NAT) service, are exemplary nodes including proxy endpoints.

[0065] A node including a TCP connection endpoint is referred to as a host. Hosts are typically user devices and/or servers that typically operate at the edge of a network. While endpoints of most TCP connections are not typically included in network nodes for relaying, routing, and/or otherwise forwarding TCP packet data within a network such as routing nodes and switching nodes. Such network nodes may include one or more connection endpoints for one or more respective TCP connections. It should be understood that the term “host” refers to a role played by a device in a network. First

node **602** and/or second node **604** may play the role of a host in a TCP connection and/or may be proxy nodes.

[0066] A node is referred to as being in or included in a TCP connection when the node includes an endpoint of the connection and/or includes a proxy for a connection endpoint, referred to as a proxy endpoint. A proxy endpoint and an endpoint in a TCP connection may be in the same node or in different nodes.

[0067] In Fig. 5, connection state component **558** may maintain state information for one or more TCP connection endpoints and/or proxy endpoints of corresponding TCP connections included in an instance of an execution environment, such as execution environment **502**, included in and/or provided by first node **602** or second node **604**.

[0068] First node **602** and/or second node **604** may play a role of a proxy node for a node including a TCP connection endpoint. First node **602** and/or second node **604** may include a proxy endpoint representing an endpoint in a TCP connection. A proxy node forwards TCP packet data, sent by a host including a TCP connection endpoint, to another host including a corresponding connection endpoint represented by a proxy endpoint included in the proxy node and vice versa. Exemplary proxy nodes in addition to including routing and/or switching capabilities may include a bridge, a hub, a repeater, a gateway, and a firewall.

[0069] In an aspect, a TCP keep-alive option, a TCP user timeout, a retransmission timeout, an acknowledgment timeout, and/or another timeout associated with a TCP connection may be modified based on the first idle information.

[0070] For example, in Fig. 5, ITP policy component **550** operating in first node **602** may modify an attribute of a TCP keep-alive option provided by one or more keep-alive components that may include settings service component **526**. Modifying a keep-alive attribute may include creating the attribute, deleting the attribute, and/or modifying the attribute. ITP policy component **550** may interoperate with settings service component **526**, connection state component **558**, and/or a keep-alive option handler component (not shown) to detect the existence and state of one or more keep-alive attributes in determining whether a keep-alive option is active and/or in identifying its current state.

[0071] In response to identifying the idle information, ITP policy component **550** may activate, disable, and/or modify the state of the keep-alive option via interoperation with one or more of settings service component **526**, connection state component **558**, and/or a keep-alive option handler. Thus, in response to identifying the idle information, ITP policy component **550** may prevent and/or alter the time a keep-alive packet is sent to second node **604** from first node **602**.

[0072] Alternatively or additionally, ITP policy component **550** operating in first node **602** may modify an attribute associated with an acknowledgment timeout configured for TCP layer component **506**. Modifying an acknowledgment timeout attribute may include creating the attribute, deleting the attribute, and/or modifying the attribute. ITP policy

component **550** may interoperate with settings service component **526**, connection state component **558**, and/or an acknowledgment option handler component (not shown) to detect the existence and state of one or more packet acknowledgment attributes. In response to identifying the idle information, ITP policy component **550** may modify the state of the packet acknowledgment option. Thus, in response to identifying the idle information, ITP policy component **550** may prevent and/or alter the time an acknowledgment is sent in a packet in a TCP connection.

[0073] Returning to Fig. 2, block **204** illustrates the method further includes generating a TCP packet including a first idle time period header identifying metadata for the first idle time period based on the first idle information. Accordingly, a system for sharing information for detecting an idle TCP connection includes means for generating a TCP packet including a first idle time period header identifying metadata for the first idle time period based on the first idle information. For example, as illustrated in Fig. 4a, packet generator component **452** is configured for generating a TCP packet including a first idle time period header identifying metadata for the first idle time period based on the first idle information.

[0074] Fig. 5 illustrates packet generator component **552** as an adaptation of and/or analog of packet generator component **452** in Fig. 4a. One or more packet generator components **552** operate in execution environment **502**.

[0075] Packet generator component **552** in Fig. 5 may receive idle information and/or information based on the received idle information from ITP policy component **550**.

Whether and when packet generator component **552** receives information for including an idle time period (ITP) header in a TCP packet may depend on a current state of the associated TCP connection. In Fig. 5, ITP policy component **550** may interoperate with connection state component **558** to determine whether and when to provide information to packet generator component **552** for including an ITP header in a TCP packet.

[0076] In an aspect, an ITP header may be included in a packet exchanged during setup of TCP connection. RFC 793 describes a “three-way handshake” for establishing a TCP connection. Other message exchanges may be used in setting up a TCP connection as those skilled in the art will understand. Such other exchanges are not currently supported by the TCP as described in RFC 793. The specified “three-way handshake” and other patterns of message exchange for setting up a TCP connection include packets that are considered to be in the TCP connection for purposes of this disclosure. Including an ITP header may be restricted to packets exchanged in connection setup, excluded from packets exchanged during connection establishment, or allowed in one or more packets exchanged during connection establishments and in packets exchanged after connection setup.

[0077] In an aspect, when connection state component **558** and/or ITP policy component **550** determine an ITP header should be included in a TCP packet based on received idle information, packet generator component **552** may include the ITP header in a next TCP packet generated in response to data received via application in-port component **522** for sending to first node **602**. In another aspect, packet generator

component **552** may send the ITP header in a TCP packet in the TCP connection with no data included in the TCP data stream sent by first node **602** to second node **604**. Such a packet is referred to as an empty Packet generator component **554** may send the empty TCP packet when TCP layer component **506** has no for data from an application in second node **604** to send in the TCP data stream to first node **602**.

[0078] Packet generator component **552** may generate a packet according to the TCP specifications and may include a header identified as an ITP header in accordance with specifications for including TCP option headers in a TCP packet. See RFC 793 for more details. Fig. 8 illustrates a format or structure for a TCP packet **802** as described in RFC 793. Each “+” character in Fig. 8, indicates a bit-boundary. TCP packet **802** specifies a location and format for including a source port **804** portion including an identifier for an endpoint of the TCP connection for a sending node and a destination port **806** including an identifier for a corresponding endpoint of the TCP connection in a receiving node. IP packet **810** illustrates a format for an IP packet header for an IP packet including TCP packet data. Source address **812** specifies a location and format in an IP header for including a network address identifying a network interface of the sending node, and destination address **814** identifying a network interface for the receiving node. A network address and a port number identify a connection endpoint in a network. Two endpoints identify a TCP connection.

[0079] Fig. 8 also illustrates a format for an exemplary ITP header **820**. A KIND location is specified for including an identifier indicating that the option is an idle time

period (ITP) option in an ITP header. Identifiers for option headers are currently under the control of the Internet Assigned Numbers Authority (IANA). Length field **824** identifies a length of an ITP header. An ITP data field **826** is specified for including ITP header information for detecting an idle time period as described herein

[0080] Those skilled in the art will recognize given this disclosure that an ITP header may have other suitable formats and may be included in a TCP packet in structures and locations other than those specified for TCP options in RFC 793. An equivalent or analog of an ITP header may be included in a footer of a protocol packet in an extension and/or variant of the current TCP.

[0081] ITP data field **826** in Fig. 8 may include and/or otherwise identify metadata for the first idle time period. For example, an ITP data field in a packet may include and/or otherwise identify one or more of a duration of time for detecting an idle time period, a duration generator for determining a duration of time for detecting an idle time period, and a parameter for use in a duration generator for determining a duration of time for measuring and detecting an idle time period.

[0082] Message **704** in Fig. 7 illustrates an invocation and/or other access to packet generator component **552** for generating a TCP packet including an ITP header based on received idle information.

[0083] Returning to Fig. 2, block **206** illustrates the method further includes sending the TCP packet in the TCP connection to the second node to provide the metadata for

the first idle time period to the second node. Accordingly, a system for sharing information for detecting an idle TCP connection further includes means for sending the TCP packet in the TCP connection to the second node to provide the metadata for the first idle time period to the second node. For example, as illustrated in Fig. 4a, the net out-port component **454** is configured for sending the TCP packet in the TCP connection to the second node to provide the metadata for the first idle time period to the second node.

[0084] Fig. 5 illustrates net out-port component **554** as an adaptation of and/or analog of net out-port component **454** in Fig. 4a. One or more net out-port components **554** operate in execution environment **502**. Net out-port component **554** is illustrated operatively coupled to packet generator component **552**. Net out-port component **554** may receive TCP packet data from packet generator component **552** and interoperate with IP layer component **514** to send the TCP packet in one or more IP packets via network **606** to second node **604**. Message **706.1** in Fig. 7 illustrates a TCP packet including an ITP header sent by first node **602** and received by second node **604**.

[0085] In one aspect, an ITP header may be sent to make sending one or more TCP keep-alive packets by a partner node in the connection unnecessary. A receiver of a packet including an ITP header, such as second node **604**, may keep a TCP connection alive based on information in the ITP header.

[0086] In another aspect, first node **602** may set a keep-alive timeout attribute based on a duration of the first idle time period identified in the first idle information and/or in

the metadata provided to second node **604**. For example, first node **602** may monitor a time period during which no non-empty packets are sent or received in the TCP connection. A keep-alive option handler and/or keep-alive component (not shown) operating in first node **602** may set a keep-alive timer according to the timeout attribute, with a duration that will result in the keep-alive timer expiring before an idle time period can occur. In response to detecting a keep-alive timeout, which may be indicated by the expiration of the keep-alive timer, the keep-alive option handler and/or keep-alive policy component may provide information to packet generator component **552** to generate a TCP keep-alive packet. The packet generator component **552** may provide the generated packet to net out-port component **554** for sending the TCP keep-alive packet to second node **604** to determine whether the TCP connection is active and/or to keep the TCP connection active.

[0087] In another aspect, ITP policy component **550** operating in first node **602** may set a timer, analogous to the keep-alive timer described in the previous paragraph that expires before an time period can occur. In response the timer expiring, ITP policy component **550** may provide idle information to packet generator component **552** to generate a TCP packet including a second ITP header. Content of the second ITP header may be based on the first idle information received, data received from second node **604**, information received from a network application that may be from a user, and/or on any information accessible to TCP layer component **506** in execution environment **502** in first node **602**. The TCP packet generated by packet generator

component **552** is provided to IP layer component **514** via net out-port component **554** to send to second node **604** in the TCP connection. Along with sending the message, first node **602** may reset and/or otherwise restart detection of the first idle time period. Thus, a second ITP header may be sent in a second TCP packet by first node **602** to second node **602** along with restarting detection of the first idle time period. Alternatively, first node **602** may reset and initiate detection of an idle time period with a different duration than the previous idle time period, based on the idle information for generating the second ITP header.

[0088] Returning to Fig. 2, block **208** illustrates the method further includes detecting the first idle time period based on the first idle information. Accordingly, a system for sharing information for detecting an idle TCP connection further includes means for detecting the first idle time period based on the first idle information. For example, as illustrated in Fig. 4a, the idle time period monitor component **456** is configured for idle time period monitor.

[0089] Fig. 5 illustrates idle time period monitor component **556** as an adaptation of and/or analog of idle time period monitor component **456** in Fig. 4a. One or more idle time period monitor components **556** operate in execution environment **502**.

[0090] In an aspect, in response to receiving the first idle information, ITP policy component **550** may store a value representing a duration of time in a configuration storage location. Alternatively, or additionally, ITP policy component **550** may invoke a duration generator to determine a duration of time for detecting the idle time period. The

duration generator may be preconfigured for the TCP connection and/or may be identified based on the idle information received. As described, the invoked generator may be invoked with a parameter included in and/or otherwise identified based on the received idle information.

[0091] ITP policy component **550** may interoperate with ITP monitor component **556** to identify the duration for detecting the idle time period. ITP monitor component **556**, in various aspects, may receive information including and/or otherwise identifying a duration of time, a duration generator, and/or a parameter for a duration generator. ITP monitor component **556** may initiate and/or restart a process for detecting an idle time period. In an aspect, ITP monitor component **556** detects and/or otherwise identifies a beginning of a potential idle time period based on one or more specified events.

[0092] In an aspect, detecting the first idle time period by ITP monitor component **556** may include detecting a time period in the idle time period during which first node **602** has received acknowledgment for all data sent via the TCP connection in the TCP data stream by first node **602** to second node **604**. Further, the first idle time period may include a time period during which first node **602** has sent one or more TCP packets to second node **604** to acknowledge all data received in a TCP data stream in the TCP connection from second node **604** to first node **602**. Detecting the first idle time period by ITP monitor component **556** may include detecting that all received data has been acknowledged and/or that all sent data has been acknowledged.

[0093] In an aspect, ITP policy component **550** may include a policy with a rule indicating that an idle time period cannot begin while a TCP packet sent by first node **602** remains unacknowledged by second node **604**. ITP policy component **550** may prevent ITP monitor component **556** from initiating detection of an idle time period while unacknowledged data exists. In a further aspect, a time duration may be associated and/or included in the policy identifying a limit to a period of waiting to receive acknowledgment of TCP packet data sent by first node **602**. In one aspect, waiting for lack of an acknowledgment for an empty packet does not delay detection of an idle time period, while in another aspect ITP monitor component **556** will not initiate detection while an empty packet remains unacknowledged.

[0094] In an aspect, idle information, received by a node may be included in and/or otherwise based on a previous idle time period header identified in a previous TCP packet received in the TCP connection by the node from a remote node prior to sending an ITP header based on the idle information by the node. For example, the first idle information received by ITP policy component **550** in first node **602** may be based on an idle time period header included a TCP packet in the TCP connection sent by second node **604** and received by first node **602** prior to sending the first TCP packet by first node **602**. The exchange of ITP headers may include a negotiation between first node **602** and second node **604**.

[0095] A duration of time may be identified based on the idle information received by ITP policy component in first node **602**. A timer may be set according to the identified

duration. Detecting the first idle time period may include and/or otherwise may be based on detecting the timer expiration. ITP monitor component **556** may set a timer configured to expire in a time duration identified based on the first idle information received by ITP policy component **550**. The identified duration may be longer, shorter, or equal to a duration of the idle time period. ITP monitor component **556** may use multiple timers. ITP monitor component **556** may recalculate and/or otherwise generate a new idle duration based on the idle information at one or more times during detection of the first idle time period. That is, a duration of an idle time period may be static and/or may be dynamic, changing based on attribute information accessible during the detection process and/or based on one or more duration generators.

[0096] Message **710.1** illustrates a call and/or other communication between ITP monitor component **556** and a timer component in first node **602** to set a timer included in detecting an idle time period. Prior to the setting the timer, first node **602** and second node **602** may be active in exchanging TCP packets as illustrated by messages including message **706.2** through message **706.n**. Those skilled in the art will recognize that detection of an idle time period may not include explicitly and/or directly using a timer. ITP monitor component **556** may monitor other events as a proxy or indirect mechanism for initiating detection and detecting an idle time period.

[0097] ITP monitor component **556** may detect one or more events configured to indicate that an idle time period has occurred. For example, expiration of a timer or multiple associated timers may be interpreted by ITP monitor component **556** as

marking an occurrence of the first idle time period. Message **710.2** illustrates ITP monitor component **556** receiving information identifying expiration of a timer for detecting the first idle time period.

[0098] In a further aspect, in response to detecting the expiration of a timer set as described above, a TCP keep-alive packet may be sent by first node **602** to determine whether the TCP connection is action and/or to keep the TCP connection active. When the keep-alive packet is sent, an acknowledgment timer may be set. If a timeout of the acknowledgment timer is detected indicating no TCP packet has been received acknowledging the keep-alive packet, the first idle time period may be detected in response to and/or otherwise based on the timeout of the acknowledgment timer.

[0099] In Fig. 5, ITP policy component **550** in first node **602** may provide a duration identified based on the received idle information to a keep-alive monitor component (not shown). The keep-alive monitor component may configure a keep-alive timer to expire based on the identified duration. In response to detecting expiration of the keep-alive timer, ITP monitor component **556** may invoke packet generator component **552** to generate a TCP keep-alive packet. First node **602** may send the TCP packet to second node **604**. The TCP keep-alive packet may be sent to prevent detection of an idle time period by second node **604** and/or may otherwise be sent to detect by first node **602** whether the TCP connection is active.

[00100] First node **602** may set an acknowledgment timer associated with sending the packet. If the acknowledgment timer expires before a TCP packet is received from

second node **602** acknowledging the packet sent, ITP monitor component **556** may detect the idle time period in response to and/or otherwise based on expiration of the acknowledgment timer.

[0100] Receiving a packet from second node **604** included in the TCP connection is an event that, in various aspects, may directly and/or indirectly indicate the beginning of a potential idle time period. A potential idle time period may begin at some specified point during and/or after processing a received TCP packet. In one aspect, an empty TCP packet may be received while a potential idle time period is being monitored. That is, a beginning of the potential idle time period has been detected. In response to receiving the empty TCP packet, monitoring of the current potential time period may be aborted. Further, in response to receiving the empty TCP packet, a beginning of a next potential idle time period may be detected.

[0101] In Fig. 5, ITP policy component **550** and ITP monitor component **556** may operate to reset and/or initiate detection of an idle time period in response to receiving an empty TCP packet. First node **602** may receive an empty packet. In response, ITP monitor component **556** may receive an event and/or other indication to reset detection of an idle time period. Resetting the detecting process may be based on whether or not a received empty TCP packet matches a specified condition. ITP option handler component **562** may be configured to determine whether a received empty TCP packet matches the condition. If ITP option handler component **562** determines the empty packet matches the condition, ITP monitor component **556** may be instructed to reset

and/or restart detection of the first idle time period including detecting the beginning of a next potential time period.

[0102] The condition may match received TCP packets including ITP headers and/or other TCP option headers. A condition may match a port number and/or other field in TCP packet. A condition may further be based on a network address in an IP header including the TCP packet.

[0103] In a further aspect, first node **602** may receive via network **606** from second node **604** a TCP packet in the TCP connection including an second ITP header. Message **706.2** in Fig. 7 illustrates the TCP packet sent by second node **604**. ITP option handler component **562** may identify the second ITP header received from second node **604**. The identified second ITP header may be for detecting by first node **602** an idle time period, during which no TCP packet in the TCP connection is received, by the first node **602** that includes data in the first TCP data stream from second node **604**. The first idle time period may be detected by ITP monitor component **556** in first node **602** based on the second ITP header and based on the received idle information. The second ITP header received in the TCP packet from second node **604** may be based on the first ITP header in the TCP packet sent in the TCP connection by first node **602** to second node **604**.

[0104] In some aspects, the first node and second node **604** may continue to exchange ITP headers. Information in the exchanged ITP headers may be based on ITP headers received in the TCP connection and/or on data accessible locally to one or

both of the nodes. In some aspects, the exchange may be a negotiation while in other the exchange may simply be informational.

[0105] Returning to Fig. 2, block **210** illustrates the method further includes deactivating the TCP connection in response to detecting the first idle time period. Accordingly, a system for sharing information for detecting an idle TCP connection further includes means for deactivating the TCP connection in response to detecting the first idle time period. For example, as illustrated in Fig. 4a, the connection state component **458** is configured for deactivating the TCP connection in response to detecting the first idle time period.

[0106] Fig. 5 illustrates connection state component **558** as an adaptation of and/or analog of connection state component **458** in Fig. 4a. One or more connection state components **558** operate in execution environment **502**.

[0107] When ITP monitor component **556** in first node **602** detects an idle time period, ITP monitor component **556** may provide an indication to connection state component **558**. The indication may indicate that the idle time period for the TCP connection has been detected and/or otherwise may instruct connection state component **558** and/or other components in TCP layer component **506** to deactivate the TCP connection. Message **712** in Fig. 7 illustrates a communication to deactivate the TCP connection communicated in response to detecting the idle time period.

[0108] Deactivating the TCP connection may include closing the TCP connection. A TCP connection may be closed using a three-way handshake packet exchange described in RFC 793. Deactivating the TCP connection may include sending a TCP packet by the detecting node to reset the TCP connection. According to RFC 793, first node **602** may send a TCP packet including a reset (RST) bit set to “1” to indicate a connection reset. Deactivating the TCP connection may include, alternatively or additionally, releasing a resource allocated for maintaining and/or activating the TCP connection.

[0109] With respect to the method illustrated in Fig. 3, block **302** illustrates the method includes receiving, by a second node from a first node, a first transmission control protocol (TCP) packet in a TCP connection. Accordingly, a system for sharing information for detecting an idle TCP connection includes means for receiving, by a second node from a first node, a first transmission control protocol (TCP) packet in a TCP connection. For example, as illustrated in Fig. 4b, the net in-port component **460** is configured for receiving, by a second node from a first node, a first transmission control protocol (TCP) packet in a TCP connection.

[0110] Fig. 5 illustrates net in-port component **560** as an adaptation of and/or analog of net in-port component **460** in Fig. 4b. One or more net in-port components **560** operate in execution environment **502**.

[0111] As described above, net in-port component **560** in Fig. 5 may operate in an instance of execution environment **502** and/or an analog included in and/or including

second node **604**. The TCP packet, illustrated by message **706.1** in Fig. 7 and described above, may be received by net in-port component **560** in second node **604**. The TCP packet may include data in a second TCP data stream sent by first node **602** to second node **604** to deliver to a user of TCP layer component **506** in second node **604** such as network application **504**. Alternatively, the TCP packet may be an empty TCP packet. The received TCP packet may be a packet included in setting up the TCP connection as described above.

[0112] Returning to Fig. 3, block **304** illustrates the method further includes detecting a first idle time period header, in the first packet, identifying metadata for a first idle time period, detectable by the first node, during which no TCP packet including data in a first TCP data stream sent in the TCP connection by the second node is received by the first node. Accordingly, a system for sharing information for detecting an idle TCP connection includes means for detecting a first idle time period header, in the first packet, identifying metadata for a first idle time period, detectable by the first node, during which no TCP packet including data in a first TCP data stream sent in the TCP connection by the second node is received by the first node. For example, as illustrated in Fig. 4b, idle time period option handler component **462** is configured for detecting a first idle time period header, in the first packet, identifying metadata for a first idle time period, detectable by the first node, during which no TCP packet including data in a first TCP data stream sent in the TCP connection by the second node is received by the first node.

[0113] Fig. 5 illustrates idle time period option handler component **562** as an adaptation of and/or analog of idle time period option handler component **462** in Fig. 4b. One or more idle time period option handler components **562** operate in execution environment **502**.

[0114] In Fig. 5, ITP option handler component **562** is operatively coupled to packet handler component **516**. The TCP packet, including the ITP header sent by first node **602**, may be received, and identified as a TCP packet by net in-port component **560** operating in second node **604**. As illustrated in Fig. 5, net in-port component **560** and/or an analog of net in-port component **560** may provide and/or otherwise identify the received packet to packet handler component **516**. Packet handler component **516** may detect various portions of the TCP packet according to the TCP packet **802** structure as illustrated in Fig. 8. Alternatively, packet handler component **516** may provide some or all of the packet to various components in TCP layer component **506** to identify portions of the packet according to the TCP specification and/or according to a particular implementation.

[0115] The ITP header sent by first node **602** may be received by and/or otherwise identified by ITP option handler component **562**. Message **708** in Fig. 7 exemplifies activation of ITP option handler component **562** for detecting the ITP header in the TCP packet received from first node **602** by second node **604**.

[0116] In various aspects, ITP option handler component **562** operating in second node **604** may detect and/or otherwise determine a duration of time for associated with

detection of the idle time period by first node **602**, a duration generator, and/or a parameter for a duration generator. The first idle time period header may identify metadata including and/or identifying for detection of the first idle time period by first node **602** a duration of time, a generator for determining a duration of time, and/or an input for determining a duration of time.

[0117] Returning to Fig. 3, block **306** illustrates the method yet further includes modifying, based on the metadata, by the second node a timeout attribute associated with the TCP connection. Accordingly, a system for sharing information for detecting an idle TCP connection includes means for modifying, based on the metadata, by the second node a timeout attribute associated with the TCP connection. For example, as illustrated in Fig. 4b, the option attribute handler component **464** is configured for modifying, based on the metadata, by the second node a timeout attribute associated with the TCP connection.

[0118] Fig. 5 illustrates option attribute handler component **564** as an adaptation of and/or analog of option attribute handler component **464** in Fig. 4b. One or more option attribute handler components **564** operate in execution environment **502**.

[0119] In an aspect, ITP option handler component **562** may one or more attribute option handler components **564** to modify one or more corresponding attributes of a keep-alive option, a TCP user timeout, a retransmission timeout, an acknowledgment timeout, and another timeout associated with the TCP connection, in response to

identifying the ITP header. The modifying may be based on the content of the ITP header.

[0120] For example, ITP option handler component **562** in second node **604** may interoperate with a keep-alive attribute option handler component **564** directly and/or indirectly via settings service component **526**, connection state component **558**, and/or a keep-alive policy component (not shown) to detect the existence and state of one or more keep-alive attributes in determining whether the keep-alive option is active and/or the state of the keep-alive option.

[0121] In response to identifying the idle time period header, ITP option handler component **562** may activate, disable, and/or modify the state of the keep-alive option via interoperation with the keep-alive attribute option handler. Thus, in response to identifying the idle information, attribute option handler component **564** may prevent and/or alter the time a keep-alive packet is sent by second node **604** to first node **602**.

[0122] Alternatively or additionally, an attribute option handler component **564** may modify an attribute associated with a packet acknowledgment option provided by TCP layer component **506** in first node **602**. Modifying a packet acknowledgment attribute may include creating the attribute, deleting the attribute, and/or modifying the attribute. Attribute option handler component **564** may interoperate with settings service component **526**, connection state component **558**, and/or an acknowledgment policy component (not shown) to detect the existence and state of one or more packet acknowledgment attributes. In response to identifying the idle information, attribute

option handler component **564** may modify the state of the packet acknowledgment option. Thus, in response to identifying the idle information, attribute option handler component **564** may prevent and/or alter the time an acknowledgment is sent in a packet data from second node **604** to first node **602** in the TCP connection.

[0123] As described herein an ITP header for detecting an idle time period for a TCP connection may serve a number of purposes. A first node in a TCP connection may via an ITP header inform and/or otherwise identify to a second node in the connection one or more durations for detecting an idle time period by one or both nodes. Given multiple purposes, one or more types of ITP headers may be supported and/or an ITP header may be structured to support one or more of the described services. An exchange of ITP headers may be informational and/or may be included in negotiation between two nodes included in a TCP connection. When used in a negotiation, an ITP header may be included in a negotiation protocol that has an identifiable end during a portion of the existence of a TCP connection or may be included in a negotiation that may remain ongoing throughout the existence of a TCP connection. Those skilled in the art will recognize the list of services in this paragraph is not exhaustive.

[0124] It should be understood that the various components illustrated in the various block diagrams represent logical components that are configured to perform the functionality described herein and may be implemented in software, hardware, or a combination of the two. Moreover, some or all of these logical components may be combined, some may be omitted altogether, and additional components may be added

while still achieving the functionality described herein. Thus, the subject matter described herein may be embodied in many different variations, and all such variations are contemplated to be within the scope of what is claimed.

[0125] To facilitate an understanding of the subject matter described above, many aspects are described in terms of sequences of actions that may be performed by elements of a computer system. For example, it will be recognized that the various actions may be performed by specialized circuits or circuitry (e.g., discrete logic gates interconnected to perform a specialized function), by program instructions being executed by one or more instruction processing units, or by a combination of both. The description herein of any sequence of actions is not intended to imply that the specific order described for performing that sequence must be followed.

[0126] Moreover, the methods described herein may be embodied in executable instructions stored in a computer readable medium for use by or in connection with an instruction execution machine, system, apparatus, or device, such as a computer-based or processor-containing machine, system, apparatus, or device. As used herein, a "computer readable medium" may include one or more of any suitable media for storing the executable instructions of a computer program in one or more of an electronic, magnetic, optical, electromagnetic, and infrared form, such that the instruction execution machine, system, apparatus, or device may read (or fetch) the instructions from the computer readable medium and execute the instructions for carrying out the described methods. A non-exhaustive list of conventional exemplary computer readable media

includes a portable computer diskette; a random access memory (RAM); a read only memory (ROM); an erasable programmable read only memory (EPROM or Flash memory); optical storage devices, including a portable compact disc (CD), a portable digital video disc (DVD), a high definition DVD (HD-DVD.TM.), a Blu-ray.TM. disc; and the like.

[0127] Thus, the subject matter described herein may be embodied in many different forms, and all such forms are contemplated to be within the scope of what is claimed. It will be understood that various details may be changed without departing from the scope of the claimed subject matter. Furthermore, the foregoing description is for the purpose of illustration only, and not for the purpose of limitation, as the scope of protection sought is defined by the claims as set forth hereinafter together with any equivalents thereof entitled to.

[0128] All methods described herein may be performed in any order unless otherwise indicated herein explicitly or by context. The use of the terms "a" and "an" and "the" and similar referents in the context of the foregoing description and in the context of the following claims are to be construed to include the singular and the plural, unless otherwise indicated herein explicitly or clearly contradicted by context. The foregoing description is not to be interpreted as indicating any non-claimed element is essential to the practice of the subject matter as claimed.

Date: 02/27/10

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 12/714,454	
APPLICATION AS FILED – PART I						
(Column 1)		(Column 2)		SMALL ENTITY		OR
OTHER THAN SMALL ENTITY						
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	82	N/A	
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	270	N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	110	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	22	minus 20 = 2	x\$26	52	x\$52	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	6	minus 3 = 3	x\$110	330	x\$220	
APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$260 (\$130 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR				
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				195	390	
				TOTAL	844	TOTAL
* If the difference in column 1 is less than zero, enter "0" in column 2.						
APPLICATION AS AMENDED – PART II						
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY
OTHER THAN SMALL ENTITY						OR
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)
Total (37 CFR 1.16(i))	*	Minus **	=	X =		X =
Independent (37 CFR 1.16(h))	*	Minus ***	=	X =		X =
Application Size Fee (37 CFR 1.16(s))				N/A		N/A
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				TOTAL		TOTAL
				ADD'T FEE		ADD'T FEE
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY
OTHER THAN SMALL ENTITY						OR
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)
Total (37 CFR 1.16(i))	*	Minus **	=	X =		X =
Independent (37 CFR 1.16(h))	*	Minus ***	=	X =		X =
Application Size Fee (37 CFR 1.16(s))				N/A		N/A
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))				TOTAL		TOTAL
				ADD'T FEE		ADD'T 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.						

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