AO 120 (Rev. 08/10)

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

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

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

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:20-cv-00015	1/21/2020	Eastern District of Texas, Marshall Division

PLAINTIFF	DEFENDANT
MONARCH NETWORKING SOLUTIONS LLC	CISCO SYSTEMS, INC.; CHARTER COMMUNICATIONS, INC.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,451,844	5/28/2013	MONARCH NETWORKING SOLUTIONS LLC
2	8,451,845	5/28/2013	MONARCH NETWORKING SOLUTIONS LLC
3	9,019,965	4/28/2015	MONARCH NETWORKING SOLUTIONS LLC
4	8,130,775	3/6/2012	MONARCH NETWORKING SOLUTIONS LLC
5			

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

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

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

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

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

PTO/SB/122 (04-15)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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.

CHANGE OF CORRESPONDENCE ADDRESS
Application

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

Application Number	12/528,083
Filing Date	2009-11-25
First Named Inventor	Frederic Jounay
Art Unit	2475
Examiner Name	PREVAL, LIONEL
Attorney Docket Number	1127-0020

Please change the Correspondence Address for the above-identified patent application to:

☒ The address associated with Customer Number: 175872

OR

☐ Firm or Individual Name

Address

City	State	Zip

Country

Telephone	Email

This form cannot be used to change the data associated with a Customer Number. To change the data associated with an existing Customer Number use "Request for Customer Number Data Change" (PTO/SB/124).

I am the:

☐ Applicant/Inventor

☐ Assignee of record of the entire interest.
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

☒ Attorney or agent of record. Registration Number 53563.

☐ Registered practitioner named in the application transmittal letter in an application without an executed oath or declaration. See 37 CFR 1.33(a)(1). Registration Number_____.

Signature	/David Wade Schnell/
Typed or Printed Name	David Wade Schnell
Date	June 14, 2021
Telephone	4809949888

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☑ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 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.

Electronic Acknowledgement Receipt

EFS ID:	42972868
Application Number:	12528083
International Application Number:	
Confirmation Number:	1617
Title of Invention:	MECHANISM FOR PROTECTING A PSEUDO-WIRE
First Named Inventor/Applicant Name:	Frederic Jounay
Customer Number:	90471
Filer:	David Wade Schnell/Acacia IP
Filer Authorized By:	David Wade Schnell
Attorney Docket Number:	1127-0020
Receipt Date:	14-JUN-2021
Filing Date:	25-NOV-2009
Time Stamp:	08:52:52
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Change of Address	Change_of_Address_12528083.pdf	98095 b3cc44d362694ccddac3cfc4e4aac167582bdc86	no	2

Warnings:

Information:	
Total Files Size (in bytes):	98095

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/528,083	11/25/2009	Frederic Jounay	1127-0020

CONFIRMATION NO. 1617

POA ACCEPTANCE LETTER

90471
Heim, Payne & Chorush, L.L.P.
1111 Bagby Street
Houston, TX 77002

OC000000125205641

Date Mailed: 04/28/2021

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/26/2021.

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

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

/nrhayden/

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
12/528,083	11/25/2009	Frederic Jounay	F71.12-0022

CONFIRMATION NO. 1617

POWER OF ATTORNEY NOTICE

27367
WESTMAN CHAMPLIN & KOEHLER, P.A.
121 South Eighth Street
Suite 1100
Minneapolis, MN 55402

OC000000125205493

Date Mailed: 04/28/2021

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/26/2021.

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

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

/nrhayden/

PTO/AIA/81A (02-15)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT - POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Patent Number	8,130,775
Issue Date	March 6, 2012
First Named Inventor	Frederic Jounay
Title	Mechanism for Protecting a Pseudo-Wire
Attorney Docket No.	1127-0020

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith: 90471

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☐ The address associated with the above-identified Customer Number.

OR

☐ The address associated with the Customer Number identified in the box at right:

OR

☒ Firm or Individual Name	Heim, Payne & Chorush, LLP				
Address	1111 Bagby Street, Suite 2100				
City	Houston	State	Texas	Zip	77002
Country	United States				
Telephone	713.221.2000	Email	mheim@hpcllp.com		

I am the:

☐ Applicant.

OR

☒ Patent owner.

Statement under 37 CFR 3.73(c) (Form PTO/AIA/96) submitted herewith or filed on _____.

SIGNATURE of Applicant or Patent Owner

Signature		Date	3/8/12
Name	Eric Leon	Telephone	
Title and Company	Director, Juniper Networks, Inc.		

NOTE: Signatures of all the applicants or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.

☐ A total of _____ forms are submitted.

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 update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 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.

PTO/AIA/96 (08-12)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: MONARCH NETWORKING SOLUTIONS LLC

Application No./Patent No.: 8,130,775 Filed/Issue Date: March 6, 2012

Titled: Mechanism for Protecting a Pseudo-Wire

Monarch Networking Solutions, a LLC

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

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

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

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

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

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

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

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

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

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

1. From: Frederic Jounay, Philippe Niger and Arnaud Cauvin To: France Telecom

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

   Reel 23572, Frame 0637, or for which a copy thereof is attached.

2. From: France Telecom To: Orange

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

   Reel 044625, Frame 0361, or for which a copy thereof is attached.

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.

PTO/AIA/96 (08-12)
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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.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: Orange To: Transpacific IP Group Limited

The document was recorded in the United States Patent and Trademark Office at
Reel 044625, Frame 0315, or for which a copy thereof is attached.

4. From: Transpacific IP Group Limited To: Acacia Research Group LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 051192, Frame 0596, or for which a copy thereof is attached.

5. From: Acacia Research Group LLC To: Monarch Networking Solutions LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 051238, Frame 0718, or for which a copy thereof is attached.

6. From: Acacia Research Group LLC To: Starboard Value Intermediate Fund LP, as Collateral Agent

The document was recorded in the United States Patent and Trademark Office at
Reel 052853, Frame 0153, or for which a copy thereof is attached.

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

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

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

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

Signature	Date: 4/20/2021
Michael F. Heim	Reg. No. 32,702
Printed or Typed Name	Title or Registration Number

From: Monarch Networking Solutions LLC To: Starboard Value Intermediate Fund LP, as Collateral Agent

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

Reel 055100, Frame 0624, or for which a copy there. of is attached.

From: Starboard Value Intermediate Fund LP, as Collateral Agent To: Acacia Research Group LLC et al

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

Reel 053654, Frame 0254, or for which a copy thereof is attached.

From: Starboard Value Intermediate Fund LP, as Collateral Agent To: Monarch Networking Solutions LLC

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

Reel 055101, Frame 0608, or for which a copy there. of is attached.

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.

UNITED STATES
PATENT AND TRADEMARK OFFICE

Assignment abstract of title for Application 12528083

Invention title/Inventor	Patent	Publication	Application	PCT	International registration
MECHANISM FOR PROTECTING A PSEUDO-WIRE Frederic Jounay, Philippe Niger, Arnaud Cauvin	8130775 Mar 06, 2012	20100098094 Apr 22, 2010	12528083 Nov 25, 2009		

Assignments (9 of 9 total)

Assignment 9

Reel/frame	Execution date	Date recorded	Properties	Pages
055101/0608	Jun 30, 2020	Jan 25, 2021	50	156

Conveyance
CORRECTIVE ASSIGNMENT TO CORRECT THE ASSIGNEE NAME PREVIOUSLY RECORDED ON REEL 053654 FRAME 0254. ASSIGNOR(S) HEREBY CONFIRMS THE RELEASE OF SECURITY INTEREST GRANTED PURSUANT TO THE PATENT SECURITY AGREEMENT PREVIOUSLYRECORDED.

Assignors
STARBOARD VALUE INTERMEDIATE FUND LP, AS COLLATERAL AGENT

Correspondent
S. KAREFF C/O SCHULTE ROTH & ZABEL LLP
919 THIRD AVENUE
25TH FLOOR
NEW YORK, NY 10022

Assignee
MONARCH NETWORKING SOLUTIONS LLC
4 PARK PLAZA
SUITE 550
IRVINE, CALIFORNIA 92614

Assignment 8

Reel/frame	Execution date	Date recorded	Properties	Pages
053654/0254	Jun 30, 2020	Jul 08, 2020	3010	236

Conveyance
RELEASE OF SECURITY INTEREST IN PATENTS

Assignors
STARBOARD VALUE INTERMEDIATE FUND LP

Correspondent
S. KAREFF C/O SCHULTE ROTH & ZABEL LLP
919 THIRD AVENUE
25TH FLOOR
NEW YORK, NY 10022

Assignee
ACACIA RESEARCH GROUP LLC
767 3RD AVE
6TH FLOOR
NEW YORK, NEW YORK 10017

AMERICAN VEHICULAR SCIENCES LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

BONUTTI SKELETAL INNOVATIONS LLC
6136 FRISCO SQUARE BLVD

SUITE 400
FRISCO, TEXAS 75034

CELLULAR COMMUNICATIONS EQUIPMENT LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

INNOVATIVE DISPLAY TECHNOLOGIES LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

LIFEPORT SCIENCES LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

LIMESTONE MEMORY SYSTEMS LLC
4 PARK PLAZA
SUITE 550
IRVINE, CALIFORNIA 92614

MOBILE ENHANCEMENT SOLUTIONS LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

MONARCH NETWORKING SOLUTIONS LLC
4 PARK PLAZA
SUITE 550
IRVINE, CALIFORNIA 92614

NEXUS DISPLAY TECHNOLOGIES LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

PARTHENON UNIFIED MEMORY ARCHITECTURE LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

R2 SOLUTIONS LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

SAINT LAWRENCE COMMUNICATIONS LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

STINGRAY IP SOLUTIONS LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

SUPER INTERCONNECT TECHNOLOGIES LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

TELECONFERENCE SYSTEMS LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

UNIFICATION TECHNOLOGIES LLC
6136 FRISCO SQUARE BLVD
SUITE 400

FRISCO, TEXAS 75034

Assignment 7

Reel/frame	Execution date	Date recorded	Properties	Pages
055100/0624	Jun 04, 2020	Jan 25, 2021	50	173

Conveyance
CORRECTIVE ASSIGNMENT TO CORRECT THE ASSIGNOR NAME PREVIOUSLY RECORDED ON REEL 052853 FRAME 0153. ASSIGNOR(S) HEREBY CONFIRMS THE SECURITY INTEREST GRANTED PURSUANT TO THE PATENT SECURITY AGREEMENT PREVIOUSLY RECORDED.

Assignors
MONARCH NETWORKING SOLUTIONS LLC

Correspondent
S. KAREFF C/O SCHULTE ROTH & ZABEL LLP
919 THIRD AVENUE
25TH FLOOR
NEW YORK, NY 10022

Assignee
STARBOARD VALUE INTERMEDIATE FUND LP, AS COLLATERAL AGENT
777 THIRD AVENUE
18TH FLOOR
NEW YORK, NEW YORK 10017

Assignment 6

Reel/frame	Execution date	Date recorded	Properties	Pages
052853/0153	Jun 04, 2020	Jun 05, 2020	3010	252

Conveyance
PATENT SECURITY AGREEMENT

Assignors
ACACIA RESEARCH GROUP LLC
AMERICAN VEHICULAR SCIENCES LLC
BONUTTI SKELETAL INNOVATIONS LLC
CELLULAR COMMUNICATIONS EQUIPMENT LLC
INNOVATIVE DISPLAY TECHNOLOGIES LLC
LIFEPORT SCIENCES LLC
LIMESTONE MEMORY SYSTEMS LLC
MERTON ACQUISITION HOLDCO LLC
MOBILE ENHANCEMENT SOLUTIONS LLC
MONARCH NETWORKING SOLUTIONS LLC
NEXUS DISPLAY TECHNOLOGIES LLC
PARTHENON UNIFIED MEMORY ARCHITECTURE LLC
R2 SOLUTIONS LLC
SAINT LAWRENCE COMMUNICATIONS LLC
STINGRAY IP SOLUTIONS LLC
SUPER INTERCONNECT TECHNOLOGIES LLC
TELECONFERENCE SYSTEMS LLC
UNIFICATION TECHNOLOGIES LLC

Correspondent
S. KAREFF C/O SCHULTE ROTH & ZABEL LLP
919 THIRD AVENUE
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NEW YORK, NY 10022

Assignee
STARBOARD VALUE INTERMEDIATE FUND LP, AS COLLATERAL AGENT
777 THIRD AVENUE
18TH FLOOR
NEW YORK, NEW YORK 10017

Assignment 5

Reel/frame	Execution date	Date recorded	Properties	Pages
051238/0718	Nov 18, 2019	Dec 10, 2019	53	34

Conveyance
ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignors
ACACIA RESEARCH GROUP LLC

Correspondent
ROBERT ALLAN BULLWINKEL
1111 BAGBY ST, SUITE 2100
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Assignee
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IRVINE, CALIFORNIA 92614

Assignment 4

Reel/frame	Execution date	Date recorded	Properties	Pages
051192/0596	Mar 29, 2019	Dec 04, 2019	53	34

Conveyance
ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignors
TRANSPACIFIC IP GROUP LIMITED

Correspondent
ROBERT ALLAN BULLWINKEL
1111 BAGBY ST, SUITE 2100
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Assignee
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Assignment 3

Reel/frame	Execution date	Date recorded	Properties	Pages
044625/0315	Sep 21, 2017	Dec 08, 2017	52	39

Conveyance
ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignors
ORANGE

Correspondent
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CAYMAN ISLANDS

Assignment 2

Reel/frame	Execution date	Date recorded	Properties	Pages
044625/0361	Jul 02, 2013	Dec 08, 2017	52	10

Conveyance
CHANGE OF NAME (SEE DOCUMENT FOR DETAILS).

Assignors
FRANCE TELECOM

Correspondent
DANIEL W JUFFERNBRUCH
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28 BARRINGTON BOURNE
BARRINGTON, IL 60010-9605

Assignee
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PARIS 75015

FRANCE

Assignment 1

Reel/frame	Execution date	Date recorded	Properties	Pages
023572/0637	Aug 25, 2009	Nov 25, 2009	1	3

Conveyance
ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignors
JOUNAY, FREDERIC
NIGER, PHILIPPE
CAUVIN, ARNAUD

Assignee
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PARIS 75015
FRANCE

Correspondent
DAVID D. BRUSH
900 SECOND AVENUE SOUTH
SUITE 1400
MINNEAPOLIS, MN 55402

Electronic Acknowledgement Receipt

EFS ID:	42554375
Application Number:	12528083
International Application Number:	
Confirmation Number:	1617
Title of Invention:	MECHANISM FOR PROTECTING A PSEUDO-WIRE
First Named Inventor/Applicant Name:	Frederic Jounay
Customer Number:	27367
Filer:	Michael F. Heim
Filer Authorized By:	
Attorney Docket Number:	F71.12-0022
Receipt Date:	26-APR-2021
Filing Date:	25-NOV-2009
Time Stamp:	16:05:23
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	20210420775PATENTPOA.pdf	542042 50b489546a4e1f44c9c6d77826a47b6260f6599f	no	1

Warnings:

The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
2	CRF Statement Paper and CRF are the same	20210420775StatementUnder37CFR.pdf	277593 34d3d0d56b6e63ea007a6d09362fb1e03069db99	no	4
Warnings:					
Information:					
3	Assignee showing of ownership per 37 CFR 3.73	20210420775assignment.pdf	40578 d25ea0ad530ad6a8ef2fae649698dbbbfd0c61b7	no	5
Warnings:					
Information:					
		Total Files Size (in bytes):	860213		

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.

Best Available Copy

OPAP AKIMA-5 APR 23 2021 PATENT & TRADEMARK OFFICE

12/528083

PTO/AIA/81A (02-15)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT - POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Patent Number	8,130,775
Issue Date	March 6, 2012
First Named Inventor	Frederic Jounay
Title	Mechanism for Protecting a Pseudo-Wire
Attorney Docket No.	1127-0020

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith: 90471

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☐ The address associated with the above-identified Customer Number.

OR

☐ The address associated with the Customer Number identified in the box at right:

OR

☒ Firm or Individual Name	Heim, Payne & Chorush, LLP				
Address	1111 Bagby Street, Suite 2100				
City	Houston	State	Texas	Zip	77002
Country	United States				
Telephone	713.221.2000	Email	mheim@hpcllp.com		

I am the:

☐ Applicant.

OR

☒ Patent owner.

Statement under 37 CFR 3.73(c) (Form PTO/AIA/96) submitted herewith or filed on _____.

SIGNATURE of Applicant or Patent Owner

Signature	[signature]	Date	4/22/21
Name	Eric Lucas	Telephone	
Title and Company	Director - Marvell Semiconductor, Inc.		

NOTE: Signatures of all the applicants or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.

☐ A total of _____ forms are submitted.

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 update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 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.

OPAP
APR 23 2021
PATENT & TRADEMARK OFFICE

PTO/AIA/96 (08-12)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: MONARCH NETWORKING SOLUTIONS LLC

Application No./Patent No.: 8,130,775 Filed/Issue Date: March 6, 2012

Titled: Mechanism for Protecting a Pseudo-Wire

Monarch Networking Solutions, a LLC

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

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

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

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

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

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

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

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

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

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

1. From: Frederic Jounay, Philippe Niger and Arnaud Cauvin To: France Telecom

The document was recorded in the United States Patent and Trademark Office at Reel 23572, Frame 0637, or for which a copy thereof is attached.

2. From: France Telecom To: Orange

The document was recorded in the United States Patent and Trademark Office at Reel 044625, Frame 0361, or for which a copy thereof is attached.

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.

PTO/AIA/96 (08-12)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: Orange To: Transpacific IP Group Limited

The document was recorded in the United States Patent and Trademark Office at Reel 044625, Frame 0315, or for which a copy thereof is attached.

4. From: Transpacific IP Group Limited To: Acacia Research Group LLC

The document was recorded in the United States Patent and Trademark Office at Reel 051192, Frame 0596, or for which a copy thereof is attached.

5. From: Acacia Research Group LLC To: Monarch Networking Solutions LLC

The document was recorded in the United States Patent and Trademark Office at Reel 051238, Frame 0718, or for which a copy thereof is attached.

6. From: Acacia Research Group LLC To: Starboard Value Intermediate Fund LP, as Collateral Agent

The document was recorded in the United States Patent and Trademark Office at Reel 052853, Frame 0153, or for which a copy thereof is attached.

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

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

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

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

Michael F. Heim — Signature

4/20/2021 — Date

Michael F. Heim — Printed or Typed Name

Reg. No. 32,702 — Title or Registration Number

Best Available Copy

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.

From: Monarch Networking Solutions LLC To: Starboard Value Intermediate Fund LP, as Collateral Agent

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

Reel 055100, Frame 0624, or for which a copy there. of is attached.

From: Starboard Value Intermediate Fund LP, as Collateral Agent To: Acacia Research Group LLC et al

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

Reel 053654, Frame 0254, or for which a copy thereof is attached.

From: Starboard Value Intermediate Fund LP, as Collateral Agent To: Monarch Networking Solutions LLC

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

Reel 055101, Frame 0608, or for which a copy there. of is attached.

UNITED STATES
PATENT AND TRADEMARK OFFICE

Assignment abstract of title for Application 12528083

Invention title/Inventor	Patent	Publication	Application	PCT	International registration
MECHANISM FOR PROTECTING A PSEUDO-WIRE Frederic Jounay, Philippe Niger, Arnaud Cauvin	8130775 Mar 06, 2012	20100098094 Apr 22, 2010	12528083 Nov 25, 2009		

OPAP AKIMA-5
APR 23 2021
PATENT AND TRADEMARK OFFICE

Assignments (9 of 9 total)

Assignment 9

Reel/frame	Execution date	Date recorded	Properties	Pages
055101/0608	Jun 30, 2020	Jan 25, 2021	50	156

Conveyance
CORRECTIVE ASSIGNMENT TO CORRECT THE ASSIGNEE NAME PREVIOUSLY RECORDED ON REEL 053654 FRAME 0254. ASSIGNOR(S) HEREBY CONFIRMS THE RELEASE OF SECURITY INTEREST GRANTED PURSUANT TO THE PATENT SECURITY AGREEMENT PREVIOUSLYRECORDED.

Assignors
STARBOARD VALUE INTERMEDIATE FUND LP, AS COLLATERAL AGENT

Correspondent
S. KAREFF C/O SCHULTE ROTH & ZABEL LLP
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Assignee
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4 PARK PLAZA
SUITE 550
IRVINE, CALIFORNIA 92614

Assignment 8

Reel/frame	Execution date	Date recorded	Properties	Pages
053654/0254	Jun 30, 2020	Jul 08, 2020	3010	236

Conveyance
RELEASE OF SECURITY INTEREST IN PATENTS

Assignors
STARBOARD VALUE INTERMEDIATE FUND LP

Correspondent
S. KAREFF C/O SCHULTE ROTH & ZABEL LLP
919 THIRD AVENUE
25TH FLOOR
NEW YORK, NY 10022

Assignee
ACACIA RESEARCH GROUP LLC
767 3RD AVE
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NEW YORK, NEW YORK 10017

AMERICAN VEHICULAR SCIENCES LLC
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SUITE 400
FRISCO, TEXAS 75034

BONUTTI SKELETAL INNOVATIONS LLC
6136 FRISCO SQUARE BLVD

SUITE 400
FRISCO, TEXAS 75034

CELLULAR COMMUNICATIONS EQUIPMENT LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

INNOVATIVE DISPLAY TECHNOLOGIES LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

LIFEPORT SCIENCES LLC
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LIMESTONE MEMORY SYSTEMS LLC
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MOBILE ENHANCEMENT SOLUTIONS LLC
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MONARCH NETWORKING SOLUTIONS LLC
4 PARK PLAZA
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NEXUS DISPLAY TECHNOLOGIES LLC
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SUITE 400
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PARTHENON UNIFIED MEMORY ARCHITECTURE LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

R2 SOLUTIONS LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

SAINT LAWRENCE COMMUNICATIONS LLC
6136 FRISCO SQUARE BLVD
SUITE 400
FRISCO, TEXAS 75034

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FRISCO, TEXAS 75034

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TELECONFERENCE SYSTEMS LLC
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SUITE 400
FRISCO, TEXAS 75034

UNIFICATION TECHNOLOGIES LLC
6136 FRISCO SQUARE BLVD
SUITE 400

FRISCO, TEXAS 75034

Assignment 7

Reel/frame	Execution date	Date recorded	Properties	Pages
055100/0624	Jun 04, 2020	Jan 25, 2021	50	173

Conveyance
CORRECTIVE ASSIGNMENT TO CORRECT THE ASSIGNOR NAME PREVIOUSLY RECORDED ON REEL 052853 FRAME 0153. ASSIGNOR(S) HEREBY CONFIRMS THE SECURITY INTEREST GRANTED PURSUANT TO THE PATENT SECURITY AGREEMENT PREVIOUSLY RECORDED.

Assignors
MONARCH NETWORKING SOLUTIONS LLC

Correspondent
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919 THIRD AVENUE
25TH FLOOR
NEW YORK, NY 10022

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777 THIRD AVENUE
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NEW YORK, NEW YORK 10017

Assignment 6

Reel/frame	Execution date	Date recorded	Properties	Pages
052853/0153	Jun 04, 2020	Jun 05, 2020	3010	252

Conveyance
PATENT SECURITY AGREEMENT

Assignors
ACACIA RESEARCH GROUP LLC
AMERICAN VEHICULAR SCIENCES LLC
BONUTTI SKELETAL INNOVATIONS LLC
CELLULAR COMMUNICATIONS EQUIPMENT LLC
INNOVATIVE DISPLAY TECHNOLOGIES LLC
LIFEPORT SCIENCES LLC
LIMESTONE MEMORY SYSTEMS LLC
MERTON ACQUISITION HOLDCO LLC
MOBILE ENHANCEMENT SOLUTIONS LLC
MONARCH NETWORKING SOLUTIONS LLC
NEXUS DISPLAY TECHNOLOGIES LLC
PARTHENON UNIFIED MEMORY ARCHITECTURE LLC
R2 SOLUTIONS LLC
SAINT LAWRENCE COMMUNICATIONS LLC
STINGRAY IP SOLUTIONS LLC
SUPER INTERCONNECT TECHNOLOGIES LLC
TELECONFERENCE SYSTEMS LLC
UNIFICATION TECHNOLOGIES LLC

Correspondent
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777 THIRD AVENUE
18TH FLOOR
NEW YORK, NEW YORK 10017

Assignment 5

Reel/frame	Execution date	Date recorded	Properties	Pages
051238/0718	Nov 18, 2019	Dec 10, 2019	53	34

Conveyance
ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignors
ACACIA RESEARCH GROUP LLC

Correspondent
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1111 BAGBY ST, SUITE 2100
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Assignee
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IRVINE, CALIFORNIA 92614

Assignment 4

Reel/frame	Execution date	Date recorded	Properties	Pages
051192/0596	Mar 29, 2019	Dec 04, 2019	53	34

Conveyance
ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignors
TRANSPACIFIC IP GROUP LIMITED

Correspondent
ROBERT ALLAN BULLWINKEL
1111 BAGBY ST, SUITE 2100
HOUSTON, TX 77002

Assignee
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FRISCO, TEXAS 75034

Assignment 3

Reel/frame	Execution date	Date recorded	Properties	Pages
044625/0315	Sep 21, 2017	Dec 08, 2017	52	39

Conveyance
ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

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Assignment 2

Reel/frame	Execution date	Date recorded	Properties	Pages
044625/0361	Jul 02, 2013	Dec 08, 2017	52	10

Conveyance
CHANGE OF NAME (SEE DOCUMENT FOR DETAILS).

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Assignment 1

Reel/frame	Execution date	Date recorded	Properties	Pages
023572/0637	Aug 25, 2009	Nov 25, 2009	1	3

Conveyance
ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

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Paper 11
Date: March 4, 2021

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC,
Petitioner,

v.

MONARCH NETWORKING SOLUTIONS LLC,
Patent Owner.

IPR2020-01226
Patent 8,130,775 B2

Before THU A. DANG, THOMAS L. GIANNETTI, and ROBERT J. WEINSCHENK, *Administrative Patent Judges.*

DANG, *Administrative Patent Judge.*

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Background

Cisco Systems, Inc. ("Petitioner") filed a Petition requesting an *inter partes* review of claims 1 and 6 (the "challenged claims") of U.S. Patent No. 8,130,775 B2 (Ex. 1001, "the '775 patent"). Paper 2 ("Pet."). Monarch Networking Solutions LLC ("Patent Owner") filed a Preliminary Response. Paper 8 ("Prelim. Resp."). Pursuant to our authorization, Petitioner filed a Reply to Patent Owner's Preliminary Response (Paper 9, "Pet. Prelim. Reply") and Patent Owner filed a Sur-reply (Paper 10, "PO Prelim. Sur-reply"), each directed to whether we should exercise our discretion to deny institution pursuant to 35 U.S.C. § 314(a).

Under 37 C.F.R. § 42.4(a), the Board has authority to determine whether to institute an *inter partes* review. We may institute an *inter partes* review if the information presented in the petition filed under 35 U.S.C. § 311, and any response filed under § 313, shows that there is a reasonable likelihood that Petitioner would prevail with respect to at least one of the claims challenged in the petition. The Board, however, has discretion to deny a petition even when a petitioner meets that threshold. *Id.*; *see, e.g.*, *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2140 (2016) ("[T]he agency's decision to deny a petition is a matter committed to the Patent Office's discretion."); *see also* Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019) ("Consolidated TPG"), 55–63, available at https://www.uspto.gov/sites/default/files/documents/tpgnov.pdf (identifying considerations that may warrant exercise of this discretion). In particular, 35 U.S.C. § 314(a) permits the Board to deny institution under certain circumstances. *See Gen. Plastic Indus. Co. v. Canon Kabushiki Kaisha*,

IPR2016-01357, Paper 19 (PTAB Sept. 6, 2017) (precedential as to § II.B.4.i).

Having considered the parties' submissions, we determine that it is appropriate in this case to exercise our discretion to deny institution of *inter partes* review pursuant to 35 U.S.C. § 314(a) due to the advanced stage of the parallel district court litigation involving the challenged patent. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 5 (PTAB Mar. 20, 2020) (precedential) ("*Fintiv*"); *NHK Spring Co. v. Intri-Plex Techs., Inc.*, IPR2018-00752, Paper 8 (PTAB Sept. 12, 2018) (precedential) ("*NHK*").

B. Related Proceedings

Petitioner identifies the '775 patent as the subject of *Monarch Networking Solutions LLC v. Cisco Systems, Inc. and Charter Communications, Inc.*, No. 2:20-cv-00015 (E.D. Tex.) ("Eastern District of Texas litigation"). Pet. 7–8.

C. The '775 Patent

The '775 patent, titled "Mechanism for Protecting a Pseudo-wire," issued on March 6, 2012, from Application No. 12/528,083, filed on February 26, 2008. Ex. 1001, codes (54), (45), (22).

The '775 patent is directed to routing data packets in packet-switched networks, wherein labels are added to data packet headers with information that enable network routers to determine the next hop for a packet to reach its destination. *See* Ex. 1001, 1:30–39. The '775 patent recognizes that pseudo-wires have been used to emulate a point-to-point link between two devices of a packet-switched network. *Id.* at 1:45–49. The prior art packet-switched network is depicted in Figure 2, reproduced below:

Fig. 2(AA)

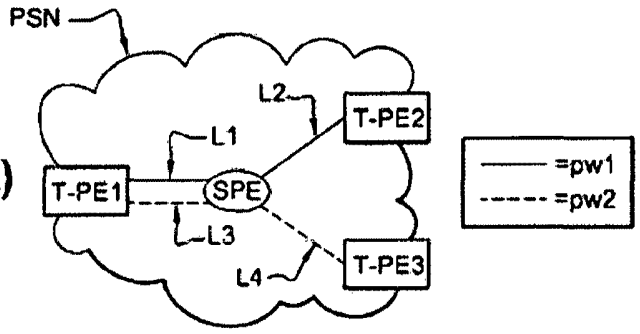


Figure 1 shows prior-art packet-switched network PSN, in which first pseudo-wire pw1 is set up between input router T-PE1 at one edge of network PSN and output router T-PE2 at another edge of network PSN. *Id.* at 2:12–17. First link L1 that is part of pseudo-wire pw1 is set up between input router T-PE1 and intermediate router SPE of network PSN, while second link L2 that is also part of pseudo-wire pw1 is set up between intermediate router SPE and output router T-PE2. *Id.* at 2:15–20. Second pseudo-wire pw2 is then set up between input router T-PE1 constituting a first end of pseudo-wire pw2 and second output router T-PE3 constituting a second end of pseudo-wire pw2. *Id.* at 2:20–23. First link L3 that is part of second pseudo-wire pw2 is set up between input router T-PE1 and intermediate router SPE, while second link L4 that is also part of second pseudo-wire pw2 is set up between intermediate router SPE and output router T-PE3. *Id.* at 2:23–27. According to the '775 patent, prior-art PSN network shown in Figure 1 has the drawback of consuming network resources that increases the restore time in the event of a fault affecting an output router, with a negative impact on quality of service. *Id.* at 2:40–47. Accordingly, the '775 patent proposes setting up two pseudo-wires to broadcast a data stream (*id.* at 2:54–60), wherein, to optimize the use of network resources, for example bandwidth, a single link common to the two

pseudo-wires are is set up between the input router and the intermediate router. *Id.* at 3:1–5.

Figure 3 is reproduced below:

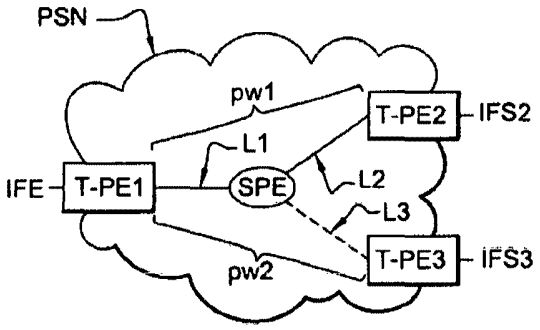


Fig. 3

Figure 3 represents a connection set up between input router T-PE1 and intermediate routers T-PE2 and T-PE3, each of these three routers being at an edge of network PSN. *Id.* at 6:25–28. As shown in Figure 3, first link L1 is set up between input router T-PE1 and intermediate router SPE, and second link L2 is set up between intermediate router SPE and first output router T-PE2, wherein first and second links L1, L2 constitute first pseudo-wire pw1 setting up a connection between input router T-PE1 and first output router T-PE2. *Id.* at 6:29–38. Second pseudo-wire pw2 is set up between input router T-PE1 and second output router T-PE3, wherein second pseudo-wire pw2 consists of first link L1 and second link L3 set up between intermediate router SPE and second output router T-PE3. *Id.* at 6:39–43. Accordingly, first link L1 is shared by pseudo-wires pw1 and pw2. *Id.* at 6:44–45.

D. The Challenged Claims

Both of the challenged claims 1 and 6 are independent claims. Claim 1 is illustrative, and is reproduced below:

> 1. A method of setting up at least two pseudo-wires able to broadcast a data stream, comprising:
>
> setting up a first pseudo-wire comprising a first link set up between an input router of a packet-switched network and an intermediate router of the packet-switched network and a second link set up between said intermediate router and a first output router of the packet-switched network; and
>
> setting up a second pseudo-wire between said input router and a second output router of the packet-switched network, wherein the second pseudo-wire comprises said first link and a third link set up between said intermediate router and said second output router, said first link being shared by the first and second pseudo-wires.

Ex. 1001, 12:14–27.

E. Asserted Grounds of Unpatentability

Petitioner challenges the patentability of claims 1 and 6 of the '775 patent on the following ground (Pet. 3):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 6	103(a)	Aggarwal,[1] Hussain,[2]

Petitioner relies on the Declaration of Henry Houh, Ph.D. (Ex. 1003) in support of its unpatentability contentions.

[1] U.S. Patent No. 7,602,702 B1, issued October 13, 2009, filed February 10, 2005 (Ex. 1005, "Aggarwal").

[2] Hussain, Iftekhar, "Fault-Tolerant IP and MPLS Network," Cisco Press, printed November 2004 (Ex. 1006, "Hussein").

II. ANALYSIS

A. Discretion Under 35 U.S.C. § 314(a)

Institution of an *inter partes* review is discretionary. Section 314(a) of title 35 of the United States Code provides that "[t]he Director may not authorize an *inter partes* review to be instituted unless the Director determines that the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." The U.S. Supreme Court has explained that because § 314 includes no mandate to institute review, "the agency's decision to deny a petition is a matter committed to the Patent Office's discretion." *Cuozzo*, 136 S. Ct. at 2140; *see also Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016) (explaining that under § 314(a), "the PTO is permitted, but never compelled, to institute an IPR proceeding"). The Director has delegated this authority under § 314(a) to the Board. 37 C.F.R. § 42.4(a) ("The Board institutes the trial on behalf of the Director.").

In this proceeding, Patent Owner argues that we should exercise our discretion under 35 U.S.C. § 314(a) to deny institution in this case because "it would be an inefficient duplication of ongoing litigation." Prelim. Resp. 45. In particular, according to Patent Owner, "[g]iven the advanced state of [the district court] litigation, which addresses the same issues raised in the instant Petition, the Board should deny institution." *Id.*

In determining whether to exercise our discretion, we are guided by the Board's precedential decision in *NHK*. There, the Board found that the "advanced state of the district court proceeding," in which the "same prior art and arguments" were presented by Petitioner, expert discovery was

scheduled to end in less than two months, and a jury trial was scheduled to begin in six months, was a "factor that weighs in favor of denying" the petition under § 314(a). *NHK*, IPR2018-00752, Paper 8 at 20. The Board determined that "[i]nstitution of an *inter partes* review under these circumstances would not be consistent with 'an objective of the AIA . . . to provide an effective and efficient alternative to district court litigation.'" *Id.* (citing *Gen. Plastic Indus.*, IPR2016-01357, Paper 19 at 16–17).

"[T]he Board's cases addressing earlier trial dates as a basis for denial under NHK have sought to balance considerations such as system efficiency, fairness, and patent quality." *Fintiv*, Paper 11 at 5. When applying *NHK*, the Board has balanced the following non-exclusive factors (herein "*Fintiv* factors"):

> 1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
>
> 2. proximity of the court's trial date to the Board's projected statutory deadline for a final written decision;
>
> 3. investment in the parallel proceeding by the court and the parties;
>
> 4. overlap between issues raised in the petition and in the parallel proceeding;
>
> 5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
>
> 6. other circumstances that impact the Board's exercise of discretion, including the merits.

Id. at 5–6.

We discuss the parties' arguments in the context of considering the above factors.

1. Whether a stay exists or is likely to be granted if a proceeding is instituted

Petitioner points out that neither party to the district court case has requested a stay. Pet. 19. Petitioner argues that "given that a motion to stay has not yet been filed, the Board should not infer the outcome of that motion." *Id.* at 20. Patent Owner counters that Judge Gilstrap is the presiding judge in the district court case, and "it is unlikely that Judge Gilstrap would grant a stay in the parallel proceeding." Prelim. Resp. 46–47. According to Patent Owner, "it would be March 8, 2021 before the parties know whether institution will occur," wherein, "[b]y that point, . . . Monarch will have already incurred the majority of expenses associated with the litigation – which Judge Gilstrap has previously found to be sufficiently showing of prejudice." *Id.* at 47 (citing *Solas OLED Ltd. v. Samsung Display Co.*, No. 2:19-CV-00152-JRG, 2020 U.S. Dist. LEXIS 125973, at *4–6 (E.D. Tex. July 17, 2020)).

On the present record, neither party has produced evidence that a stay has been requested or that the district court has considered a stay in the parallel litigation. Further, a judge determines whether to grant a stay based on the facts of each specific case as presented in the briefs by the parties. Although Patent Owner cites to the presiding Judge's finding in another proceeding (Prelim. Resp. 47), we decline to infer, based on actions taken in different cases with different facts, how the district court would rule should a stay be requested by the parties in the parallel litigation. *Fintiv* at 12. Thus, we find that this factor does not weigh for or against exercising discretion to deny institution under § 314(a).

2. Proximity of the court's trial date to the Board's projected statutory deadline for a final written decision

The parties agree that the trial in the Eastern District of Texas currently is scheduled to begin on June 7, 2021. *See* Prelim. Resp. 48; Pet. Prelim. Reply 2. However, Petitioner expresses its concern about the uncertainty of the June 7, 2021 trial date due to the COVID-19 pandemic as well as the district court's backlog. Pet. Prelim. Reply 2–3. In particular, Petitioner argues that "the rescheduled June 7, 2021 trial date is still not guaranteed because Judge Gilstrap currently has six other trials scheduled for jury selection on that same date," and that "in the January-May 2021 period, Judge Gilstrap has more than 60 trials scheduled." *Id.* at 3 (citing Ex. 1042, 2; Ex. 1043, 1; Ex. 1044, 1; Ex. 1045, 1; Ex. 1046, 1; Ex. 1047, 1; Ex. 1048, 1–34).

Furthermore, Petitioner argues that a motion to transfer the district court case to Northern District of California is currently pending. Pet. Prelim. Reply 3. According to Petitioner, if the motion is granted, the Northern District of California would set a new case schedule, including a new trial date. *Id.* Thus, Petitioner argues that the pending motion to transfer adds uncertainty to the June 7 trial date. *Id.*

Patent Owner counters that a final written decision in this matter "would likely issue in March 2022 – well after the likely conclusion of the litigation in June 2021." Prelim. Resp. 48. According to Patent Owner, as of the filing date of the Preliminary Sur-reply of January 14, 2021, "the parties are one month away from completing discovery." PO Prelim. Sur-reply 2 (citing Ex. 2010, 3). Thus, Patent Owner contends that any "hypothetical scenarios" suggested by Petitioner, including Petitioner's "speculat[ion] that a motion to transfer might influence the timing," could

not "reasonably be expected to result in a nine-month delay of the trial date." *Id.* at 3.

Generally, if a district court's trial date is substantially earlier than the projected statutory deadline, the Board has weighed this factor in favor of exercising authority to deny institution under § 314(a). *Fintiv* at 9. We note that there is some uncertainty that the jury trial will occur on June 7, 2021. First, as Petitioner contends, a motion to transfer the district court case to Northern District of California is currently pending. Pet. Prelim. Reply 3. We decline to speculate, though, whether the district court will grant that motion..

Further, as Petitioner points out, there are six other trials scheduled for jury selection on June 7, 2021, in the Eastern District of Texas. Pet. Prelim. Reply 2–3. Although at least some of those trials will not occur on June 7, 2021, we decline to speculate as to which trials will not occur on that date.

Additionally, given the substantial nine-month gap between the scheduled June 7 trial date (and the other potential dates proposed by Patent Owner) and March 2022 (the likely date for any final written decision in this proceeding), even if the trial date were postponed substantially, it appears unlikely, on the present record, that the trial would occur after a final written decision in this proceeding.

Accordingly, on the record before us, this factor weighs in favor of exercising our discretion to deny institution pursuant to § 314(a).

3. Investment in the parallel proceeding by the district court and the parties

We consider now the amount and type of work already completed in the parallel litigation by the court and the parties at the time of the institution decision. *See Fintiv* at 9.

The Eastern District of Texas issued a claim construction order on January 7, 2021. Ex. 2013 (Claim Construction Memorandum and Order). Fact discovery currently is scheduled to have closed on January 12, 2021, expert discovery currently is scheduled to have closed on February 19, 2021, and dispositive motions currently are scheduled to have been filed by February 24, 2021. Ex. 2010 (First Amended Docket Control Order).[3] As Patent Owner contends, by the time this institution decision issues, "the parties likely will have received the [district court's] claim construction order, completed discovery, and filed all dispositive motions." Prelim. Resp. 49. According to Patent Owner, both the district court and the parties have "already made significant investments in the litigation, and most pretrial matters likely will be disposed before any decision on institution issues." In particular, Patent Owner contends that Petitioner "has already submitted its 694-page invalidity expert report in the district court case," wherein "all discovery will conclude by February 19, 2021 – likely well before the Board issues its institution decision." PO Prelim. Sur-reply 3 (emphasis omitted).

As set forth in *Fintiv*, "district court claim construction orders may indicate that the court and parties have invested sufficient time in the parallel proceeding to favor denial." *Fintiv* at 10. "This investment factor is related to the trial date factor, in that more work completed by the parties and court in the parallel proceeding tends to support the argument[] that the parallel proceeding is more advanced, a stay may be less likely, and instituting would lead to duplicative costs." *Id.*

However, Petitioner's timing in filing the Petition is also relevant to this factor. If the evidence shows that a petitioner filed its petition

[3] Neither party has advised us of any changes to the schedule.

expeditiously, such as promptly after becoming aware of the claims being asserted, this fact has weighed against denying institution. *Fintiv* at 11 (citing *Intel Corp. v. VLSI Tech. LLC*, IPR2019-01192, Paper 15 at 12–13 (PTAB Jan. 9, 2020); *Illumina Inc. v. Natera, Inc.*, IPR2019-01201, Paper 19 at 8 (PTAB Dec. 18, 2019)). Here, Petitioner contends that it "diligently reviewed prior art and prepared this Petition upon being informed on May 4, 2020 of the claims of the '775 Patent asserted by Patent Owner against Petitioner" whereas "Petitioner worked diligently to prepare and file this Petition in about two months." Pet. 19–20.

Although we do not find that Petitioner unreasonably delayed filing the Petition, we do find that the parties already have invested significantly in the Eastern District of Texas litigation. As noted above, the district court claim construction order issued on January 7, 2021, fact discovery currently is scheduled to have closed on January 12, 2021, expert discovery currently is scheduled to have closed on February 19, 2021, and dispositive motions are scheduled to have been filed by February 24, 2021.

We also find that the investment made by the parties in the district court litigation relating to issues of patent validity overlap with the issues in this *inter partes* proceeding. First, the claim construction issues addressed by the court overlap with the issues in this proceeding. For example, the district court made a finding with respect to the term "link" in claims 1–7 of the '775 patent, and, in this proceeding, Patent Owner contends that neither of the prior art relied upon by Petitioner discloses a "link." Ex. 2013, 35; Prelim. Resp. 28.

Furthermore, the same prior art at issue here is also at issue in the district court. *See* Pet. 21; Prelim. Resp. 49. Expert discovery is scheduled to have closed on February 19, 2021 (prior to the issuance of this Decision),

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and the parties already have invested significant resources in preparing expert reports on overlapping invalidity issues. *See* PO Prelim. Sur-reply 3 ("Cisco has already submitted its 694-page invalidity expert report").

Weighing the facts in this particular case, including the time invested by the parties and the district court in the parallel litigation, the extent to which the investment in the district court proceeding relates to issues of patent validity, and the timing of the filing of the Petition, we find that this factor weighs in favor of exercising our discretion to deny institution pursuant to § 314(a).

4. Overlap between issues raised in the Petition and in the parallel proceeding

This factor evaluates "concerns of inefficiency and the possibility of conflicting decisions" when substantially identical prior art is submitted in both the district court and the *inter partes* review proceedings. *Fintiv* at 12.

Patent Owner points out Petitioner "concedes" that "Petitioner asserted the exact same invalidity grounds in the parallel proceeding." Prelim. Resp. 49 (citing Pet. 21). However, Patent Owner also acknowledges that Petitioner represents that it plans to withdraw the overlapping grounds from the district court litigation if the Board issues a decision granting institution. *Id.* at 49–50.

In particular, as set forth in its Preliminary Reply, Petitioner explains that it "stipulated not to pursue in the district court proceeding the same invalidity grounds raised in the Petition, if the Board institutes trial." Pet. Prelim. Reply 5. According to Petitioner, "[t]his stipulation eliminates any overlap between this proceeding and the district court proceeding, if the Board institutes review." *Id.* at 5 (citing *Fintiv* at 12–13). Petitioner contends that "[o]ther panels have found that such stipulations avoid

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'overlap' between the proceedings, which weighs in favor of institution." *Id.* (citing *Sand Revolution II, LLC v. Cont'l Intermodal Grp.–Trucking LLC*, IPR2019-01393, Paper 24 at 12 (PTAB June 16, 2020) (informative) ("*Sand*"); *NanoCellect Biomedical, Inc. v. Cytonome/ST, LLC*, IPR2020-00551, Paper 19 at 23 (PTAB Aug. 27, 2020); *Apple Inc. v. SEVEN Networks, LLC*, IPR2020-00285, Paper 10 at 22 (PTAB July 28, 2020)).

In its Sur-reply, Patent Owner asserts that Petitioner "only offered to 'cease asserting in the district court litigation the combination of references on which trial is instituted for the claims on which trial is instituted, while trial is instituted.'" PO Prelim. Sur-reply 4 (citing Pet. 21–22). According to Patent Owner, "[s]uch a narrow stipulation favors exercising discretionary denial." *Id.* (citing *Sotera Wireless, Inc. v. Masimo Corporation*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020) ("*Sotera*")). That is, according to Patent Owner, what is important is whether the "Petitioner broadly stipulates to not pursue '*any ground* raised or that could have been reasonably raised.'" *Id.* (quoting *Sotera* at 19). Patent Owner contends that "Petitioner's overly narrow stipulation does little to 'address[] concerns of duplicative efforts and potentially conflicting decisions' in the litigation." *Id.* (alteration in original).

As Patent Owner points out, Petitioner is asserting the "exact same invalidity grounds" here as in the district court. Prelim. Resp. 49; *see* Pet. 21. However, Petitioner's stipulation mitigates, to some degree, the concerns over duplicative efforts between the district court and the Board, as well as concerns over potentially conflicting decisions.

Given the facts here that Petitioner's stipulation reduces concerns regarding overlapping issues, this factor weighs marginally against discretionary denial under § 314(a).

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5. Identity of Petitioner and the defendant in the underlying litigation

"If a petitioner is unrelated to a defendant in an earlier court proceeding, the Board has weighed this fact against exercising discretion." *Fintiv* at 13–14. Both parties acknowledge that Petitioner here is the defendant in the underlying litigation. Pet. 22; Prelim. Resp. 50. Therefore, we find that this factor weighs in favor of exercising our discretion to deny institution pursuant to § 314(a).

6. Other circumstances that impact the Board's exercise of discretion, including the merits

As indicated in *Fintiv*, a balanced assessment of factors may include consideration of the merits. *Fintiv* at 14–15. Here, the parties make arguments related to the merits of Petitioner's unpatentability challenges. Pet. 22; Prelim. Resp. 50; Pet. Prelim. Reply 6; PO Prelim. Sur-reply 4. In particular, Petitioner contends that claims 1 and 6 of the '775 patent are obvious over the teachings of Aggarwal and Hussain. Pet. 16. Patent Owner responds that "the merits of this Petition are particularly weak" wherein "Petitioner has not shown that Aggarwal or Hussain, alone or in combination, disclose a 'link' or a 'link being shared' within the meaning of the '775 Patent claims." Prelim. Resp. 50.

The decision whether to exercise discretion to deny institution under § 314(a) is based on "a balanced assessment of all relevant circumstances in the case, including the merits." Consolidated TPG 58. We have reviewed Petitioner's unpatentability arguments in the Petition and Reply, and Patent Owner's arguments in the Preliminary Response and Sur-reply. Based on the limited record before us, we do not find that the merits outweigh the

other *Fintiv* factors. Thus, we find that this factor does not weigh for or against exercising discretion to deny institution under § 314(a).

7. Conclusion on discretionary denial under § 314(a)

As noted in *Fintiv*, we consider the above six factors when taking "a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review." *Fintiv* at 6. We recognize that weighing the *Fintiv* factors in this proceeding is a close call. However, based on the particular circumstances of this case, we determine that instituting an *inter partes* review would be an inefficient use of Board resources. As discussed above, while factor 4 weighs marginally against denying institution, factors 2, 3 and 5 weigh more significantly in favor of denying institution, with factors 1 and 6 being neutral. On balance, after a holistic consideration of the relevant facts, we are persuaded to exercise our discretion pursuant to § 314(a) to deny institution.

III. CONCLUSION

For the foregoing reasons, we exercise our discretion pursuant to 35 U.S.C. § 314(a) to deny institution of *inter partes* review.

IV. ORDER

For the reasons given, it is

ORDERED that the Petition (Paper 2) is denied as to the challenged claims of the '775 patent; and

FURTHER ORDERED that no *inter partes* review is instituted.

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/528,083	03/06/2012	8130775	F71.12-0022	1617

27367 7590 02/15/2012

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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 141 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):

Frederic Jounay, Pleumeur Bodou, FRANCE;
Philippe Niger, Lannion, FRANCE;
Arnaud Cauvin, Paris, FRANCE;

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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)

27367 7590 12/30/2011
WESTMAN CHAMPLIN & KELLY, P.A.
SUITE 1400
900 SECOND AVENUE SOUTH
MINNEAPOLIS, MN 55402

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.
12/528,083	11/25/2009	Frederic Jounay	F71.12-0022	1617

TITLE OF INVENTION: MECHANISM FOR PROTECTING A PSEUDO-WIRE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	03/30/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
PREVAL, LIONEL	2475	370-401000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

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

1 David D. Brush;
2 Westman, Champlin & Kelly, P.A.
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: France Telecom

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Paris, France

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 231123 (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 David D. Brush Date 1/27/2012

Typed or printed name David D. Brush Registration No. 34,557

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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

Electronic Patent Application Fee Transmittal

Application Number:	12528083
Filing Date:	25-Nov-2009
Title of Invention:	MECHANISM FOR PROTECTING A PSEUDO-WIRE
First Named Inventor/Applicant Name:	Frederic Jounay
Filer:	David D. Brush/Danel Edminster
Attorney Docket Number:	F71.12-0022

Filed as Large Entity

U.S. National Stage under 35 USC 371 Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1740	1740
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**2040**

Electronic Acknowledgement Receipt

EFS ID:	11940443
Application Number:	12528083
International Application Number:	
Confirmation Number:	1617
Title of Invention:	MECHANISM FOR PROTECTING A PSEUDO-WIRE
First Named Inventor/Applicant Name:	Frederic Jounay
Customer Number:	27367
Filer:	David D. Brush/Danel Edminster
Filer Authorized By:	David D. Brush
Attorney Docket Number:	F71.12-0022
Receipt Date:	27-JAN-2012
Filing Date:	25-NOV-2009
Time Stamp:	16:34:17
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$2040
RAM confirmation Number	3652
Deposit Account	231123
Authorized User	BRUSH,DAVID D.

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. 1.492 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

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	Miscellaneous Incoming Letter	FTRD-06403-LM-AG_Comments-on-Statements-of-Reasons-for-Allowance_2012-01-27.pdf	17105 2ae5a4c0c026afe72926f415b2787b10c812bdd6	no	1
Warnings:					
Information:					
2	Issue Fee Payment (PTO-85B)	FTRD-06403-LM-AG_Issue-Fee-Transmittal_2012-01-27.pdf	101348 51fec89ffb2a19a124efd546a30642831e66bcb9	no	1
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	32147 eadf0c3c19f9c7fa302e6652b075d88184886b05	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	150600		

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Frederic Jounay et al.	Confirmation No.: 1617
Appln. No.	:	12/528,083	Group Art Unit: 2475
Filed	:	November 25, 2009	Examiner: Preval, Lionel
For	:	MECHINISM FOR PROTECTING A PSEUDO-WIRE	
Docket No.	:	F71.12-0022	

COMMENTS ON STATEMENT OF REASONS FOR ALLOWANCE

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

I HEREBY CERTIFY THAT THIS PAPER IS BEING TRANSMITTED VIA THE PATENT OFFICE EFS, TO THE COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450, THIS 27TH DAY OF JANUARY, 2012.

/DAVID D. BRUSH/
PATENT ATTORNEY

Sir:

The Applicant agrees with the Examiner's Statement of Reasons for Allowance to the extent that the claims of the present invention are patentable over the references in the record. The Applicant expressly traverses the Examiner's Statement of Reasons for Allowance to the extent that any comment is intended or has the effect of limiting a claim scope, explicitly or implicitly, by not reciting verbatim and/or in complete context, the respective claim language, or is intended or has the effect of limiting a claim scope by stating or implying that all the reasons of patentability are in any way fully enumerated.

The Director is authorized to charge any fee deficiency required by this paper to Deposit Account No. 23-1123.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: /David D. Brush/
David D. Brush, Reg. No. 34,557
900 Second Avenue South, Suite 1400
Minneapolis, Minnesota 55402-3244
Phone: (612) 334-3222
Fax: (612) 334-3312

DDB/dme

Examiner-Initiated Interview Summary	Application No.	Applicant(s)	
	12/528,083	JOUNAY ET AL.	
	Examiner	Art Unit	
	LIONEL PREVAL	2475	

All participants (applicant, applicant's representative, PTO personnel):

(1) *LIONEL PREVAL*. (3)_____.

(2) *DAVID D. BRUSH*. (4)_____.

Date of Interview: *22 December 2011*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☐103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *1-9*.

Identification of prior art discussed: _____.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Examiner saught and received authorization for an examiner's amendments to the claims to correct minor antecedent issues such as to clarify the claims language.

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/Robert W Wilson/ Primary Examiner, Art Unit 2475	

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

27367 7590 12/30/2011

WESTMAN CHAMPLIN & KELLY, P.A.
SUITE 1400
900 SECOND AVENUE SOUTH
MINNEAPOLIS, MN 55402

EXAMINER
PREVAL, LIONEL

ART UNIT	PAPER NUMBER
2475	

DATE MAILED: 12/30/2011

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/528,083	11/25/2009	Frederic Jounay	F71.12-0022	1617

TITLE OF INVENTION: MECHANISM FOR PROTECTING A PSEUDO-WIRE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	03/30/2012

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.

Juniper Exhibit 1002, page 56

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)

27367 7590 12/30/2011

WESTMAN CHAMPLIN & KELLY, P.A.
SUITE 1400
900 SECOND AVENUE SOUTH
MINNEAPOLIS, MN 55402

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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.
12/528,083	11/25/2009	Frederic Jounay	F71.12-0022	1617

TITLE OF INVENTION: MECHANISM FOR PROTECTING A PSEUDO-WIRE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	03/30/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
PREVAL, LIONEL	2475	370-401000

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

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

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

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

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

1 _____

2 _____

3 _____

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

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

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

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

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

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

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

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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

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

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

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/528,083	11/25/2009	Frederic Jounay	F71.12-0022	1617

27367 7590 12/30/2011

WESTMAN CHAMPLIN & KELLY, P.A.
SUITE 1400
900 SECOND AVENUE SOUTH
MINNEAPOLIS, MN 55402

EXAMINER	
PREVAL, LIONEL	

ART UNIT	PAPER NUMBER
2475	

DATE MAILED: 12/30/2011

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

The Patent Term Adjustment to date is 141 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 141 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.

Juniper Exhibit 1002, page 58

Privacy Act Statement

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

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

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

Notice of Allowability	Application No.	Applicant(s)	
	12/528,083	JOUNAY ET AL.	
	Examiner	Art Unit	
	LIONEL PREVAL	2475	

-- 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 *09/19/2011*.

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 *1-9*.

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 Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
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 _____.

/Robert W Wilson/
Primary Examiner, Art Unit 2475

DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with David D. Brush on 12/22/2011 at 3:20 PM.

The application has been amended as follows:

1. (Currently amended) A method of setting up at least two pseudo-wires able to broadcast a data stream, comprising:

setting up a first pseudo-wire comprising a first link set up between an input router of a packet-switched network and an intermediate router of the packet-switched network and a second link set up between said intermediate router and a first output router of the packet-switched network; and

setting up a second pseudo-wire between said input router and a second output router of the packet-switched network, wherein the second pseudo-wire comprises said first link and a third link set up between said intermediate router and said second output router, said first link being shared by the ~~two~~ first and second pseudo-wires.

2. (Previously Presented) The method according to claim 1, wherein the steps of setting up the first and second pseudo-wires are performed at the initiative of said input

router by sending said intermediate router a message for setting-up said third link including an identifier of said input router, an identifier of said first output router, and a field containing an identifier of said second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire.

3. (Currently amended) A method of broadcasting a data ~~streams~~ over a first pseudo-wire comprising a first link set up between an input router of a packet-switched network and an intermediate router of said packet-switched network and a second link set up between said intermediate router and a first output router of said packet-switched network, said method comprising:

a step of detecting a fault affecting the first output router; and

on reception of information on a fault affecting said first output router, a step of switching the data stream to a second pseudo-wire comprising said first link and a third link set up between said intermediate router and a second output router of said packet-switched network, said first link being shared by the first and second pseudo-wires.

4. (Currently Amended) An intermediate router configured to be connected by a first link to an input router of a packet-switched network and by a second link to a first output router of said packet-switched network, said first and second links constituting a first pseudo-wire able to broadcast a data stream, the intermediate router comprising:

means for receiving a first message for setting up the first link including an identifier of said input router, an identifier of said first output router, and a field containing an identifier of a second output router of said network;

means for sending a second message for setting up said second link between said intermediate router and said first output router and a third message for setting up a third link between said intermediate router and said second output router, the second message including the identifier of said input router and the identifier of said first output router, the third message including the identifier of said input router and the identifier of said second output router, and said first and third links constituting a second pseudo-wire;

means for configuring at least one switching table for said broadcasting with a parameter specifying that the second pseudo-wire is a back-up pseudo-wire, said parameter being included in the first set-up message.

5. (Previously Presented) The intermediate router according to claim 4, wherein the intermediate router includes means for detecting a fault affecting said first output router and means for switching the stream of data from the second link to the third link.

6. (Currently Amended)A computer program product stored on a non-transitory computer- readable medium and comprising program code instructions for implementing a method of setting up at least two pseudo-wires able to broadcast a data

stream when said program is executed by a computer, ~~the method comprising~~ the program code instructions comprising instructions for:

setting up a first pseudo-wire comprising a first link set up between an input router of a packet-switched network and an intermediate router of the packet-switched network and a second link set up between said intermediate router and a first output router of the packet-switched network; and

setting up a second pseudo-wire between said input router and a second output router of the packet-switched network, wherein the second pseudo-wire comprises said first link and a third link set up between said intermediate router and said second output router, said first link being shared by the first and second pseudo-wires.

7. (Currently Amended) A computer program product stored on a non-transitory computer- readable medium and comprising program code instructions for implementing a method of broadcasting a data stream~~s~~ over a first pseudo-wire when said program is executed by a computer, wherein the first pseudo-wire comprises a first link set up between an input router of a packet- switched network and an intermediate router of said packet-switched network and a second link set up between said intermediate router and a first output router of said packet-switched network, ~~said method comprising~~ the program code instructions comprising instructions for:

detecting a fault affecting the first output router; and on reception of information on a fault affecting said first output router, switching he data stream to a second pseudo-wire comprising said first link and a third link set up between said intermediate

router and a second output router of said packet- switched network, said first link being shared by the first and second pseudo-wires.

8. (Currently Amended) A method comprising:

generating a signal configured to be transmitted between an input router of a packet-switched network and an intermediate router of said packet-switched network, said signal carrying a message for setting up at least two pseudo-wires able to broadcast a stream of data, ~~the~~ a first pseudo-wire being set up between said input router and a first output router of said packet-switched network, ~~the~~ a second pseudo-wire being set up between said input router and a second output router of said packet-switched network, said set-up message including:

an identifier of said input router;

an identifier of said first output router; and

a field containing an identifier of said second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire; and transmitting the signal between the input router of the packet-switched network and the intermediate router of said packet-switched network.

9. (Currently Amended) The method according to claim 8, wherein the field further contains an identifier of said intermediate router.

Allowable Subject Matter

2. Claims 1 – 9 have been allowed. The following is an examiner's statement of reasons for allowance:

Claims 1 – 9 have been allowed since no prior art reference or combination of prior art reference disclose or suggest the combination of limitations specified in the amended independent Claims including:

"setting up a second pseudo-wire between said input router and a second output router of the packet-switched network, wherein the second pseudo-wire comprises said first link and a third link set up between said intermediate router and said second output router, said first link being shared by the first and second pseudo-wires" and "a step of switching a data stream to a second pseudo-wire comprising said first link and a third link set up between said intermediate router and a second output router of said packet-switched network, said first link being shared by the first and second pseudo-wires" and "means for sending a second message for setting up said second link between said intermediate router and said first output router and a third message for setting up a third link between said intermediate router and said second output router, the second message including the identifier of said input router and the identifier of said first output router, the third message including the identifier of said input router and the identifier of said second output router, and said first and third links constituting a second pseudo-wire; and a computer program product for setting up a second pseudo-wire between said input router and a second output router of the packet-switched network, wherein

the second pseudo-wire comprises said first link and a third link set up between said intermediate router and said second output router, said first link being shared by the first and second pseudo-wires" and switching the data stream to a second pseudo-wire comprising said first link and a third link set up between said intermediate router and a second output router of said packet- switched network, said first link being shared by the first and second pseudo-wires".

With respect to claim 4, the corresponding structure for each of the means in the claim is correlated to elements set forth in the written description as follows: structure for the means for receiving a message is an input interface as described on page 12 of the specification "on reception of the first set-up message SIGI, the intermediate router S-PE extracts the identifier of the input router T-PEI" and structure for the means for sending a message is an output interface as described on page 13 of the specification "The packets sent to the first output router T-PE2 are directed to the interface if2 of the intermediate router S-PE" and structure for the means for configuring at least one switching table is memory as described on page 12, 18 and 21 of the specification "The intermediate router S-PE uses this information to fill in a switching table TC" and "This intermediate table contains for a given FEC information indicating the label that must be inserted into the header of the message in order to perform the next hop and the output interface to which to direct the data streams".

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance.

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LIONEL PREVAL whose telephone number is (571) 270-5673. The examiner can normally be reached on Monday - Thursday 10:00AM - 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dang Ton can be reached on (571) 272-3171. 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.

/Robert W Wilson/

Primary Examiner, Art Unit 2475

/L. P./
Examiner, Art Unit 2475

PTO/SB/08a (03-09)
Approved for use through 04/30/2009. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	12/528083
Filing Date	2009-08-21
First Named Inventor	Frederic Jounay et al.
Art Unit	2475
Examiner Name	Lionel Preval
Attorney Docket Number	F71.12-0022

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12/528083
	Filing Date	2009-08-21
	First Named Inventor	Frederic Jounay et al.
	Art Unit	2475
	Examiner Name	Lionel Preval
	Attorney Docket Number	F71.12-0022

/L.P./	1	P. PAN (HAMMERHEAD SYSTEMS); M. BOCCI, and M. AISSAOUI (ALCATEL); F. BLAUS and H. OULD-BRAHIM (NORTEL), "Pseudo Wire Protection" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, Chapter No. 3, July 1, 2006	☐
/L.P./	2	M. BOCCI (ALCATEL); S. BRYANT (CISCO SYSTEMS), "An Architecture for Multi-Segment Pseudo Wire Emulation Edge-to-Edge" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, Vol. pwe3, no. 2, October 20, 2006	☐
/L.P./	3	E. MANNIE, D. PAPADIMITRIOU: "Recovery (Protection and Restoration) Terminology for Generalized Multi-Protocol Label Switching (GMPLS)" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, October 5, 2004	☐
/L.P./	4	L. MARTINI (CISCO SYSTEMS INC); M. BOCCI and F. BALUS (ALCATEL): "Dynamic Placement of Multi Segment Pseudo Wires" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, Vol. pwe3, no., October 2, 2006	☐
/L.P./	5	International Search Report for corresponding International Application No. PCT/FR2008/050324, filed February 26, 2008	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/Lionel Preval/	Date Considered	06/14/2011

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

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

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BIB DATA SHEET

CONFIRMATION NO. 1617

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/528,083	11/25/2009	370	2475	F71.12-0022

APPLICANTS

Frederic Jounay, Pleumeur Bodou, FRANCE;
Philippe Niger, Lannion, FRANCE;
Arnaud Cauvin, Paris, FRANCE;

**** CONTINUING DATA ***************************

This application is a 371 of PCT/FR08/50324 02/26/2008

**** FOREIGN APPLICATIONS ***************************

FRANCE 0753489 02/26/2007

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

01/09/2010

Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☑ Yes ☐ No	☑ Yes ☐ No	/LIONEL PREVAL/ Examiner's Signature	☐ Initials	FRANCE	6	9	6

ADDRESS

WESTMAN CHAMPLIN & KELLY, P.A.
SUITE 1400
900 SECOND AVENUE SOUTH
MINNEAPOLIS, MN 55402
UNITED STATES

TITLE

Mechanism for Protecting a Pseudo-Wire

FILING FEE RECEIVED		
1770	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

Issue Classification

Application/Control No.	Applicant(s)/Patent Under Reexamination
12528083	JOUNAY ET AL.
Examiner	**Art Unit**
LIONEL PREVAL	2475

ORIGINAL		INTERNATIONAL CLASSIFICATION														
CLASS	SUBCLASS	CLAIMED									NON-CLAIMED					
370	401	H	0	4	L	12 / 28 (2006.01.01)										

CROSS REFERENCE(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
710	316				
379	242				

☒ 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														
	2														
	3														
	4														
	5														
	6														
	7														
	8														
	9														

/LIONEL PREVAL/ Examiner.Art Unit 2475	12/22/2011	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	9	
/ROBERT WILSON/ Primary Examiner.Art Unit 2475	12/28/2011	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12528083	JOUNAY, FREDERIC
	Examiner	Art Unit
	LIONEL PREVAL	2475

✓	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	06/15/2011	12/22/2011							
	1	✓	=							
	2	✓	=							
	3	✓	=							
	4	✓	=							
	5	✓	=							
	6	✓	=							
	7	✓	=							
	8	✓	=							
	9	✓	=							

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L4	157	((pseudowire or pseudo$1wire) near5 (protect$4 or backup or back $1up or main or second$4 or redund $6))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2011/12/22 19:34
L6	123333	(((rout$4 or forward$4 or lookup or learn$4 or look$1up) near2 (table or base or database or cach $4)) with (refresh $4 or generat$4 or transmi$8 or send $4 or receiv$4 or recept$4 or transfer $4 or forward$4))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2011/12/22 19:34
L7	8892	L6 and (network near3 (manag$4))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2011/12/22 19:34
L8	7231	L7 and (network near3 (connect$4))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2011/12/22 19:34
L9	1322	L8 and ((peer near2 peer) or P2P)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2011/12/22 19:34
L10	1121	L9 and (rout$4 near3 (information or data or message))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2011/12/22 19:34

L11	239	L10 and (neighbor $4 node)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2011/12/22 19:34
L14	299	((pseudowire or pseudo$1wire) same (protect$4 or backup or back $1up or main or second$4 or redund $6 or alterna$4))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2011/12/22 19:34
L15	114	L14 and (((rout$4 or forward$4 or lookup or learn$4 or look$1up) near2 (table or base or database or cach $4)) with (refresh $4 or generat$4 or transmi$8 or send $4 or receiv$4 or recept$4 or transfer $4 or forward$4))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2011/12/22 19:34
L16	94	L15 and (network near3 (connect$4 or manag$4))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2011/12/22 19:34

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	99	((pseudowire or pseudo $1wire) near5 (first or second $4 or (set$4 near2 up))).clm.	US-PGPUB; USPAT; UPAD	ADJ	ON	2011/12/22 19:10
L2	96	L1 and (router or edge)	US-PGPUB; USPAT; UPAD	ADJ	ON	2011/12/22 19:12
L3	44	L2 and (@AD<"20070309" OR @RLAD<"20070309" OR @PTAD<"20070309" OR @PD<"20070309")	US-PGPUB; USPAT; UPAD	ADJ	ON	2011/12/22 19:13

12/ 22/ 2011 7:35:54 PM
C:\ Documents and Settings\ lpreval\ My Documents\ EAST\ Workspaces\ 12528083.wsp

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12528083	JOUNAY, FREDERIC
	Examiner	Art Unit
	LIONEL PREVAL	2475

SEARCHED			
Class	Subclass	Date	Examiner
370	401, 228, 389	06/14/2011	LP
709	238	06/14/2011	LP
Above	Refreshed	12/22/2011	LP

SEARCH NOTES		
Search Notes	Date	Examiner
Consulted with SPE Dang Ton	06/14/2011	LP
Double Patenting Search Done	06/14/2011	LP
Inventorship Search conducted	06/14/2011	LP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
370	401	06/14/2011	LP

/LIONEL PREVAL/ Examiner.Art Unit 2475	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor :	Frederic Jounay et al.	Confirmation No: 1617
Appln. No.:	12/528,083	Group Art Unit: 2475
Filed :	November 25, 2009	
For :	Mechanism for Protecting a Pseudo-Wire	Examiner: Preval, Lionel
Docket No.:	F71.12-0022	

AMENDMENT

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

I HEREBY CERTIFY THAT THIS PAPER IS BEING TRANSMITTED VIA THE PATENT OFFICE EFS, TO THE COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450, THIS 19TH DAY OF SEPTEMBER, 2011.

/DAVID D. BRUSH/
PATENT ATTORNEY

Sir:

This is in response to the Office Action mailed on June 17, 2011. Please amend the above-identified application as follows:

CLAIMS

Please amend the presently pending claims as follows:

1. (Previously Presented) A method of setting up at least two pseudo-wires able to broadcast a data stream, comprising:

setting up a first pseudo-wire comprising a first link set up between an input router of a packet-switched network and an intermediate router of the packet-switched network and a second link set up between said intermediate router and a first output router of the packet-switched network; and

setting up a second pseudo-wire between said input router and a second output router of the packet-switched network, wherein the second pseudo-wire comprises said first link and a third link set up between said intermediate router and said second output router, said first link being shared by the two pseudo-wires.

2. (Previously Presented) The method according to claim 1, wherein the steps of setting up the first and second pseudo-wires are performed at the initiative of said input router by sending said intermediate router a message for setting-up said third link including an identifier of said input router, an identifier of said first output router, and a field containing an identifier of said second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire.

3. (Previously Presented) A method of broadcasting data streams over a first pseudo-wire comprising a first link set up between an input router of a packet-switched network and an intermediate router of said packet-switched network and a second link set up between said intermediate router and a first output router of said packet-switched network, said method comprising:

a step of detecting a fault affecting the first output router; and

on reception of information on a fault affecting said first output router, a step of switching the data stream to a second pseudo-wire comprising said first link and a third link

set up between said intermediate router and a second output router of said packet-switched network, said first link being shared by the first and second pseudo-wires.

4. (Currently Amended) An intermediate router ~~adapted~~ configured to be connected by a first link to an input router of a packet-switched network and by a second link to a first output router of said packet-switched network, said first and second links constituting a first pseudo-wire able to broadcast a data stream, the intermediate router comprising:

· means for receiving a first message for setting up the first link including an identifier of said input router, an identifier of said first output router, and a field containing an identifier of a second output router of said network;

· means for sending a second message for setting up said second link between said intermediate router and said first output router and a third message for setting up a third link between said router and said second output router, the second message including the identifier of said input router and the identifier of said first output router, the third message including the identifier of said input router and the identifier of said second output router, and said first and third links constituting a second pseudo-wire;

· means for configuring at least one switching table for said broadcasting with a parameter specifying that the second pseudo-wire is a back-up pseudo-wire, said parameter being included in the first set-up message.

5. (Currently Amended) The intermediate router according to claim 4, wherein the intermediate router includes means for detecting a fault affecting said first output router and means for switching the stream of data from the second link to the third link.

6. (Currently Amended) A computer program product stored on a non-transitory computer-readable medium and comprising program code instructions for implementing a method of setting up at least two pseudo-wires able to broadcast a data stream when said program is

executed by a computer, the ~~method comprising~~ the program code instructions comprising instructions for:

setting up a first pseudo-wire comprising a first link set up between an input router of a packet-switched network and an intermediate router of the packet-switched network and a second link set up between said intermediate router and a first output router of the packet-switched network; and

setting up a second pseudo-wire between said input router and a second output router of the packet-switched network, wherein the second pseudo-wire comprises said first link and a third link set up between said intermediate router and said second output router, said first link being shared by the two pseudo-wires.

7. (Currently Amended) A computer program product stored on a non-transitory computer-readable medium and comprising program code instructions for implementing a method of broadcasting data streams over a first pseudo-wire when said program is executed by a computer, wherein the first pseudo-wire comprises a first link set up between an input router of a packet-switched network and an intermediate router of said packet-switched network and a second link set up between said intermediate router and a first output router of said packet-switched network, said ~~method comprising~~ the program code instructions comprising instructions for:

~~a step of~~ detecting a fault affecting the first output router; and

on reception of information on a fault affecting said first output router, ~~a step of~~ switching the data stream to a second pseudo-wire comprising said first link and a third link set up between said intermediate router and a second output router of said packet-switched network, said first link being shared by the first and second pseudo-wires.

8. (Currently Amended) A method comprising:

generating a signal ~~adapted~~ configured to be transmitted between an input router of a packet-switched network and an intermediate router of said packet-switched

network, said signal carrying a message for setting up at least two pseudo-wires able to broadcast a stream of data, the first pseudo-wire being set up between said input router and a first output router of said packet-switched network, the second pseudo-wire being set up between said input router and a second output router of said packet-switched network, said set-up message including:

an identifier of said input router;

an identifier of said first output router; and

a field containing an identifier of said second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire; and

transmitting the signal between the input router of the packet-switched network and the intermediate router of said packet-switched network.

9. (Currently Amended) The ~~signal~~ method according to claim 8, wherein the field further contains an identifier of said intermediate router.

REMARKS

This Amendment is in response to the Office Action dated June 17, 2011. Applicant respectfully requests reconsideration and allowance of all pending claims in view of the above-amendments and the following remarks.

I. CLAIM OBJECTIONS

Claims 4, 5, 6, 7, 9 were objected to because of minor informalities.

As suggested in the Office Action, claims 4 and 8 are amended to replace "adapted to" with "configured to".

Also, the term "router" is amended in claims 4 and 5 to refer to an "intermediate router" in order to better distinguish between the input and output routers, as suggested in the Office action.

Claims 6 and 7 are amended generally as suggested in the Office Action to replace "said method comprising" with "the program code instructions comprising instructions for". Although Applicant notes that the prior versions of these computer-readable medium claims had formats that are extremely common definite under §112. They recited computer-readable mediums comprising program code instructions for performing a certain method and the steps of that method.

Claim 9 is amended to replace "The signal" with "The method" to provide better antecedent basis with respect to claim 8 (which was previously amended to replace "A signal" with "A method" in the preliminary amendment).

The above claims amendments are made in response to the claims objections and not in view of any prior art reference.

II. CLAIM REJECTIONS – 35 U.S.C. § 112

Claims 4, 5, and 9 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

As discussed above, these claims are amended as suggested in the Office Action and should now be sufficiently definite.

III. CLAIM REJECTIONS – 35 U.S.C. § 101

Claims 6 and 7 were rejected under 35 U.S.C. § 101 because the phrase "computer program product" as recited in claims 6 and 7, line 1 was interpreted as covering transitory mediums.

The Office Action suggests Applicant change the phrase "computer program product" to "non-transitory computer program product". However, Applicant believes it is more appropriate to change the phrase "computer-readable medium" with "non-transitory computer-readable medium."

IV. CLAIM REJECTIONS – 35 U.S.C. § 102

Claims 1-5, 8 and 9 were rejected under 35 U.S.C. 102(e) as being allegedly unpatentable over Li, U.S. Publication No. 2008/0175234 A1.

Applicant respectfully disagrees.

A. **Summary of an Exemplary Embodiment of the Application**

The present application teaches, for example, a method to setup at least two multi-segment pseudowires in a "Y" shape, wherein one segment located between the input router and an intermediary router ("first link" in claim 1) is shared by first and second pseudowires.

Other features include:

a) the first pseudowire is protected by the second pseudowire (stated in Claim 2),

b) a message from the entry router to the intermediate router setups up both pseudowires (stated in Claim 2),

c) detection of a default occurring between the intermediate router and the output router is carried out by the intermediate router (stated in Claim 3),

d) switching to the second pseudowire is carried out by the intermediate router (stated in Claim 3).

B. **Li**

Li teaches a method and device to switch from a pseudowire in a group of working pseudowires to a pseudowire in a group of protective pseudowires. Pseudowires can be single- or multi-segment, and there is a one to one mapping established between pseudowires in the working group and pseudowires in the protective group. Li also teaches the necessary conditions to meet for switching.

Claim 1: Li does not teach a method wherein a first link is shared by the first pseudowire and the second pseudowire. The fact that Li teaches a method by which working and protective pw can be single- or multi-segment (para. [0014], lines 1-2) is not an indication that any of them share a segment. In Figure 2 of the present application, multi-segment pseudowires are shown as prior art.

Claim 2: Li does not teach a method wherein the steps of setting up all the pseudowires are performed at the initiative of the input router by sending the intermediate router a message. In fact, Li does not even teach the messages initiating the steps of setting up the working and protective pseudowires.

Claim 3: Li teaches a step of detecting a fault affecting the first output router. Paragraph [0048], mentioned in the action in relation to claim 4, does not teach which router performs the detecting, but it seems from paragraph [0054] that it is performed by either the entry or the output router.

Li teaches a step of switching the data stream to a second (protective) pseudowire, upon reception of a default information affecting the output router. Paragraph [0048], mentioned in the

action in relation to claim 4, does not teach which router performs the switching, but it seems from paragraph [0062] that it is performed by the entry and the output routers.

In the present application, the detecting and the switching is performed by the intermediate router, giving the advantage of speed when the default occurs between the intermediate and the output router and thus affecting the output router, in comparison to detecting and switching performed at the input router.

This latter fact is clarified by the amendment to claim 4 in which the router is defined as the **intermediate router**.

Claim 4: Li does not teach that the means for receiving the message for setting up all the pseudowires are contained in the intermediate router. Li also does not teach that the means for configuring a switching table are contained in the intermediate router. In fact, Li actually does not teach the messages initiating the steps of setting up the working and protective pseudowires, and does not teach the configuration of a switching table.

Claim 5: Li does not teach that the switching means are included in the intermediate router. It seems from paragraph [0062] that the switching means are included in the entry and output routers.

Claims 8 and 9: Li does not teach a method generating a signal configured to carry out the steps defined in previous claims.

V. CLAIM REJECTIONS – 35 U.S.C. §102

Claims 6 and 7 were rejected under 35 U.S.C. 102(e) as being allegedly unpatentable over Guichard et al., U.S. Publication No. 2008/0089227 A1.

A. **Guichard et al.**

Guichard teaches logic and apparatus for protection of multi-segment pseudowires, where pseudowires span different autonomous networks joined by stitching points. Backup pseudowire paths must not share stitching points with working pseudowire paths.

Claims 6 and 7: Guichard does not teach a non-transitory computer readable medium storing

program code instructions for setting up, or for switching, between pseudowires sharing a link. Paragraphs [0014] and [0027] mentioned by the Examiner actually state the contrary, i.e., the choice of a backup path that does not include a shared (and failed) PSP.

III. CONCLUSION

Neither Li nor Guichard anticipate all the elements of any one claim in the present application. Therefore, Applicant respectfully requests that the claim rejections under §102€ be withdrawn.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

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DDB:dme

Electronic Acknowledgement Receipt

EFS ID:	10975696
Application Number:	12528083
International Application Number:	
Confirmation Number:	1617
Title of Invention:	Mechanism for Protecting a Pseudo-Wire
First Named Inventor/Applicant Name:	Frederic Jounay
Customer Number:	27367
Filer:	David D. Brush/Danel Edminster
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Application Type:	U.S. National Stage under 35 USC 371

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		FTRD-06403-LM-AG_Amendment_2011-09-19.pdf	54841 a9ff03821b8629b10df87492a771870b2834b0df	yes	10

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	10
Warnings:			
Information:			
	Total Files Size (in bytes):	54841	

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.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/528,083	Filing Date 11/25/2009	☐ To be Mailed

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), (i), 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 $ =		OR	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 $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	09/19/2011	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 9	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 6	Minus	***6	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

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

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

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

Legal Instrument Examiner:
/KIMBERLY WHITE/

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

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/528,083	11/25/2009	Frederic Jounay	F71.12-0022	1617

27367 7590 06/17/2011

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EXAMINER	
PREVAL, LIONEL	
ART UNIT	PAPER NUMBER
2475	

MAIL DATE	DELIVERY MODE
06/17/2011	PAPER

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

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

Office Action Summary	Application No.	Applicant(s)	
	12/528,083	JOUNAY, FREDERIC	
	Examiner	Art Unit	
	LIONEL PREVAL	2475	

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

Period for Reply

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

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

Status

1)☒ Responsive to communication(s) filed on *21 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

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

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

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

10)☒ The drawing(s) filed on *21 August 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

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

a)☒ All b)☐ Some * c)☐ None of:

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

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

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

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

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *08/21/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The subject matter of a properly construed claim is defined by the terms that limit its scope. It is this subject matter that must be examined. As a general matter, the grammar and intended meaning of terms used in a claim will dictate whether the language limits the claim scope. Language that suggests or makes optional but does not require steps to be performed or does not limit a claim to a particular structure does not limit the scope of a claim or claim limitation. The following are examples of language that may raise a question as to the limiting effect of the language in a claim:

(A) statements of intended use or field of use,

(B) "adapted to" or "adapted for" clauses,

(C) "wherein" clauses, or

(D) "whereby" clauses.

This list of examples is not intended to be exhaustive. See also MPEP § 2111.04. ("During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow.... The reason is simply that during patent prosecution when claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed.... An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process.")

NOTE: The claim limitation "adapted to" is not a positive recitation. Claims 4 and 8 recites the limitation "adapted to" in the claim language, an alternative is "**configured to**", or **an action verb** to perform the function, which positively recites claim limitations. Therefore, all claim limitations following "adapted to" have not been considered for examination. That means claim limitations such as: "a router adapted to be connected by a first link to an input router of a packet-switched network" in **Claim** 4 and "a signal adapted to be transmitted between an input router of a packet- switched network and an intermediate router of the packet-switched network" in **Claim** 8 have not been considered for examination. However, the cited references do teach the above limitations.

Claim Objections

2. **Claims** 4, 5, 6, 7, 9 are objected to because of the following informalities:

Regarding **Claim** 4, claim 4 recites the limitation "the router" or "said router" in lines 4, 8 and 9. For purposes of clarity in the claim language, it is suggested that applicant place an identifier in such as (packet or data) in front of the recitation of "router" to better distinguish it from the other routers recited in the claim. A similar issue exists with respect to claim 5, lines 1 - 2. Appropriate correction is required.

Regarding **Claim** 6, claim 6 recites the limitation "the method comprising:" in line 5. It would appear that applicant meant to recite --- ~~the method comprising:~~ **the**

program code comprising instructions for: ---. If this is true it is suggested applicant make the appropriate changes.

Regarding **Claim** 7, claim 7 recites the limitation "said method comprising: a step of" in lines 8 - 9. It would appear that applicant meant to recite --- ~~said method comprising: a step of~~ **said program code comprising instructions for:** ---. If this is true it is suggested applicant make the appropriate changes.

Regarding **Claim** 9, Claim 9 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 9 recites the limitation "the signal according to claim 8", claim 8 is directed to a method, not a signal. One or more claims may be presented in dependent form, referring back to and further limiting another claim or claims in the same application. Claim 9 provides no such further limitation, as claim 9 is directed to a signal. Appropriate correction is required.

Claim Rejections - 35 USC § 112

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

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

Claims 4, 5, 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding **Claim** 4, claim 4 recites the limitation "the router" or "said router" in lines 4, 8 and 9. These recitations render the claim vague and indefinite as it is not entirely clear which of the several previously recited routers the limitations refers to. A similar issue exists with respect to claim 5, lines 1 – 2. Correction is needed to better distinguish the claimed router from the other routers recited in the claim.

Regarding **Claim** 9, Claim recites the limitation "the signal according to claim 8" in line 1. This recitation renders the claim vague and indefinite as, claim 8 is directed to a method, not a signal.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 6 and 7 are rejected under 35 U.S.C. 101 because the phrase "computer program product" as recited in claims 6 and 7, line 1 is not a non-transitory form indicated in the claim or specification or in the record. Therefore claims 6 and 7 could be interpreted to be directed to a signal per se. To overcome this rejection, it is

suggested applicant change the phrase “computer program product“ to ---non-transitory computer program product --- .

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 – 5, 8 and 9 are rejected under 35 U.S.C. 102(e) as being unpatentable over **LI** (US 20080175234 A1).

Regarding **Claim** 1, **LI** teaches a method of setting up at least two pseudo-wires able to broadcast a data stream (**LI**, FIG. 2), comprising: setting up a first pseudo-wire (an MS-PW reference model defined in the IETF draft standard draft-ietf-pwe3-ms-pw-requirements-00.txt is shown in FIG. 2, **LI**, ¶ [0040], lines 1 - 3) comprising a first link (**LI**, FIG. 2, PW1) set up between an input router (**LI**, FIG. 2, PE1) of a packet-switched network (CE1 and CE2 are costumer edge network devices, AC is an access circuit, PW switching points are PW switching nodes, **LI**, ¶ [0040], lines 4 - 6) and an intermediate router (**LI**, FIG. 2, PE2) of the packet-switched network and a second link

(**LI**, FIG. 2, PW2) set up between the intermediate router and a first output router of the packet-switched network (**LI**, FIG. 2, PE3) and setting up a second pseudo-wire between the input router and a second output router of the packet-switched network (**LI**, FIG. 2, PW3), wherein the second pseudo-wire comprises the first link and a third link set up between the intermediate router (Provider1 and Provider2 are network carriers, Provider1 and Provider2 can be the same carrier within an administrative domain, **LI**, ¶ [0040], lines 6 - 8) and the second output router, the first link being shared by the two pseudo-wires (The PW in the working PWG and the protective PWG is a single-segment PW or a multi-segment PW, **LI**, ¶ [0014], lines 1 - 2).

Regarding **Claim** 2, **LI** teaches a the steps of setting up the first and second pseudo-wires are performed at the initiative of the input router (The multi-segment PWs as shown in FIG. 3 belong to the same carrier network, **LI**, ¶ [0041], lines 1 - 4) by sending the intermediate router a message for setting-up the third link including an identifier of the input router (P is an inter-carrier network device, Tunnel1 runs from PE1 through the PSN network to PE3, **LI**, ¶ [0042], lines 1 - 2), an identifier of the first output router, and a field containing an identifier of the second output router (PWG1 carried by Tunnel1 runs from PE1 directly to PE3, **LI**, ¶ [0043], lines 1 - 2) and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire (The grouping criterions can be the same source and destination, the same path, the same type and the same QoS requirement, or a criterion specified according to transmission requirements, **LI**, ¶ [0045], lines 2 - 5).

Regarding **Claim** 3, **LI** teaches a method (**LI**, FIG. 2) of broadcasting data streams over a first pseudo-wire (an MS-PW reference model defined in the IETF draft standard draft-ietf-pwe3-ms-pw-requirements-00.txt is shown in FIG. 2, **LI**, ¶ [0040], lines 1 - 3) comprising a first link (**LI**, FIG. 2, PW1) set up between an input router (**LI**, FIG. 2, PE1) of a packet-switched network (CE1 and CE2 are costumer edge network devices, AC is an access circuit, PW switching points are PW switching nodes, **LI**, ¶ [0040], lines 4 - 6) and an intermediate router (**LI**, FIG. 2, PE2) of the packet-switched network and a second link (**LI**, FIG. 2, PW2) set up between the intermediate router and a first output router of the packet-switched network (**LI**, FIG. 2, PE3), the method comprising: a step of detecting a fault affecting the first output router and on reception of information on a fault affecting the first output router (The state of a certain PWG can be determined by the real-time monitoring of the state of one or more typical PWs in the PWG, **LI**, ¶ [0048], lines 2 - 4), a step of switching the data stream to a second pseudo-wire comprising the first link and a third link set up between the intermediate router and a second output router of the packet-switched network, the first link being shared by the first and second pseudo-wires (0X00000008 and 0X00000010 are indications of a PW state in which receive faults and transmit faults occur, respectively, and can constitute the PW protective switching condition, **LI**, ¶ [0048], lines 2 - 4).

Regarding **Claim** 4, **LI** teaches a router (**LI**, FIG. 3, P) adapted to be connected by a first link to an input router of a packet-switched network and by a second link to a

first output router of the packet-switched network, the first and second links constituting a first pseudo-wire able to broadcast a data stream (P is an inter-carrier network device, Tunnel1 runs from PE1 through the PSN network to PE3, **LI**, ¶ [0042], lines 1 - 2), the router comprising: means for receiving a first message for setting up the first link including an identifier of the input router (Provider1 and Provider2 are network carriers, Provider1 and Provider2 can be the same carrier within an administrative domain, **LI**, ¶ [0040], lines 6 - 8), an identifier of the first output router, and a field containing an identifier of a second output router of the network (PWG1 carried by Tunnel1 runs from PE1 directly to PE3, **LI**, ¶ [0043], lines 1 - 2); means for sending a second message for setting up the second link between the router and the first output router and a third message for setting up a third link between the router and the second output router (The multi-segment PWs as shown in FIG. 3 belong to the same carrier network, **LI**, ¶ [0041], lines 1 - 4), the second message including the identifier of the input router and the identifier of the first output router (The PW in the working PWG and the protective PWG is a single-segment PW or a multi-segment PW, **LI**, ¶ [0014], lines 1 - 2), the third message including the identifier of the input router and the identifier of the second output router, and the first and third links constituting a second pseudo-wire (The grouping criterions can be the same source and destination, the same path, the same type and the same QoS requirement, or a criterion specified according to transmission requirements, **LI**, ¶ [0045], lines 2 - 5); means for configuring at least one switching table for the broadcasting with a parameter specifying that the second pseudo-wire is a back-up pseudo-wire, the parameter being included in the first set-up message (One-to-

one mapping is established between the working PWG (i.e., the main PWG) and the protective PWG (i.e., the backup PWG), **LI**, ¶ [0045], lines 2 - 5).

Regarding **Claim** 5, **LI** teaches the router includes means for detecting a fault affecting the first output router (The state of a certain PWG can be determined by the real-time monitoring of the state of one or more typical PWs in the PWG, **LI**, ¶ [0048], lines 2 - 4) and means for switching the stream of data from the second link to the third link (0X00000008 and 0X00000010 are indications of a PW state in which receive faults and transmit faults occur, respectively, and can constitute the PW protective switching condition, **LI**, ¶ [0048], lines 2 - 4).

Regarding **Claim** 8, **LI** teaches a method comprising: generating a signal adapted to be transmitted between an input router of a packet- switched network and an intermediate router of the packet-switched network (One or more PWs are contained in the working PWG and the protective PWG, **LI**, ¶ [0015], lines 1 - 2), the signal carrying a message for setting up at least two pseudo-wires able to broadcast a stream of data, the first pseudo-wire being set up between the input router and a first output router of the packet-switched network (an MS-PW reference model defined in the IETF draft standard draft-ietf-pwe3-ms-pw-requirements-00.txt is shown in FIG. 2, **LI**, ¶ [0040], lines 1 - 3), the second pseudo-wire being set up between the input router and a second output router of the packet-switched network (CE1 and CE2 are costumer edge network devices, AC is an access circuit, PW switching points are PW switching nodes, **LI**, ¶

[0040], lines 4 - 6), the set-up message including: an identifier of the input router; an identifier of the first output router (PWG1 carried by Tunnel1 runs from PE1 directly to PE3, **LI**, ¶ [0043], lines 1 - 2); and a field containing an identifier of the second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire (The grouping criterions can be the same source and destination, the same path, the same type and the same QoS requirement, or a criterion specified according to transmission requirements, **LI**, ¶ [0045], lines 2 - 5); and transmitting the signal between the input router of the packet-switched network and the intermediate router of the packet-switched network (P is an inter-carrier network device, Tunnel1 runs from PE1 through the PSN network to PE3, **LI**, ¶ [0042], lines 1 - 2).

Regarding **Claim** 9, **LI** teaches the field further contains an identifier of the intermediate router (The protective switching is performed only for a desired group, thereby enabling the edge-to-edge grouped protective switching of the PWs on the PSN, **LI**, ¶ [0029], lines 9 - 11).

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 6 and 7 are rejected under 35 U.S.C. 102(e) as being unpatentable over **Guichard *et al.*** (US 20080089227 A1).

Regarding **Claim** 6, **Guichard *et al.*** teaches a computer program product stored on a computer-readable medium (Techniques disclosed herein may be encoded as logic in one or more tangible media for execution and when executed operable to perform the encoded techniques, **Guichard *et al.***, ¶ [0014], lines 6 - 9) and comprising program code instructions for implementing a method of setting up at least two pseudo-wires able to broadcast a data stream (the protection of multi-segment pseudowires by utilizing pre-computed backup paths is disclosed herein, **Guichard *et al.***, ¶ [0014], lines 4 - 6) when the program is executed by a computer, the method comprising: setting up a first pseudo-wire (PSN tunnel signaling is used to set up, maintain, and tear down the underlying PSN tunnel, **Guichard *et al.***, ¶ [0017], lines 4 - 5) comprising a first link set up between an input router of a packet-switched network (The T-PE from which traffic originates, also referred to as the source, is referred to herein as the head-end of the pseudowire, **Guichard *et al.***, ¶ [0016], lines 15 - 17) and an intermediate router of the packet-switched network (The network 100 also comprises a plurality of Pseudowire Stitching Points ("PSPs"): PSPa, PSPb, PSPc, and PSPd, **Guichard *et al.***, ¶ [0020], lines 4 - 8) and a second link set up between the intermediate router and a first output router of the packet-switched network (the T-PE to which traffic is destined, also

referred to as a sink, is referred to herein as the tail-end of the pseudowire, **Guichard *et al.***, ¶ [0016], lines 17 - 19); and setting up a second pseudo-wire between the input router and a second output router of the packet-switched network (at least one backup path is computed prior to any detection of a failure in the primary pseudowire path, **Guichard *et al.***, ¶ [0027], lines 5 - 8), wherein the second pseudo-wire comprises the first link and a third link set up between the intermediate router and the second output router, the first link being shared by the two pseudo-wires (a plurality of backup paths are established such that for each PSP in the primary path of a multi-segment pseudowire, there is at least one backup path that does not include that PSP, **Guichard *et al.***, ¶ [0027], lines 5 - 8).

Regarding **Claim** 7, **Guichard *et al.*** teaches a computer program product stored on a computer-readable medium (Techniques disclosed herein may be encoded as logic in one or more tangible media for execution and when executed operable to perform the encoded techniques, **Guichard *et al.***, ¶ [0014], lines 6 - 9) and comprising program code instructions for implementing a method of broadcasting data streams over a first pseudo-wire when the program is executed by a computer (the protection of multi-segment pseudowires by utilizing pre-computed backup paths is disclosed herein, **Guichard *et al.***, ¶ [0014], lines 4 - 6), wherein the first pseudo-wire comprises a first link set up between an input router of a packet-switched network (The T-PE from which traffic originates, also referred to as the source, is referred to herein as the head-end of the pseudowire, **Guichard *et al.***, ¶ [0016], lines 15 - 17) and an intermediate router of

the packet-switched network (The network 100 also comprises a plurality of Pseudowire Stitching Points ("PSPs"): PSPa, PSPb, PSPc, and PSPd, **Guichard *et al.***, ¶ [0020], lines 4 - 8) and a second link set up between the intermediate router and a first output router of the packet-switched network (the T-PE to which traffic is destined, also referred to as a sink, is referred to herein as the tail-end of the pseudowire, **Guichard *et al.***, ¶ [0016], lines 17 - 19), the method comprising: a step of detecting a fault affecting the first output router; and on reception of information on a fault affecting the first output router (logic encoded in one or more tangible media for execution and when executed operable to detect a failure of a pseudowire stitching point in a multi-segment pseudowire containing a head-end and a tail-end, **Guichard *et al.***, ¶ [0014], lines 10 - 13), a step of switching the data stream to a second pseudo-wire comprising the first link and a third link set up between the intermediate router and a second output router of the packet-switched network, the first link being shared by the first and second pseudo-wires (choose a pre-computed backup path that does not include the failed stitching point, **Guichard *et al.***, ¶ [0014], lines 10 - 13).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. **Wainner *et al.*** (US 20070239891 A1) is cited to show a method, apparatus and computer program product for providing point-to-multipoint multihop distribution using Pseudowires (PWs). Data is received at a switching provider edge (S-

PE) router from an upstream originating provider edge (O-PE) router by way of a first PW, the first PW having a head-end coupled to the O-PE and a tail end coupled to the S-PE. The data received is replicated by the S-PE to at least one receiver provider edge (R-PE) router by way of a respective PW for each of the at least one R-PE, each of the respective PW between the S-PE and the R-PE having a head end coupled to the SPE and a tail end coupled to the R-PE, which is similar to aspects of the claimed invention.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LIONEL PREVAL whose telephone number is (571)270-5673. The examiner can normally be reached on Monday - Thursday 10:00AM - 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dang T. Ton can be reached on (571) 272-3171. 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.

LIONEL PREVAL
Examiner
Art Unit 2475

/L. P./
Examiner, Art Unit 2475

/DANG T TON/
Supervisory Patent Examiner, Art Unit 2475/D. T./
Supervisory Patent Examiner, Art Unit 2475

Notice of References Cited	Application/Control No. 12/528,083	Applicant(s)/Patent Under Reexamination JOUNAY, FREDERIC	
	Examiner LIONEL PREVAL	Art Unit 2475	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2007/0239891 A1	10-2007	Wainner et al.	709/238
*	B	US-2008/0089227 A1	04-2008	Guichard et al.	370/228
*	C	US-2008/0175234 A1	07-2008	LI, Xixiang	370/389
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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	P					
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	S					
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NON-PATENT DOCUMENTS

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

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12528083	JOUNAY, FREDERIC
	Examiner	Art Unit
	LIONEL PREVAL	2475

✓	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	06/15/2011								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12528083	JOUNAY, FREDERIC
	Examiner	Art Unit
	LIONEL PREVAL	2475

SEARCHED

Class	Subclass	Date	Examiner
370	401, 228, 389	06/14/2011	LP
709	238	06/14/2011	LP

SEARCH NOTES

Search Notes	Date	Examiner
Consulted with SPE Dang Ton	06/14/2011	LP
Double Patenting Search Done	06/14/2011	LP
Inventorship Search conducted	06/14/2011	LP

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner
370	401	06/14/2011	LP

/LIONEL PREVAL/ Examiner.Art Unit 2475	

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	123	((pseudowire or pseudo$1wire) near5 (protect$4 or backup or back $1up or main or second$4 or redund$6))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2011/06/14 20:10

EAST Search History (Interference)

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CONFIRMATION NO. 1617

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/528,083	11/25/2009 RULE	370	2475	F71.12-0022

APPLICANTS

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Philippe Niger, Lannion, FRANCE;
Arnaud Cauvin, Paris, FRANCE;

**** CONTINUING DATA ***************************

This application is a 371 of PCT/FR08/50324 02/26/2008

**** FOREIGN APPLICATIONS ***************************

FRANCE 0753489 02/26/2007

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

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Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☑ Yes ☐ No	☑ Yes ☐ No	/LIONEL PREVAL/ Examiner's Signature	☐ Initials	FRANCE	6	9	6

ADDRESS

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UNITED STATES

TITLE

Mechanism for Protecting a Pseudo-Wire

FILING FEE RECEIVED		
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	12/528083
Filing Date	2009-08-21
First Named Inventor	Frederic Jounay et al.
Art Unit	2475
Examiner Name	Lionel Preval
Attorney Docket Number	F71.12-0022

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12/528083
	Filing Date	2009-08-21
	First Named Inventor	Frederic Jounay et al.
	Art Unit	2475
	Examiner Name	Lionel Preval
	Attorney Docket Number	F71.12-0022

/L.P./	1	P. PAN (HAMMERHEAD SYSTEMS); M. BOCCI, and M. AISSAOUI (ALCATEL); F. BLAUS and H. OULD-BRAHIM (NORTEL), "Pseudo Wire Protection" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, Chapter No. 3, July 1, 2006	☐
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/L.P./	5	International Search Report for corresponding International Application No. PCT/FR2008/050324, filed February 26, 2008	☐

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EXAMINER SIGNATURE

Examiner Signature	/Lionel Preval/	Date Considered	06/14/2011

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COMBINED DECLARATION AND POWER OF ATTORNEY IN ORIGINAL APPLICATION

Attorney Docket No.

F71.12-0022

SPECIFICATION AND INVENTORSHIP IDENTIFICATION

As a below named inventor, I declare that:

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

I believe I am the original and first inventor of the subject matter which is claimed, and for which a patent is sought, on the invention entitled Mechanism for Protecting a Pseudo-Wire the specification of which having the above title and/or attorney docket number **F71.12-0022**

__X__ was filed on August 21, 2009 as Appln. No. 12/528,083.

_____ and was amended on _____.

__X__ was described and claimed in PCT International Application No. PCT/FR2008/050324 filed on February 26, 2008.

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I have reviewed and understand the contents of the above-identified application, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. 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.

PRIORITY CLAIM (35 U.S.C. § 119)

Prior Foreign Application(s)

I claim foreign priority benefits under 35 U.S.C. § 119(a-d) or **365(b)** of any foreign application(s) for patent or inventor's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below, each of which is incorporated by reference in its entirety, and have also identified below any foreign application for patent, inventor's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed:

Number	Country	Day/Month/Year Filed	Priority Claimed
07 53489	France	February 26, 2007	Yes X No ____

Prior Provisional Application(s)

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States Provisional Application(s) listed below, each of which is incorporated by reference in its entirety:

Number	Day/Month/Year Filed
_____	_____

AUTHORIZATION TO PERMIT ACCESS TO APPLICATION BY PARTICIPATING OFFICE

The undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified patent application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h).

PRIORITY CLAIM (35 U.S.C. § 120)

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

Appln. No.	U.S. Appln. No.	Filing Date	Status

DECLARATION

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

POWER OF ATTORNEY

I appoint the attorneys and agents associated with

Customer Number 27367,

which is the customer number for the law firm of Westman, Champlin & Kelly, P.A., to prosecute the patent application identified above and to transact all business in the Patent and Trademark Office connected therewith, including full power of association, substitution and revocation.

I ratify all prior actions taken by Westman, Champlin & Kelly, P.A. or the attorneys and agents mentioned above in connection with the prosecution of the above-mentioned patent application.

DESIGNATION OF CORRESPONDENCE ADDRESS

Please address all correspondence and telephone calls to **David D. Brush** in care of:

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Inventor : _____ Date : 05/03/2010
(Signature)

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COMBINED DECLARATION AND POWER OF ATTORNEY IN ORIGINAL APPLICATION

Attorney Docket No.

F71.12-0022

Inventor : _____ Date : 05/03/2012
(Signature)

Inventor : Philippe Niger
(Printed Name)

Residence : Lannion, France Citizenship : French

P.O. Address : 47 Hent Ar Vouden - Servel, 22300 Lannion, France

Inventor : _____ Date : _____
(Signature)

Inventor : Arnaud Cauvin
(Printed Name)

Residence : Paris, France Citizenship : French

P.O. Address : 5 impasse des Orteaux, 75020 Paris, France

COMBINED DECLARATION AND POWER OF ATTORNEY IN ORIGINAL APPLICATION

Attorney Docket No.

F71.12-0022

SPECIFICATION AND INVENTORSHIP IDENTIFICATION

As a below named inventor, I declare that:

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

I believe I am the original and first inventor of the subject matter which is claimed, and for which a patent is sought, on the invention entitled Mechanism for Protecting a Pseudo-Wire the specification of which having the above title and/or attorney docket number **F71.12-0022**

_X_ was filed on August 21, 2009 as Appln. No. 12/528,083.

____ and was amended on _____.

_X_ was described and claimed in PCT International Application No. PCT/FR2008/050324 filed on February 26, 2008.

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I have reviewed and understand the contents of the above-identified application, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. 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.

PRIORITY CLAIM (35 U.S.C. § 119)

Prior Foreign Application(s)

I claim foreign priority benefits under 35 U.S.C. § 119(a-d) or **365(b)** of any foreign application(s) for patent or inventor's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below, each of which is incorporated by reference in its entirety, and have also identified below any foreign application for patent, inventor's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed:

Number	Country	Day/Month/Year Filed	Priority Claimed
07 53489	France	February 26, 2007	Yes _X_ No ____

Prior Provisional Application(s)

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States Provisional Application(s) listed below, each of which is incorporated by reference in its entirety:

Number	Day/Month/Year Filed
_____	_____

AUTHORIZATION TO PERMIT ACCESS TO APPLICATION BY PARTICIPATING OFFICE

The undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified patent application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h).

PRIORITY CLAIM (35 U.S.C. § 120)

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

Appln. No.	U.S. Appln. No.	Filing Date	Status

DECLARATION

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

POWER OF ATTORNEY

I appoint the attorneys and agents associated with

Customer Number 27367,

which is the customer number for the law firm of Westman, Champlin & Kelly, P.A., to prosecute the patent application identified above and to transact all business in the Patent and Trademark Office connected therewith, including full power of association, substitution and revocation.

I ratify all prior actions taken by Westman, Champlin & Kelly, P.A. or the attorneys and agents mentioned above in connection with the prosecution of the above-mentioned patent application.

DESIGNATION OF CORRESPONDENCE ADDRESS

Please address all correspondence and telephone calls to **David D. Brush** in care of:

WESTMAN, CHAMPLIN & KELLY, P.A.
900 Second Avenue South, Suite 1400
Minneapolis, Minnesota 55402-3244
Phone: (612) 334-3222 Fax: (612) 334-3312

Inventor : _____ Date : 05/03/2010
(Signature)

Inventor : Frédéric Jounay
(Printed Name)

Residence : Pleumeur Bodou, France Citizenship : French

P.O. Address : 19 Le Dossen, 22560 Pleumeur Bodou, France

COMBINED DECLARATION AND POWER OF ATTORNEY IN ORIGINAL APPLICATION

Attorney Docket No.

F71.12-0022

Inventor : _____ Date : _____
(Signature)

Inventor : Philippe Niger
(Printed Name)

Residence : Lannion, France Citizenship : French

P.O. Address : 47 Hent Ar Vouden - Servel, 22300 Lannion, France

Inventor : _____ Date : 29/03/2010
(Signature)

Inventor : Arnaud Cauvin
(Printed Name)

Residence : Paris, France Citizenship : French

P.O. Address : 5 impasse des Orteaux, 75020 Paris, France

Supplemental Application Data Sheet

Application Information

Application number::	12/528,083
Filing Date::	August 21, 2009
Application Type::	Non-provisional
Subject Matter::	Utility
Title::	MECHANISM FOR PROTECTING A PSEUDO-WIRE
Attorney Docket Number::	F71.12-0022
Request for Non-Publication?::	No
Suggested Drawing Figure::	3
Total Drawing Sheets::	6
Small Entity?::	No
Petition included?::	No
Petition Type::	N/A

Applicant Information

Applicant Authority Type::	Inventor
Primary Citizenship Country::	FR
Given Name::	Frederic
Family Name::	Jounay
Name Suffix::	
City of Residence::	Pleumeur Bodou
State or Province of Residence::	
Country of Residence::	FR
Street of Mailing address::	19 Le Dossen
City of Mailing address::	Pleumeur Bodou
State of Province of mailing address::	

Country of mailing address::	FR
Postal or Zip Code::	22560

Applicant Authority Type::	Inventor
Primary Citizenship Country::	FR
Given Name::	Philippe
Family Name::	Niger
Name Suffix::	
City of Residence::	Lannion
State or Province of Residence::	
Country of Residence::	FR
Street of Mailing address::	47 Hent Ar Vouden - Servel
City of Mailing address::	Lannion
State of Province of mailing address::	
Country of mailing address::	FR
Postal or Zip Code::	22300

Applicant Authority Type::	Inventor
Primary Citizenship Country::	FR
Given Name::	Arnaud
Family Name::	Cauvin
Name Suffix::	
City of Residence::	Paris
State or Province of Residence::	
Country of Residence::	FR
Street of Mailing address::	~~15 avenue Parmentier~~ 5 impasse des Orteaux
City of Mailing address::	Paris
State of Province of mailing address::	
Country of mailing address::	FR

Postal or Zip Code:: ~~75020~~ 75011

Correspondence Customer Number:: 27367

Representative Information

Representative Customer Number::	27367

Domestic Priority Information/National Stage Information

Application::	Continuity Type::	Parent Application::	Parent Filing Date::
This application	A 371 of International	PCT/FR2008/050324	02-26-2008

Foreign Priority Information

Country::	Application number::	Filing Date::	Priority Claimed::
FR	0753489	02-26-2007	Yes

Assignee Information

Assignee name:: France Telecom
Street of mailing address:: 6, place d'Alleray
City of mailing address:: Paris
State or Province of mailing address::
Country of mailing address:: France
Postal or Zip Code of mailing address:: 75015

Electronic Acknowledgement Receipt

EFS ID:	7473071
Application Number:	12528083
International Application Number:	
Confirmation Number:	1617
Title of Invention:	Mechanism for Protecting a Pseudo-Wire
First Named Inventor/Applicant Name:	Frederic Jounay
Customer Number:	27367
Filer:	David D. Brush/Danel Morrison
Filer Authorized By:	David D. Brush
Attorney Docket Number:	F71.12-0022
Receipt Date:	23-APR-2010
Filing Date:	25-NOV-2009
Time Stamp:	15:27:23
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Oath or Declaration filed	2010-04-23_Supplemental-Declaration_FTRD-06403.pdf	289294 e5353d6ca0473ba8ac265d15ede0f630c914d17d	no	6

Warnings:	
Information:	

2	Application Data Sheet	2010-04-23_Supplemental-ADS_FTRD-06403.pdf	16133 f245e4f0a8977b221ed8e49df6a1df9950df5d9f	no	3

Warnings:	
Information:	
This is not an USPTO supplied ADS fillable form	
Total Files Size (in bytes):	305427

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/528,083	11/25/2009	Frederic Jounay	F71.12-0022

CONFIRMATION NO. 1617

PUBLICATION NOTICE

27367
WESTMAN CHAMPLIN & KELLY, P.A.
SUITE 1400
900 SECOND AVENUE SOUTH
MINNEAPOLIS, MN 55402

OC000000041235543

Title: Mechanism for Protecting a Pseudo-Wire

Publication No.US-2010-0098094-A1
Publication Date:04/22/2010

NOTICE OF PUBLICATION OF APPLICATION

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

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

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

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

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

Best Available Copy

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET (FOR USE WITH FORM PTO-875)	SERIAL NO. 12/528083	FILING DATE 8-21-09
	APPLICANT(S)	

CLAIMS

	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
1	1		1			
2		1		1		
3	1		1			
4	1		1			
5		1		1		
6		1	1			
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49						
50						
TOTAL IND.		↓	6	↓		↓
TOTAL DEP.		←	3	←		←
TOTAL CLAIMS			9			

	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
51						
52						
53						
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99						
100						
TOTAL IND.		↓		↓		↓
TOTAL DEP.		←		←		←
TOTAL						

PATENT APPLICATION FEE DETERMINATION RECORD

Effective December 8, 2004

Application or Docket Number: 12/528083

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)	SMALL ENTITY RATE	SMALL ENTITY FEE	OR	LARGE ENTITY RATE	LARGE ENTITY FEE
U.S. NATIONAL STAGE FEES							
BASIC FEE			BASIC FEE		OR	BASIC FEE	330
EXAMINATION FEE			EXAM. FEE			EXAM. FEE	220
SEARCH FEE			SEARCH FEE			SEARCH FEE	430
FEE FOR EXTRA SPEC. PGS.	minus 100 =	/ 50 =	X $ 125 =			X $ 250 =	
TOTAL CHARGEABLE CLAIMS	9 minus 20 =		X $ 25 =		OR	X $ 50 =	
INDEPENDENT CLAIMS	1 minus 3 =	3	X $ 100 =		OR	X $ 200 =	660
MULTIPLE DEPENDENT CLAIM PRESENT		☐	+ $ 180 =		OR	+ $ 360 =	
* If the difference in column 1 is less than zero, enter "0" in column 2			TOTAL		OR	TOTAL	980

CLAIMS AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE	SMALL ENTITY ADDITIONAL FEE	OR	OTHER THAN SMALL ENTITY RATE	OTHER THAN SMALL ENTITY ADDITIONAL FEE
AMENDMENT A	Total	*	Minus	**	=	X $ 25 =		OR	X $ 50 =	
	Independent	*	Minus	***	=	X $ 100 =		OR	X $ 200 =	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐					+ $ 180 =		OR	+ $ 360 =	
						TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
AMENDMENT B	Total	*	Minus	**	=	X $ 25 =		OR	X $ 50 =	
	Independent	*	Minus	***	=	X $ 100 =		OR	X $ 200 =	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐					+ $ 180 =		OR	+ $ 360 =	
						TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

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

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

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

U.S. APPLICATION NUMBER NO.	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
12/528,083	Frederic Jounay	F71.12-0022

27367
WESTMAN CHAMPLIN & KELLY, P.A.
SUITE 1400
900 SECOND AVENUE SOUTH
MINNEAPOLIS, MN 55402

INTERNATIONAL APPLICATION NO.	
PCT/FR08/50324	
I.A. FILING DATE	PRIORITY DATE
02/26/2008	02/26/2007

CONFIRMATION NO. 1617
371 ACCEPTANCE LETTER

OC000000039580305

Date Mailed: 01/12/2010

NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office in its capacity as a Designated / Elected Office (37 CFR 1.495), has determined that the above identified international application has met the requirements of 35 U.S.C. 371, and is ACCEPTED for national patentability examination in the United States Patent and Trademark Office.

The United States Application Number assigned to the application is shown above and the relevant dates are:

11/25/2009	11/25/2009
DATE OF RECEIPT OF 35 U.S.C. 371(c)(1), (c)(2) and (c)(4) REQUIREMENTS	DATE OF COMPLETION OF ALL 35 U.S.C. 371 REQUIREMENTS

A Filing Receipt (PTO-103X) will be issued for the present application in due course. **THE DATE APPEARING ON THE FILING RECEIPT AS THE " FILING DATE" IS THE DATE ON WHICH THE LAST OF THE 35 U.S.C. 371 (c)(1), (c)(2) and (c)(4) REQUIREMENTS HAS BEEN RECEIVED IN THE OFFICE. THIS DATE IS SHOWN ABOVE.** *The filing date of the above identified application is the international filing date of the international application (Article 11(3) and 35 U.S.C. 363).* Once the Filing Receipt has been received, send all correspondence to the Group Art Unit designated thereon.

The following items have been received:

- Copy of the International Application filed on 08/21/2009
- Copy of the International Search Report filed on 08/21/2009
- Preliminary Amendments filed on 08/21/2009
- Information Disclosure Statements filed on 08/21/2009
- Oath or Declaration filed on 11/25/2009
- Request for Immediate Examination filed on 08/21/2009
- U.S. Basic National Fees filed on 08/21/2009
- Priority Documents filed on 08/21/2009

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

VALERIE D KINARD

Telephone: (703) 756-1432

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/528,083	11/25/2009	2465	1770	F71.12-0022	9	6

CONFIRMATION NO. 1617

27367
WESTMAN CHAMPLIN & KELLY, P.A.
SUITE 1400
900 SECOND AVENUE SOUTH
MINNEAPOLIS, MN 55402

FILING RECEIPT



Date Mailed: 01/12/2010

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)

Frederic Jounay, Pleumeur Bodou, FRANCE;
Philippe Niger, Lannion, FRANCE;
Arnaud Cauvin, Paris, FRANCE;

Assignment For Published Patent Application

FRANCE TELECOM, Paris, FR

Power of Attorney: The patent practitioners associated with Customer Number 27367

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/FR08/50324 02/26/2008

Foreign Applications

FRANCE 0753489 02/26/2007

If Required, Foreign Filing License Granted: 01/09/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/528,083**

Projected Publication Date: 04/22/2010

Non-Publication Request: No

Early Publication Request: No

Title

Mechanism for Protecting a Pseudo-Wire

Preliminary Class

370

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

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

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

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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

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

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

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

NOT GRANTED

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor :	Frédéric Jounay et al.	Confirmation No: 1617
Appln. No.:	12/528,083	Group Art Unit:
Filed :	August 21, 2009	
For :	Mechanism for Protecting a Pseudo-Wire	Examiner:
Docket No.:	F71.12-0022	

PRELIMINARY AMENDMENT

ELECTRONICALLY FILED DECEMBER 21, 2009

Sir:

Please amend the above-identified application as follows:

SPECIFICATION

Please amend page 1, lines 4-6 of the Substitute Specification (clean version), filed on August 21, 2009, as follows:

This Application is a Section 371 National Stage Application of International Application No. PCT/FR2008/050324, filed February 26, 2008 and published as WO 2008/110735 on September 18, ~~2009~~2008, not in English.

REMARKS

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By:/David D. Brush/

David D. Brush, Reg. No. 34,557
900 Second Avenue South, Suite 1400
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DDB:kmm

Electronic Acknowledgement Receipt

EFS ID:	6679174
Application Number:	12528083
International Application Number:	
Confirmation Number:	1617
Title of Invention:	Mechanism for Protecting a Pseudo-Wire
First Named Inventor/Applicant Name:	Frederic Jounay
Customer Number:	27367
Filer:	David D. Brush
Filer Authorized By:	
Attorney Docket Number:	F71.12-0022
Receipt Date:	21-DEC-2009
Filing Date:	
Time Stamp:	16:05:24
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Preliminary_Amendment_06403.pdf	20390 e3e7a8e860ecfc70e44382768927b43ee033aa6f	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	1
	Specification	2	2
	Applicant Arguments/Remarks Made in an Amendment	3	3
Warnings:			
Information:			
	Total Files Size (in bytes):	20390	

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

UNITED STATES RECEIVING OFFICE (RO/US)

Re	International Appln. No. PCT/FR2008/050324
International Filing Date	26 February 2008 (26.02.08)
Applicant	Frederic Jounay
U.S. Serial No.	12/528,083
U.S. Filing Date	August 21, 2009
Title of Invention	MECHANISM FOR PROTECTING A PSEUDO-WIRE
Agent's File	F71.12-0022

TRANSMITTAL OF MISSING REQUIREMENTS UNDER 35 U.S.C. 371 IN THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)

Filed Electronically November 25, 2009

I hereby certify that the following are being electronically filed with the United States Patent and Trademark Office:

1. $130.00 Fee-furnishing Oath/Declaration later than 30 months from earliest claimed priority date
2. Executed Combined Declaration and Power of Attorney

/David D. Brush/

David D. Brush, Reg., No. 34,557
WESTMAN, CHAMPLIN & KELLY, P.A.
900 Second Avenue South, Suite 1400
Minneapolis, Minnesota 55402-3244
Telephone : 612/334-3222
facsimile: 612/334-3312

DDB:kmm
Encs.

COMBINED DECLARATION AND POWER OF ATTORNEY IN ORIGINAL APPLICATION

Attorney Docket No.

F71.12-0022

SPECIFICATION AND INVENTORSHIP IDENTIFICATION

As a below named inventor, I declare that:

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

I believe I am the original and first inventor of the subject matter which is claimed, and for which a patent is sought, on the invention entitled Mechanism for Protecting a Pseudo-Wire the specification of which having the above title and/or attorney docket number **F71.12-0022**

_X_ was filed on August 21, 2009 as Appln. No. 12/528,083.

____ and was amended on _____.

_X_ was described and claimed in PCT International Application No. PCT/FR2008/050324 filed on February 26, 2008.

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. 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.

PRIORITY CLAIM (35 U.S.C. § 119)

Prior Foreign Application(s)

I claim foreign priority benefits under 35 U.S.C. § 119(a-d) or **365(b)** of any foreign application(s) for patent or inventor's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below, each of which is incorporated by reference in its entirety, and have also identified below any foreign application for patent, inventor's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed:

Number	Country	Day/Month/Year Filed	Priority Claimed	
07 53489	France	February 26, 2007	Yes X	No ___
_____	_____	_____	Yes ___	No ___

Prior Provisional Application(s)

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States Provisional Application(s) listed below, each of which is incorporated by reference in its entirety:

Number	Day/Month/Year Filed
_____	_____

AUTHORIZATION TO PERMIT ACCESS TO APPLICATION BY PARTICIPATING OFFICE

The undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified patent application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h).

PRIORITY CLAIM (35 U.S.C. § 120)

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

Appln. No.	U.S. Appln. No.	Filing Date	Status

DECLARATION

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

POWER OF ATTORNEY

I appoint the attorneys and agents associated with

Customer Number 27367,

which is the customer number for the law firm of Westman, Champlin & Kelly, P.A., to prosecute the patent application identified above and to transact all business in the Patent and Trademark Office connected therewith, including full power of association, substitution and revocation.

I ratify all prior actions taken by Westman, Champlin & Kelly, P.A. or the attorneys and agents mentioned above in connection with the prosecution of the above-mentioned patent application.

DESIGNATION OF CORRESPONDENCE ADDRESS

Please address all correspondence and telephone calls to **David D. Brush** in care of:

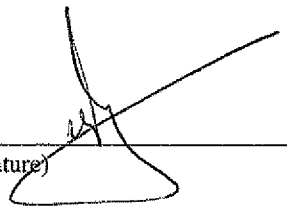
WESTMAN, CHAMPLIN & KELLY, P.A.
900 Second Avenue South, Suite 1400
Minneapolis, Minnesota 55402-3244
Phone: (612) 334-3222 Fax: (612) 334-3312

Inventor : _____ Date : 03/09/09
(Signature)

Inventor : Frédéric Jounay
(Printed Name)

Residence : Pleumeur Bodou, France Citizenship : French

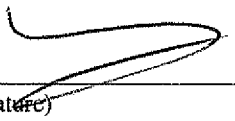
P.O. Address : 19 Le Dossen, 22560 Pleumeur Bodou, France

Inventor :  Date : 25/08/2009
(Signature)

Inventor : Philippe Niger
(Printed Name)

Residence : Lannion, France Citizenship : French

P.O. Address : 47 Hent Ar Vouden - Servel, 22300 Lannion, France

Inventor :  Date : 04/10/2009
(Signature)

Inventor : Arnaud Cauvin
(Printed Name)

Residence : Paris, France Citizenship : French

P.O. Address : ~~15 avenue Parmentier, 75011 Paris, France~~
5 impasse des Orteaux 75020 Paris, France

Supplemental Application Data Sheet

Application Information

Application number::	12/528,083
Filing Date::	August 21, 2009
Application Type::	Non-provisional
Subject Matter::	Utility
Title::	MECHANISM FOR PROTECTING A PSEUDO-WIRE
Attorney Docket Number::	F71.12-0022
Request for Non-Publication?::	No
Suggested Drawing Figure::	3
Total Drawing Sheets::	6
Small Entity?::	No
Petition included?::	No
Petition Type::	N/A

Applicant Information

Applicant Authority Type::	Inventor
Primary Citizenship Country::	FR
Given Name::	Frederic
Family Name::	Jounay
Name Suffix::	
City of Residence::	Pleumeur Bodou
State or Province of Residence::	
Country of Residence::	FR
Street of Mailing address::	19 Le Dossen
City of Mailing address::	Pleumeur Bodou
State of Province of mailing address::	

Country of mailing address::	FR
Postal or Zip Code::	22560

Applicant Authority Type::	Inventor
Primary Citizenship Country::	FR
Given Name::	Philippe
Family Name::	Niger
Name Suffix::	
City of Residence::	Lannion
State or Province of Residence::	
Country of Residence::	FR
Street of Mailing address::	47 Hent Ar Vouden - Servel
City of Mailing address::	Lannion
State of Province of mailing address::	
Country of mailing address::	FR
Postal or Zip Code::	22300

Applicant Authority Type::	Inventor
Primary Citizenship Country::	FR
Given Name::	Arnaud
Family Name::	Cauvin
Name Suffix::	
City of Residence::	Paris
State or Province of Residence::	
Country of Residence::	FR
Street of Mailing address::	5 impasse des Orteaux
City of Mailing address::	Paris
State of Province of mailing address::	
Country of mailing address::	FR

Postal or Zip Code:: 75020

Correspondence Customer Number:: 27367

Representative Information

Representative Customer Number::	27367

Domestic Priority Information/National Stage Information

Application::	Continuity Type::	Parent Application::	Parent Filing Date::
This application	A 371 of International	PCT/FR2008/050324	02-26-2008

Foreign Priority Information

Country::	Application number::	Filing Date::	Priority Claimed::
FR	0753489	02-26-2007	Yes

Assignee Information

Assignee name:: France Telecom
Street of mailing address:: 6, place d'Alleray
City of mailing address:: Paris
State or Province of mailing address::
Country of mailing address:: France
Postal or Zip Code of mailing address:: 75015

Electronic Patent Application Fee Transmittal

Application Number:	12528083
Filing Date:	
Title of Invention:	Mechanism for Protecting a Pseudo-Wire
First Named Inventor/Applicant Name:	Frederic Jounay
Filer:	David D. Brush
Attorney Docket Number:	F71.12-0022

Filed as Large Entity

U.S. National Stage under 35 USC 371 Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Oath/decl > 30 months from priority date	1617	1	130	130
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**130**

Electronic Acknowledgement Receipt

EFS ID:	6524979
Application Number:	12528083
International Application Number:	
Confirmation Number:	1617
Title of Invention:	Mechanism for Protecting a Pseudo-Wire
First Named Inventor/Applicant Name:	Frederic Jounay
Customer Number:	27367
Filer:	David D. Brush
Filer Authorized By:	
Attorney Docket Number:	F71.12-0022
Receipt Date:	25-NOV-2009
Filing Date:	
Time Stamp:	16:40:26
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$130
RAM confirmation Number	2948
Deposit Account	231123
Authorized User	BRUSH,DAVID D.

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. 1.492 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

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	Applicant Response to Pre-Exam Formalities Notice	Transmittal_of_Missing_Requirements_FTRD-06403.pdf	17782 d337ee236aecbd46ad260307527815dd0e54ce7b	no	1
Warnings:					
Information:					
2	Oath or Declaration filed	Declaration_FTRD-06403.pdf	205458 e24a09c8f7ffd5c35fbef7325d3601d3d61e38dc	no	3
Warnings:					
Information:					
3	Application Data Sheet	Supplemental_ADS_FTRD-06403.pdf	17306 71eef86d586b029ea903f98f04ad089c611ed4c1	no	3
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
4	Fee Worksheet (PTO-875)	fee-info.pdf	29596 80ff9370378ba584c6bcf591e5f60f904afff60c	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	270142		

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 RECEIVING OFFICE (RO/US)

Re	International Appln. No. PCT/FR2008/050324
Applicant	JOUNAY Frédéric et al.
International Filing Date	26 February 2008 (26.02.2008)
Title of Invention	Mechanism for Protecting a Pseudo-Wire
Agent's File	F71.12-0022

Letter

ELECTRONICALLY FILED ON AUGUST 21, 2009

Sir:

The following are being electronically filed with the United States Patent and Trademark Office:

1. $1,640.00 Filing Fee
2. Transmittal Letter (completed Form No. PTO-1390)
3. Application Data Sheet
4. Combined Declaration and Power of Attorney
5. Preliminary Amendment
6. Abstract typed on a separate page
6. Substitute Specification (Clean Version)
7. Substitute Specification (Marked-up Version)
8. Copy of front page only of International Publication No. WO 2008/110735 A3 (PCT/FR2008/050324)
9. Copy of the International Search Report
10. Copy of specification and drawings as originally filed in French, translated into English
11. Information Disclosure Statement.

/David D. Brush/

David D. Brush, Reg. No. 34,557
WESTMAN, CHAMPLIN & KELLY, P.A.
900 Second Avenue South, Suite 1400
Minneapolis, Minnesota 55402-3319
Telephone : 612/334-3222
Telefacsimile: 612/334-3312

DDB:dmm

PTO-1390 (Rev. 09-08)
Approved for use through 2/28/2010. OMB 0651-0021
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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.

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	
F71.12-0022	
U.S. APPLICATION NO. (If known, see 37 CFR 1.5)	

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/FR2008/050324	2008-02-26	2007-02-26

TITLE OF INVENTION
Mechanism for Protecting a Pseudo-Wire

APPLICANT(S) FOR DO/EO/US
Frederic Jounay et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☑ This is a **FIRST** submission of items concerning a submission under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a submission under 35 U.S.C. 371.
3. ☑ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☑ The US has been elected (Article 31).
5. ☑ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☑ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☑ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☑ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☑ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☑ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☑ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☑ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☑ A preliminary amendment.
14. ☑ An Application Data Sheet under 37 CFR 1.76.
15. ☑ A substitute specification.
16. ☐ A power of attorney and/or change of address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13*ter*.3 and 37 CFR 1.821- 1.825.
18. ☐ A second copy of the published International Application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).

This collection of information is required by 37 CFR 1.414 and 1.491-1.492. The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 15 minutes to complete, including gathering information, preparing, and submitting the completed 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: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Juniper Exhibit 1002, page 151

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
	PCT/FR2008/050324	F71.12-0022

20. Other items or information:

Search Report
Abstract
Preliminary Examination Report

The following fees have been submitted	CALCULATIONS	PTO USE ONLY
21. ☑ Basic national fee (37 CFR 1.492(a)) **$330**	$ 330	
22. ☑ Examination fee (37 CFR 1.492(c)) If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)..... **$0** All other situations..... **$220**	$ 220	
23. ☑ Search fee (37 CFR 1.492(b)) If the written opinion of the ISA/US or the International preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)..... **$0** Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority..... **$100** International Search Report prepared by an ISA other than the US and provided to the Office or previously communicated to the US by the IB..... **$430** All other situations..... **$540**	$ 430	
TOTAL OF 21, 22 and 23 =	980	

☐ Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing in compliance with 37 CFR 1.821(c) or (e) in an electronic medium or computer program listing in an electronic medium) (37 CFR 1.492(j)).
The fee is **$270** for each additional 50 sheets of paper or fraction thereof.

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof (round **up** to a whole number)	RATE	
- 100 =	/50 =		x $**270**	$ 0

Surcharge of **$130.00** for furnishing any of the search fee, examination fee, or the oath or declaration after the date of commencement of the national stage (37 CFR 1.492(h)).	$

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	$
Total claims	9 - 20 =	0	x $ **52**	$ 0
Independent claims	6 - 3 =	3	x **$220**	$ 660
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ **$390**	$ 0
			TOTAL OF ABOVE CALCULATIONS =	$ 660
☐ Applicant claims small entity status. See 37 CFR 1.27. Fees above are reduced by ½.				
			SUBTOTAL =	$ 1640
Processing fee of **$130.00** for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(i)). +				$
			TOTAL NATIONAL FEE =	$ 1640
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +				$
			TOTAL FEES ENCLOSED =	$ 1,640.00
			Amount to be refunded:	$
			Amount to be charged	$ 1,640.00

a. ☐ A check in the amount of $ _____ to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees.

c. ☑ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 231123.

d. ☑ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038. The PTO-2038 should only be mailed or faxed to the USPTO. However, when paying the basic national fee, the PTO-2038 may NOT be faxed to the USPTO.

ADVISORY: If filing by EFS-Web, do **NOT** attach the PTO-2038 form as a PDF along with your EFS-Web submission. Please be advised that this is **not** recommended and by doing so your **credit card information may be displayed via PAIR**. To protect your information, it is recommended paying fees online by using the electronic payment method.

NOTE: Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the International Application to pending status.

SEND ALL CORRESPONDENCE TO:

Customer No. 27367

/David D. Brush/
SIGNATURE

David D. Brush
NAME

34,557
REGISTRATION NUMBER

Privacy Act Statement

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

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

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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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	F71.12-0022
	Application Number	
Title of Invention	Mechanism for Protecting a Pseudo-Wire	

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.
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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.)

Applicant Information:

Applicant 1 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

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Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

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Citizenship under 37 CFR 1.41(b)[i] FR

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Postal Code	22560	Country[i]	FR

Applicant 2 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
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Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

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Citizenship under 37 CFR 1.41(b)[i] FR

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City	Lannion	State/Province	
Postal Code	22300	Country[i]	FR

Applicant 3 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Arnaud		Cauvin	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Paris	Country Of Residence[i]	FR

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	F71.12-0022
	Application Number	
Title of Invention	Mechanism for Protecting a Pseudo-Wire	

Citizenship under 37 CFR 1.41(b) [i]	FR		
Mailing Address of Applicant:			
Address 1	15 avenue Parmentier		
Address 2			
City	Paris	**State/Province**	
Postal Code	75011	**Country** [i]	FR

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

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	27367		
Email Address	dbrush@wck.com	Add Email	Remove Email

Application Information:

Title of the Invention	Mechanism for Protecting a Pseudo-Wire		
Attorney Docket Number	F71.12-0022	**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)	6	**Suggested Figure for Publication (if any)**	3

Publication Information:

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

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

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	F71.12-0022
	Application Number	
Title of Invention	Mechanism for Protecting a Pseudo-Wire	

Customer Number	27367

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	a 371 of international	PCT/FR2008/050324	2008-02-26

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim 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).

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Application Number	Country [i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
0753489	FR	2007-02-26	(•) Yes ( ) No

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Assignee Information:

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

If the Assignee is an Organization check here. [X]

Organization Name	France Telecom		
Mailing Address Information:			
Address 1	6, place d'Alleray		
Address 2			
City	Paris	**State/Province**	
Country [i]	FR	Postal Code	75015
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the **Add** button. Add

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	F71.12-0022
	Application Number	
Title of Invention	Mechanism for Protecting a Pseudo-Wire	

Signature	/David D. Brush/			Date (YYYY-MM-DD)	2009-08-21
First Name	David	Last Name	Brush	Registration Number	34557

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

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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).

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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.

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COMBINED DECLARATION AND POWER OF ATTORNEY IN ORIGINAL APPLICATION

Attorney Docket No.

F71.12-0022

SPECIFICATION AND INVENTORSHIP IDENTIFICATION

As a below named inventor, I declare that:

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

I believe I am the original and first inventor of the subject matter which is claimed, and for which a patent is sought, on the invention entitled Mechanism for Protecting a Pseudo-Wire the specification of which having the above title and/or attorney docket number **F71.12-0022**

_X_ was filed on August 21, 2009 as Appln. No. _____.

____ and was amended on _____.

_X_ was described and claimed in PCT International Application No. PCT/FR2008/050324 filed on February 26, 2008.

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. 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.

PRIORITY CLAIM (35 U.S.C. § 119)

Prior Foreign Application(s)

I claim foreign priority benefits under 35 U.S.C. § 119(a-d) or **365(b)** of any foreign application(s) for patent or inventor's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below, each of which is incorporated by reference in its entirety, and have also identified below any foreign application for patent, inventor's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed:

Number	Country	Day/Month/Year Filed	Priority Claimed	
07 53489	France	February 26, 2007	Yes _X_	No ____
_____	_____	_____	Yes ____	No ____

Prior Provisional Application(s)

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States Provisional Application(s) listed below, each of which is incorporated by reference in its entirety:

Number	Day/Month/Year Filed
_____	_____

AUTHORIZATION TO PERMIT ACCESS TO APPLICATION BY PARTICIPATING OFFICE

The undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified patent application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h).

PRIORITY CLAIM (35 U.S.C. § 120)

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

Appln. No.	U.S. Appln. No.	Filing Date	Status

DECLARATION

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

POWER OF ATTORNEY

I appoint the attorneys and agents associated with

Customer Number 27367,

which is the customer number for the law firm of Westman, Champlin & Kelly, P.A., to prosecute the patent application identified above and to transact all business in the Patent and Trademark Office connected therewith, including full power of association, substitution and revocation.

I ratify all prior actions taken by Westman, Champlin & Kelly, P.A. or the attorneys and agents mentioned above in connection with the prosecution of the above-mentioned patent application.

DESIGNATION OF CORRESPONDENCE ADDRESS

Please address all correspondence and telephone calls to **David D. Brush** in care of:

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(Signature)

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Inventor : _____ Date : _____
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Inventor : _____ Date : _____
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ABSTRACT

A method is provided for setting up at least two pseudo-wires able to broadcast a stream of data, wherein a first pseudo-wire is set up between an input router of a packet-switched network and first output router of the packet-switched network, and a second pseudo-wire is set up between the input router and a second output router of the packet-switched network. A first link of the first pseudo-wire is set up between the first output router and an intermediate router of the packet-switched network. A second link of the second pseudo-wire is set up between the second output router and the intermediate router. A third link of both pseudo-wires is set up between the intermediate router and the input router.

SUBSTITUTE SPECIFICATION

(CLEAN VERSION)

MECHANISM FOR PROTECTING A PSEUDO-WIRE

CROSS-REFERENCE TO RELATED APPLICATIONS

This Application is a Section 371 National Stage Application of International Application No. PCT/FR2008/050324, filed February 26, 2008 and published as WO 2008/110735 on September 18, 2009, not in English.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

None.

THE NAMES OF PARTIES TO A JOINT RESEARCH AGREEMENT

None.

FIELD OF THE DISCLOSURE

The field of the disclosure is telecommunications, and more particularly packet-switched networks.

BACKGROUND OF THE DISCLOSURE

In a packet-switched network, data is transmitted in the form of packets processed by routers of the network until they reach their destination. Together the packets for transmission constitute a data stream.

One example of a technology used for routing data packets in packet-switched networks is the multi-protocol label switching (MPLS) technology. The MPLS technology adds one or more labels to the data packet headers, said labels containing information enabling the routers of the network to determine the next hop for a packet to reach its destination. The MPLS technology is described in more detail in Internet Engineering Task Force (IETF) Request For Comments (RFC) 3031.

However, the MPLS protocol can process only packets conforming to the Internet Protocol (IP).

To alleviate this problem, the IETF Pseudo-Wire Emulation Edge-To-Edge (PWE3) standardization group has defined a pseudo-wire concept for emulating a point-to-point link between two equipments of a packet-switched network based on the

IP/MPLS technology. Such pseudo-wires, defined in the document RFC 3985, enable data packets to be transmitted that do not conform to the Internet Protocol, for example data packets conforming to the ATM protocol.

Referring to Figure 1, a pseudo-wire pw1 is set up between a first router T-PE1 at the edge of a packet-switched network PSN and a second router T-PE2, also at the edge of the network PSN. A first link L1 that is part of the pseudo-wire pw1 is set up between the first router T-PE1 and an intermediate router S-PE of the network PSN. A second link L2 that is also part of the pseudo-wire pw1 is set up between the intermediate router S-PE and the second router T-PE2. The first router T-PE1 is called the input router and constitutes a first end of the pseudo-wire pw1 and the second router T-PE2 is called the output router and constitutes a second end of the pseudo-wire pw1. Once the pseudo-wire pw1 has been set up, the input router T-PE1 transmits a data stream routed via the pseudo-wire pw1 to the output router T-PE2. This kind of pseudo-wire pw1 is defined in more detail in the document "An Architecture for Multi-Segment Pseudo-Wire Emulation Edge-to-Edge" (draft-ietf-pwe3-ms-pw-arch-02.txt).

To ensure continuity of service in the event of a fault affecting the output router, the working group PWE3 proposes a solution that backs up the first pseudo-wire set up between the input router and the output router by a second pseudo-wire serving as a back-up pseudo-wire so that, in the event of a fault affecting the output router constituting one end of the first pseudo-wire, the data packets are routed by the back-up pseudo-wire, one end of which consists of a different output router.

Accordingly, referring to Figure 2, a first pseudo-wire pw1 is set up between an input router T-PE1 at the edge of a packet-switched network PSN and an output router T-PE2 also at the edge of the network PSN. A first link L1 that is part of the pseudo-wire pw1 is set up between the input router T-PE1 and an intermediate router S-PE of the network PSN. A second link L2 that is also part of the pseudo-wire pw1 is set up between the intermediate router S-PE and the output router T-PE2. A second pseudo-wire pw2 is then set up between the input router T-PE1 constituting a first end of the pseudo-wire and a second output router T-PE3 constituting a second end of the pseudo-

wire. A first link L3 that is part of the second pseudo-wire is set up between the input router T-PE1 and the intermediate router S-PE and a second link L4 that is also part of the second pseudo-wire is set up between the intermediate router S-PE and the second output router T-PE3.

To ensure continuity of service, the input router T-PE1 includes a function for detecting a fault affecting the first output router T-PE2 and a function for switching the data stream from the first pseudo-wire pw1 to the second pseudo-wire pw2.

A fault affecting the first output router T-PE2 is detected in the input router T-PE1, for example from a message indicating the occurrence of a fault sent via the public switched network PSN to the input router T-PE1. Once informed of the fault, the input router T-PE1 triggers switching of the data stream from the first pseudo-wire pw1 to the second pseudo-wire pw2, thus routing the data to the output router T-PE3.

However, this kind of solution has the drawback of consuming network resources, for example processing resources in the network equipments (storage capacity, computation capacity, etc.), signaling streams for setting-up two pseudo-wires, and bandwidth, especially between the input router and the intermediate router. This increases the restore time in the event of a fault affecting an output router, with a negative impact on quality of service.

SUMMARY

The solution proposed in the context of an exemplary embodiment of the invention is free of those problems of the prior art.

An embodiment is based on a method of setting up at least two pseudo-wires able to broadcast a data stream wherein a first pseudo-wire is set up between an input router of a packet-switched network and a first output router of said packet-switched network, the second pseudo-wire is set up between said input router and a second output router of said packet-switched network, a first link that is part of the first pseudo-wire is set up between the first output router and an intermediate router of said packet-switched network, and a second link that is part of the second pseudo-wire is set up between said second output router and said intermediate router.

This kind of setting up method is noteworthy in that a third link that is part of the two pseudo-wires is set up between said intermediate router and said input router.

This optimizes the use of network resources, for example bandwidth, between the input router and the intermediate router by setting up between them a single link common to the two pseudo-wires. This solution has never been envisaged in the prior art. In the prior art, when a main pseudo-wire and a back-up pseudo-wire are set up between an input router and a first, respectively a second, output router, a link is set up between the input router and the intermediate router for each pseudo-wire, i.e. two links. The person skilled in the art has always considered a pseudo-wire as a point-to-point link set up between an input router and an output router, with the result that each input router/output router pair is associated with a pseudo-wire. Moreover, this kind of approach is recommended in the standards.

Going against this received wisdom of the person skilled in the art, the inventors of the present application propose, in contrast, to share the link set up between the input router and the intermediate router, which improves the use of network resources and reduces the restore time in the event of a fault affecting the first output router. In the prior art, the back-up pseudo-wire, although used only to broadcast data in the event of a fault affecting the main pseudo-wire, reserves resources used to set it up over the whole of the network between the input router and the output router. Because the main pseudo-wire and the back-up pseudo-wire share the link set up between the input router and the intermediate router, the network resources that in the past were reserved for the back-up pseudo-wire are released and can be used in a manner closer to the optimum.

In this kind of embodiment, the first, second, and third links are not necessarily direct links between routers. For example, the second link set up between the intermediate router and the first output router can comprise one or more hops and possibly pass through one or more other intermediate routers before reaching the output router. The same applies to the link set up between the input router and the intermediate router and to the link set up between the intermediate router and the second output router.

The data broadcast on the pseudo-wires can be payload data, for example an ATM stream transporting a service, or service data, for example a message indicating detection of a fault affecting a network equipment. Accordingly, in the situation of exchanging service data, the solution proposed in the present application makes the network equipments more responsive.

According to one feature of the method of an embodiment of the invention, the pseudo-wires are set up at the initiative of said input router by sending said intermediate router a message for setting-up said third link including an identifier of said input router, an identifier of said first output router, and a field containing an identifier of said second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire

In this kind of embodiment, setting up the pseudo-wires is at the initiative of the input router. It is assumed, in the context of an embodiment of the invention, that in order to be able to initiate the setting up of the main and back-up pseudo-wires the input router has in a routing table information on the hops to reach the first and second output routers. By means of this information, the input router knows to which router of the network it must send the pseudo-wire set-up message, which router is then considered the intermediate router. It is then necessary to configure only the input router, which reduces network maintenance. The parameter in the set-up message indicating that the second pseudo-wire is a back-up pseudo-wire enables the intermediate router to be configured for subsequent broadcasting of data.

An embodiment of the invention also relates to a method of broadcasting data streams between an input router of a packet-switched network and a first output router of said packet-switched network, wherein a data stream is broadcast on a first pseudo-wire comprising a first link set up between said input router and an intermediate router of said packet-switched network and a second link set up between said intermediate router and said first output router, said method including a step of detecting a fault affecting said first output router.

Moreover, a method of this kind includes a step, on reception by the intermediate router of information relating to a fault, of switching the data stream to a third link set up between said intermediate router and a second output router, said first link and said third link constituting a second pseudo-wire.

An embodiment of this kind improves the restore time in the event of a fault affecting the first output router because the data stream is switched as close as possible to the fault.

An embodiment of the invention further comprises a router adapted to be connected by a first link to an input router of a packet-switched network and by a second link to a first output router of said packet-switched network, said first and second links constituting a first pseudo-wire able to broadcast a data stream, the router being characterized in that it includes:

· means for receiving a first message for setting up the first link including an identifier of said input router, an identifier of said first output router, and a field containing an identifier of a second output router of said network;

· means for sending a second message for setting up said second link between said router and said first output router and a third message for setting up a third link between said router and said second output router, the second message including the identifier of said input router and the identifier of said first output router, the third message including the identifier of said input router and the identifier of said second output router, and said first and third links constituting a second pseudo-wire;

· means for configuring at least one switching table for said broadcasting with a parameter specifying that the second pseudo-wire is a back-up pseudo-wire, said parameter being included in the first set-up message.

This kind of intermediate router is able, on reception of a set-up message sent by the input router, to set up two pseudo-wires having a shared link between the input router and the output router and then its own link between the intermediate router and a first, respectively a second, output router. This optimizes use of the resources of the network

between the first router and the intermediate router, which improves the restore time on detection of a fault affecting the first output router.

According to another feature, the router of an embodiment of the invention includes means for detecting a fault affecting said first output router and means for switching the data stream from the second link to the third link.

Providing in the intermediate router a function for detecting a fault affecting the first output router and a function for switching the data stream improves the restore time on detection of a fault affecting the first output router.

This improves the responsiveness of the network because detection occurs as close as possible to the fault. Accordingly, a fault affecting the first output router is detected more quickly, as the information does not have to cross the network as far as the input router before being processed. The function for switching the data stream also being a function of the intermediate router, switching the data stream to the third link, set up between the intermediate router and the second output router and with the first link constituting the back-up pseudo-wire, occurs faster because it is triggered on detection of the fault by the intermediate router.

This kind of solution reduces the quantity of data lost following a fault affecting the first output router.

An embodiment of the invention relates to a computer program product downloadable from a communications network and/or stored on a computer-readable medium and/or executable by a processor, characterized in that it comprises program code instructions for implementing the setting-up method of an embodiment of the invention when said program is executed by a computer.

An embodiment of the invention relates to a second computer program product downloadable from a communications network and/or stored on a computer-readable medium and/or executable by a processor, characterized in that it comprises program code instructions for implementing the broadcasting method of an embodiment of the invention when said program is executed by a computer.

An embodiment of the invention relates finally to a signal adapted to be transmitted between an input router of a packet-switched network and an intermediate router of said packet-switched network, said signal carrying a message for setting up at least two pseudo-wires able to broadcast a stream of data, the first pseudo-wire being set up between said input router and a first output router of said packet-switched network, the second pseudo-wire being set up between said input router and a second output router of said packet-switched network, said set-up message including:

· an identifier of said input router;

· an identifier of said first output router;

· a field containing an identifier of said second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages become apparent on reading the description of preferred embodiments given with reference to the drawings, in which:

· Figure 1 represents a pseudo-wire set up as in the prior art between an input router and an output router of a packet-switched network;

· Figure 2 represents a solution implemented in the prior art to ensure continuity of service in a packet-switched network;

· Figure 3 represents two pseudo-wires set up by the method of an embodiment of the invention;

· Figure 4 is a timing diagram of the exchange of requests firstly between an input router and an intermediate router of a packet-switched network and secondly between the intermediate router and first and second output routers in order to set up pseudo-wires by the method of an embodiment of the invention;

· Figure 5 represents diagrammatically routing and switching tables of an intermediate router of an embodiment of the invention;

· Figures 6A, 6B, and 6C represent set-up messages used in the setting-up method of an embodiment of the invention;

· Figure 7 is a timing diagram of the exchange of messages in a first embodiment of the invention firstly between an input router and an intermediate router of a packet-switched network and secondly between the input router and first and second output routers when broadcasting data on pseudo-wires set up in the packet-switched network;

· Figure 8 is a timing diagram of the exchange of messages in a second embodiment of the invention firstly between an input router and an intermediate router of a packet-switched network and secondly between the input router and first and second output routers when broadcasting data on pseudo-wires set up in the packet-switched network;

· Figure 9 shows two pseudo-wires set up by a method conforming to a third embodiment of the invention;

· Figure 10 is a timing diagram of the exchange of requests firstly between a first edge router and intermediate routers of a packet-switched network and secondly between the intermediate routers and second and third edge routers in order to set up pseudo-wires by the method conforming to the third embodiment of the invention;

· Figures 11A, 11B, 11C represent set-up messages used in the method conforming to the third embodiment of the invention;

· Figure 12 is a timing diagram of the exchange of messages firstly between an edge router and an intermediate router of a packet-switched network and secondly between the intermediate router and second and third edge routers when broadcasting data on pseudo-wires set up in the packet-switched network in accordance with the third embodiment of the invention.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

Figure 3 represents a connection set up between an input router T-PE1 and two output routers T-PE2 and T-PE3, each of these three routers being at the edge of a packet-switched network PSN.

Referring to this figure, a first link L1 is set up between the input router T-PE1 and an intermediate router S-PE of the network PSN. A second link L2 is set up between the intermediate router S-PE and the first output router T-PE2. The first and second links

constitute a first pseudo-wire pw1 setting up a connection between the input router T-PE1 and the first output router T-PE2. The pseudo-wire pw1 set up in this way is used to broadcast data streams divided into packets between the input router T-PE1 and the first output router T-PE2.

A second pseudo-wire pw2 is set up between the input router T-PE1 and the second output router T-PE3. The pseudo-wire pw2 consists of the first link L1 and a second link L3 set up between the intermediate router S-PE and the second output router T-PE3.

Accordingly, the first link L1 is shared by the two pseudo-wires pw1 and pw2. This optimizes the use of network resources, such as bandwidth, between the input router T-PE1 and the intermediate router S-PE, as only one link is set up between these two routers.

One example of application of an embodiment of the invention is collecting traffic for a mobile network. In this kind of example, the input router T-PE1 is connected to a first equipment such as a base station (not represented in the figures), for which it sends data to other aggregation equipments such as a radio network controller RNC connected to the output routers T-PE2 and T-PE3.

Figure 4 is a timing diagram of the exchange of messages between the input router T-PE1, the intermediate router S-PE, and the output routers T-PE2 and T-PE3 when setting up the pseudo-wires pw1 and pw2.

According to an embodiment of the invention, the pseudo-wires pw1 and pw2 are set up at the initiative of the input router T-PE1 and setting them up is based on the exchange of set-up messages conforming to the label distribution protocol (LDP) as defined in the documents RFC 3036 and RFC 4477. Accordingly, a first set-up message SIG1 is sent by the input router T-PE1 to the intermediate router S-PE. This first set-up message includes an identifier SAII of the input router T-PE1, an identifier of an input interface IFE associated with an equipment connected to the input router, an identifier TAII2 of the first output router T-PE2, an identifier of an output interface IFS2 associated with an equipment connected to the first output router T-PE2, and a field containing an

identifier TAII3 of the second output router T-PE3, an identifier of an output interface IFS3 associated with an equipment connected to the first output router T-PE3, and a "backup" parameter specifying that the second pseudo-wire is a back-up pseudo-wire. Figure 6A shows one such setting up message SIG1.

A forwarding equivalent class (FEC) consists of the pair {identifier SAII of input router T-PE1/associated input interface IFE; identifier TAII2 of first output router T-PE2/associated output interface IFS2}. This information is necessary for setting up a pseudo-wire. The pair consisting of the identifier SAII of the input router T-PE1/associated input interface IFE and the identifier TAII3/associated output interface IFS of the first output router T-PE3 also constitutes an FEC.

The first set-up message SIG1 differs from a standard pseudo-wire set-up message because it includes additional data such as the identifier TAII3 of the second output router T-PE3 and the "backup" parameter indicating the nature of the second pseudo-wire pw2 to be set up.

The set-up message SIG1 also includes a label lbl1 associated with the first link L1. This label is used by the input router T-PE1 and the intermediate router S-PE when broadcasting data streams. It is added by the input router T-PE1 to each packet of data to be sent to the first output router T-PE2.

Referring to Figure 5, on reception of the first set-up message SIG1, the intermediate router S-PE extracts the identifier of the input router T-PE1, the identifier of the first output router T-PE2, and the information contained in the additional field of the message SIG1, namely the identifier of the second output router T-PE3 and the "backup" parameter.

The intermediate router S-PE uses this information to fill in a switching table TC. This switching table TC includes for a given FEC information indicating the label that must be inserted into the header of the message in order to perform the next hop and the output interface if2, if3 to which to direct the data streams. The "backup" parameter indicating the nature of the second pseudo-wire pw2 is also entered into the switching table TC.

Once the switching table TC has been filled in, the intermediate router sends two set-up messages SIG2 and SIG3. The set-up message SIG2 is sent to the first output router T-PE2 and the set-up message SIG3 is sent to the second output router T-PE3.

The message SIG2 includes the identifier SAII of the input router T-PE1, the identifier of an input interface IFE associated with an equipment connected to the input router, the identifier TAII2 of the first output router T-PE2, the identifier of an output interfere IFS2 associated with an equipment connected to the first output router T-PE2, and the label lbl2 associated with the link L2 and used when broadcasting data. Figure 6B shows a message of this kind.

The message SIG3 includes the identifier SAII of the input router T-PE1, the identifier of an input interface IFE associated with an equipment connected to the input router, the identifier TAII3 of the second output router T-PE3, the identifier of an output interface IFS3 associated with an equipment connected to the second output router T-PE3, and the label lbl3 associated with the link L3 and used when broadcasting data. Figure 6C shows a message of this kind.

Once the pseudo-wires pw1 and pw2 have been set up, data streams are broadcast between the input router T-PE1 and the first output router T-PE2.

On reception of a data packet sent by the input router T-PE1, the intermediate router S-PE uses the label added to the packet by the input router to determine to which output interface if2, if3 to direct the data packet, as a function of the information contained in the switching table TC. The packets sent to the first output router T-PE2 are directed to the interface if2 of the intermediate router S-PE. This interface if2 constitutes a first end of the link L2. Before the data packet is sent to the first output router T-PE2, the new label lb2 is added to the packet.

Figure 7 represents a timing diagram of the exchange of messages between the input router T-PE1, the intermediate router S-PE, the first output router T-PE2, and the second output router T-PE3 when broadcasting data streams in a first embodiment of the invention.

A data stream D1 is sent by the input router T-PE1 to the first output router T-PE2. This first data stream is broadcast over the network PSN by means of the first pseudo-wire pw1.

To ensure continuity of service, the input router T-PE1 includes a function for detecting a fault affecting the first output router T-PE2. In order to detect this kind of fault, the input router T-PE1 regularly exchanges "echo" messages with the first output router T-PE2 and with the intermediate router S-PE.

If the input router does not receive a response to an "echo" message, it deduces that the first output router T-PE2 or the intermediate router S-PE is faulty.

If the faulty router is the first output router T-PE1, it then sends the intermediate router S-PE a switching message MG1. On reception of this message, the intermediate router S-PE switches the data streams to the link L3.

A data stream D2 sent by the input router T-PE1 following detection of a fault affecting the first output router T-PE2 is then broadcast by the second pseudo-wire pw2 and received by the second output router T-PE3.

Figure 8 is a timing diagram of the exchange of messages between the input router T-PE1, the intermediate router S-PE, the first output router T-PE2, and the second output router T-PE3 when broadcasting data streams in a second embodiment of the invention.

A data stream D1' is sent by the input router T-PE1 to the first output router T-PE2. This data stream is broadcast over the network PSN by the first pseudo-wire pw1.

To ensure continuity of service, the intermediate router S-PE includes a function for detecting a fault affecting the first output router T-PE2. In order to detect such a fault, the intermediate router S-PE regularly exchanges "echo" messages with the first output router T-PE2.

If the intermediate router does not receive a response to its "echo" message, it deduces that the first output router T-PE2 is faulty. It then switches the data streams coming from the input router T-PE1 to the link L3 and advises the input router T-PE1 of this.

Thus a data stream D2' sent by the input router T-PE1 after detection of the fault affecting the first output router is then broadcast by the second pseudo-wire pw2 and received by the second output router T-PE3.

Figure 9 represents a packet-switched communications network PNS comprising a plurality of edge routers T-PE1, T-PE2, and T-PE3 and a plurality of intermediate routers S-PE1 to S-PE5. In such a network, a connection is set up between an input router T-PE1 and first and second output routers T-PE2 and T-PE3, each of these three routers being at the edge of a packet-switched network PSN.

Referring to this figure, a first link L10 is set up between the input router T-PE1 and a first intermediate router S-PE1 of the PSN. A second link L11 is set up between the first intermediate router S-PE1 and a second intermediate router S-PE4. A third link L12 is set up between the second intermediate router S-PE4 and the first output router T-PE2. The first connection 10, the second connection 11, and the third connection 12 constitute a first pseudo-wire pw3, referred to as the main pseudo-wire, setting up a connection between the input router T-PE1 and the first output router T-PE2. The pseudo-wire pw3 set up in this way is used to broadcast data streams divided into packets between the input router T-PE1 and the first output router T-PE2.

A second pseudo-wire pw4, called the back-up pseudo-wire, is set up between the input router T-PE1 and the second output router T-PE3. The pseudo-wire pw4 consists of the first link L10, the second link L11, and a third link L13 set up between a third intermediate router S-PE5 and the second output router T-PE3.

Accordingly, the link L10 and the link L11 are shared by the two pseudo-wires pw3 and pw4. This optimizes use of network resources, such as bandwidth, between the input router T-PE1and the second intermediate router S-PE4.

Figure 10 represents a timing diagram for the exchange of messages between the input router T-PE1, the first, second, and third intermediate routers S-PE1, S-PE4, and S-PE5, and the first and second output routers T-PE2 and T-PE3 when setting up the pseudo-wires pw3 and pw4.

According to an embodiment of the invention, the pseudo-wires pw3 and pw4 are set up at the initiative of the input router T-PE1 and setting them up relies on the exchange of LDP set-up messages. Thus a first set-up message SIG10 is sent by the input router T-PE1 to the first intermediate router S-PE1. This first set-up message includes an identifier SAII of the input router T-PE1, an identifier of an input interface IFE associated with an equipment connected to the input router, an identifier TAII2 of the first output router T-PE2, an identifier of an output interface IFS2 associated with an equipment connected to the first output router T-PE2, and a field containing an identifier TAII3 of the second output router T-PE3, an identifier of an output interface IFS3 associated with an equipment connected to the second output router T-PE3, a "backup" parameter specifying that the second pseudo-wire pw4 is a back-up pseudo-wire, and an identifier of an intermediate router S-PE4 handling switching from the first pseudo-wire pw3 to the second pseudo-wire pw4 in the event of a fault affecting the third link L12 that is part of the pseudo-wire pw3. Figure 11A represents one such-set up message SIG10.

The set-up message SIG10 can contain a plurality of identifiers of output routers to be reached in the event of a fault affecting a link of the first pseudo-wire pw3. Such a message contains as many "backup" parameters as there are output routers to be reached and therefore as there are back-up pseudo-wires to be set up.

A set-up message SIG10 can also contain an additional field containing an explicit list of intermediate routers between which the links of the first pseudo-wire pw3 must be set up.

The set-up message SIG10 also contains a label lbl10. This label is used by the input router T-PE1 and the first intermediate router S-PE1 when broadcasting data streams from the intermediate router S-PE1 to the input router T-PE1. It is added by the first intermediate router S-PE1 to each data packet to be sent to the input router T-PE1.

On reception of the first set-up message SIG10, the intermediate router S-PE1 extracts the identifier of the input router T-PE1, the identifier of the first output router T-

PE2, and where appropriate the explicit list of intermediate routers between which the links of the first pseudo-wire pw3 must be set up.

The first intermediate router S-PE1 uses this information to fill out an intermediate table. This intermediate table contains for a given FEC information indicating the label that must be inserted into the header of the message in order to perform the next hop and the output interface to which to direct the data streams.

Once the switching table has been filled out, the first intermediate router sends a second set-up message SIG11 to the second intermediate router S-PE4.

The hop that the set-up message SIG11 must perform to reach the second intermediate router S-PE4 is determined by the routing information contained in the switching table TC of the intermediate router S-PE1.

The set-up message SIG10 can optionally also contain this kind of additional field for each back-up pseudo-wire to be set up, thus specifying the intermediate routers between which the links of the pseudo-wires are set up.

The message SIG11 is identical to the message SIG10; the label lbl12 to be used when broadcasting data is the only thing that differs between the two messages.

The information relating to the back-up pseudo-wire pw4, such as the identifier of the intermediate router to effect switching from the first pseudo-wire pw3 to the back-up pseudo-wire pw4, is sent from one intermediate router to another until it reaches the intermediate router that is to effect the switching.

On reception of this set-up message SIG11, the intermediate router S-PE4 extracts the identifier of the input router T-PE1, the identifier of the first output router T-PE2, and where appropriate the explicit list of intermediate routers between which the links of the first pseudo-wire pw3 must be set up. The "backup" parameter indicating the nature of the second pseudo-wire pw4 is also entered into the switching table.

Once the switching table of the intermediate router S-PE4 has been filled out, said router sends two set-up messages SIG12 and SIG13 to the first output router T-PE2 and the third intermediate router S-PE5, respectively.

The message SIG12 contains the identifier SAII of the input router T-PE1, the identifier of an input interface IFE associated with an equipment connected to the input router, the identifier TA112 of the first output router T-PE2, the identifier of an output interface IFS2 associated with an equipment connected to the first output router T-PE2, and the label lbl12 to be associated with the link L12 and used when broadcasting data. Figure 11B represents such a message.

The message SIG13 contains the identifier SAII of the input router T-PE1, the identifier of an input interface IFE associated with an equipment connected to the input router, the identifier TAII3, the identifier of an output interface IFS3 associated with an equipment connected to the second output router T-PE3, and the label lbl13 associated with the link L13 to be set up and used when broadcasting data. Figure 11C shows such a message. Such a message can contain an explicit list of intermediate routers between which the links of the second pseudo-wire pw4 must be set up to connect the intermediate router S-PE4 to the second output router T-PE3.

Once the pseudo-wires pw3 and pw4 have been set up, the data streams are broadcast between the input router T-PE1 and the first output router T-PE2.

On reception of a data packet sent by the input router T-PE1, the first intermediate router S-PE1 uses the label added to the packet by the router T-PE1 to determine to which output interface if2, if3 to direct the data packet, as a function of the information contained in the switching table TC. The packets sent to the first output router T-PE2 are directed to the interface if2 of the first intermediate router S-PE1. This interface if2 constitutes a first end of the link L10. Before the data packet is sent to the second intermediate router S-PE4, the new label lb11 is added to the data packet.

Figure 12 is a timing diagram of the exchange of messages between the input router T-PE1, the first intermediate router S-PE1, the second intermediate router S-PE4, the third intermediate router S-PE5, the first output router T-PE2, and the second output router T-PE3 when broadcasting data streams.

A data stream D1 is sent by the input router T-PE1 to the first output router T-PE2. This data stream is broadcast over the network PSN by means of the first pseudo-wire pw3.

To ensure continuity of service, the intermediate router S-PE4 includes a function for detecting a fault affecting the first output router T-PE2. To detect such a fault, the intermediate router S-PE4 regularly exchanges "echo" messages with the first output router T-PE2.

If the input router does not receive a response to its "echo" message, it deduces that the first output router T-PE2 is faulty. It then switches the data streams coming from the input router T-PE1 onto the link L12 and advises the input router T-PE1 of this.

Accordingly, a data stream D'1 sent by the input router T-PE1 following detection of the a fault affecting the first output router T-PE2 is then broadcast by the second pseudo-wire pw4 and received by the second output router T-PE3.

An embodiment of the invention also protects the network from a fault affecting one of the links of the first pseudo-wire pw3 or one of the intermediate routers of the network PSN.

For example, when setting up the first pseudo-wire pw3, the set-up message SIG10 contains, in addition to the information necessary for setting up the back-up pseudo-wire pw4, such as the identifier TAII3 of the second output router T-PE3, the "backup" parameter, and the identifier of the intermediate router S-PE4, additional information necessary for setting up a third or back-up pseudo-wire pw5 (represented in dashed line in Figure 9).

This information consists of the identifier TAII3 of the second output router T-PE3, the identifier of an output interface IFS3 associated with an equipment connected to the second output router T-PE3, a "backup" parameter specifying that the third pseudo-wire pw5 is a back-up pseudo-wire, and an identifier of an intermediate router S-PE5 effecting switching from the first pseudo-wire pw3 to the third pseudo-wire pw5 in the event of a fault affecting the second link L11 of the pseudo-wire pw3 or the intermediate router S-PE4.

Accordingly, if the intermediate router S-PE1 detects a fault affecting the link L11 or the intermediate router S-PE4, it advises the input router T-PE1 of this and switches the data stream to be broadcast to the third pseudo-wire pw5.

Finally, an embodiment of the invention further includes a computer program, notably a computer program on or in an information medium or memory, adapted to implement an embodiment of the invention. This program can use any programming language and take the form of source code, object code or a code intermediate between source code and object code, such as a partially-compiled form, or any other desirable form for implementing a method of an embodiment of the invention.

The information medium can be any entity or device capable of storing the program. For example, the medium can include storage means, such as a ROM, for example a CD ROM or a micro-electronic circuit ROM, or magnetic storage means, for example a floppy disk or a hard disk.

Moreover, the information medium can be a transmissible medium such as an electrical or optical signal, which can be routed via an electrical or optical cable, by radio or by other means. The program of an embodiment of the invention can in particular be downloaded over an Internet-type network.

Although the present disclosure has been described with reference to one or more examples, workers skilled in the art will recognize that changes may be made in form and detail without departing from the scope of the disclosure and/or the appended claims.

SUBSTITUTE SPECIFICATION

(MARKED-UP VERSION)

SUBSTITUTE SPECIFICATION
(ANNOTATED TO SHOW MARKED CHANGES)

~~A~~ MECHANISM FOR PROTECTING A PSEUDO-WIRE

CROSS-REFERENCE TO RELATED APPLICATIONS

This Application is a Section 371 National Stage Application of International Application No. PCT/FR2008/050324, filed February 26, 2008 and published as WO 2008/110735 on September 18, 2009, not in English.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

None.

THE NAMES OF PARTIES TO A JOINT RESEARCH AGREEMENT

None.

FIELD OF THE DISCLOSURE

The field of the ~~invention~~ disclosure is telecommunications, and more particularly packet-switched networks.

BACKGROUND OF THE DISCLOSURE

In a packet-switched network, data is transmitted in the form of packets processed by routers of the network until they reach their destination. Together the packets for transmission constitute a data stream.

One example of a technology used for routing data packets in packet-switched networks is the multi-protocol label switching (MPLS) technology. The MPLS technology adds one or more labels to the data packet headers, said labels containing information enabling the routers of the network to determine the next hop for a packet to reach its destination. The MPLS technology is described in more detail in Internet Engineering Task Force (IETF) Request For Comments (RFC) 3031.

However, the MPLS protocol can process only packets conforming to the Internet Protocol (IP).

To alleviate this problem, the IETF Pseudo-Wire Emulation Edge-To-Edge (PWE3) standardization group has defined a pseudo-wire concept for emulating a point-to-point link between two equipments of a packet-switched network based on the IP/MPLS technology. Such pseudo-wires, defined in the document RFC 3985, enable data packets to be transmitted that do not conform to the Internet Protocol, for example data packets conforming to the ATM protocol.

Referring to Figure 1, a pseudo-wire pw1 is set up between a first router T-PE1 at the edge of a packet-switched network PSN and a second router T-PE2, also at the edge of the network PSN. A first link L1 that is part of the pseudo-wire pw1 is set up between the first router T-PE1 and an intermediate router S-PE of the network PSN. A second link L2 that is also part of the pseudo-wire pw1 is set up between the intermediate router S-PE and the second router T-PE2. The first router T-PE1 is called the input router and constitutes a first end of the pseudo-wire pw1 and the second router T-PE2 is called the output router and constitutes a second end of the pseudo-wire pw1. Once the pseudo-wire pw1 has been set up, the input router T-PE1 transmits a data stream routed via the pseudo-wire pw1 to the output router T-PE2. This kind of pseudo-wire pw1 is defined in more detail in the document "An Architecture for Multi-Segment Pseudo-Wire Emulation Edge-to-Edge" (draft-ietf-pwe3-ms-pw-arch-02.txt).

To ensure continuity of service in the event of a fault affecting the output router, the working group PWE3 proposes a solution that backs up the first pseudo-wire set up between the input router and the output router by a second pseudo-wire serving as a back-up pseudo-wire so that, in the event of a fault affecting the output router constituting one end of the first pseudo-wire, the data packets are routed by the back-up pseudo-wire, one end of which consists of a different output router.

Accordingly, referring to Figure 2, a first pseudo-wire pw1 is set up between an input router T-PE1 at the edge of a packet-switched network PSN and an output router T-PE2 also at the edge of the network PSN. A first link L1 that is part of the pseudo-wire pw1 is set up between the input router T-PE1 and an intermediate router S-PE of the network PSN. A second link L2 that is also part of the pseudo-wire pw1 is set up

between the intermediate router S-PE and the output router T-PE2. A second pseudo-wire pw2 is then set up between the input router T-PE1 constituting a first end of the pseudo-wire and a second output router T-PE3 constituting a second end of the pseudo-wire. A first link L3 that is part of the second pseudo-wire is set up between the input router T-PE1 and the intermediate router S-PE and a second link L4 that is also part of the second pseudo-wire is set up between the intermediate router S-PE and the second output router T-PE3.

To ensure continuity of service, the input router T-PE1 includes a function for detecting a fault affecting the first output router T-PE2 and a function for switching the data stream from the first pseudo-wire pw1 to the second pseudo-wire pw2.

A fault affecting the first output router T-PE2 is detected in the input router T-PE1, for example from a message indicating the occurrence of a fault sent via the public switched network PSN to the input router T-PE1. Once informed of the fault, the input router T-PE1 triggers switching of the data stream from the first pseudo-wire pw1 to the second pseudo-wire pw2, thus routing the data to the output router T-PE3.

However, this kind of solution has the drawback of consuming network resources, for example processing resources in the network equipments (storage capacity, computation capacity, etc.), signaling streams for setting-up two pseudo-wires, and bandwidth, especially between the input router and the intermediate router. This increases the restore time in the event of a fault affecting an output router, with a negative impact on quality of service.

SUMMARY

The solution proposed in the context of an exemplary embodiment of the invention is free of those problems of the prior art.

~~It~~An embodiment is based on a method of setting up at least two pseudo-wires able to broadcast a data stream wherein a first pseudo-wire is set up between an input router of a packet-switched network and a first output router of said packet-switched network, the second pseudo-wire is set up between said input router and a second output router of said packet-switched network, a first link that is part of the first pseudo-wire is

set up between the first output router and an intermediate router of said packet-switched network, and a second link that is part of the second pseudo-wire is set up between said second output router and said intermediate router.

This kind of setting up method is noteworthy in that a third link that is part of the two pseudo-wires is set up between said intermediate router and said input router.

This optimizes the use of network resources, for example bandwidth, between the input router and the intermediate router by setting up between them a single link common to the two pseudo-wires. This solution has never been envisaged in the prior art. In the prior art, when a main pseudo-wire and a back-up pseudo-wire are set up between an input router and a first, respectively a second, output router, a link is set up between the input router and the intermediate router for each pseudo-wire, i.e. two links. The person skilled in the art has always considered a pseudo-wire as a point-to-point link set up between an input router and an output router, with the result that each input router/output router pair is associated with a pseudo-wire. Moreover, this kind of approach is recommended in the standards.

Going against this received wisdom of the person skilled in the art, the inventors of the present application propose, in contrast, to share the link set up between the input router and the intermediate router, which improves the use of network resources and reduces the restore time in the event of a fault affecting the first output router. In the prior art, the back-up pseudo-wire, although used only to broadcast data in the event of a fault affecting the main pseudo-wire, reserves resources used to set it up over the whole of the network between the input router and the output router. Because the main pseudo-wire and the back-up pseudo-wire share the link set up between the input router and the intermediate router, the network resources that in the past were reserved for the back-up pseudo-wire are released and can be used in a manner closer to the optimum.

In this kind of embodiment, the first, second, and third links are not necessarily direct links between routers. For example, the second link set up between the intermediate router and the first output router can comprise one or more hops and possibly pass through one or more other intermediate routers before reaching the output

router. The same applies to the link set up between the input router and the intermediate router and to the link set up between the intermediate router and the second output router.

The data broadcast on the pseudo-wires can be payload data, for example an ATM stream transporting a service, or service data, for example a message indicating detection of a fault affecting a network equipment. Accordingly, in the situation of exchanging service data, the solution proposed in the present application makes the network equipments more responsive.

According to one feature of the method of an embodiment of the invention, the pseudo-wires are set up at the initiative of said input router by sending said intermediate router a message for setting-up said third link including an identifier of said input router, an identifier of said first output router, and a field containing an identifier of said second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire

In this kind of embodiment, setting up the pseudo-wires is at the initiative of the input router. It is assumed, in the context of an embodiment of the invention, that in order to be able to initiate the setting up of the main and back-up pseudo-wires the input router has in a routing table information on the hops to reach the first and second output routers. By means of this information, the input router knows to which router of the network it must send the pseudo-wire set-up message, which router is then considered the intermediate router. It is then necessary to configure only the input router, which reduces network maintenance. The parameter in the set-up message indicating that the second pseudo-wire is a back-up pseudo-wire enables the intermediate router to be configured for subsequent broadcasting of data.

~~The~~ An embodiment of the invention also relates to a method of broadcasting data streams between an input router of a packet-switched network and a first output router of said packet-switched network, wherein a data stream is broadcast on a first pseudo-wire ~~consisting of~~ comprising a first link set up between said input router and an intermediate router of said packet-switched network and a second link set up between said

intermediate router and said first output router, said method including a step of detecting a fault affecting said first output router.

Moreover, a method of this kind includes a step, on reception by the intermediate router of information relating to a fault, of switching the data stream to a third link set up between said intermediate router and a second output router, said first link and said third link constituting a second pseudo-wire.

An embodiment of this kind improves the restore time in the event of a fault affecting the first output router because the data stream is switched as close as possible to the fault.

~~The~~ An embodiment of the invention further ~~consists in~~ comprises a router adapted to be connected by a first link to an input router of a packet-switched network and by a second link to a first output router of said packet-switched network, said first and second links constituting a first pseudo-wire able to broadcast a data stream, the router being characterized in that it includes:

· means for receiving a first message for setting up the first link including an identifier of said input router, an identifier of said first output router, and a field containing an identifier of a second output router of said network;

· means for sending a second message for setting up said second link between said router and said first output router and a third message for setting up a third link between said router and said second output router, the second message including the identifier of said input router and the identifier of said first output router, the third message including the identifier of said input router and the identifier of said second output router, and said first and third links constituting a second pseudo-wire;

· means for configuring at least one switching table for said broadcasting with a parameter specifying that the second pseudo-wire is a back-up pseudo-wire, said parameter being included in the first set-up message.

This kind of intermediate router is able, on reception of a set-up message sent by the input router, to set up two pseudo-wires having a shared link between the input router and the output router and then its own link between the intermediate router and a first,

respectively a second, output router. This optimizes use of the resources of the network between the first router and the intermediate router, which improves the restore time on detection of a fault affecting the first output router.

According to another feature, the router of an embodiment of the invention includes means for detecting a fault affecting said first output router and means for switching the data stream from the second link to the third link.

Providing in the intermediate router a function for detecting a fault affecting the first output router and a function for switching the data stream improves the restore time on detection of a fault affecting the first output router.

This improves the responsiveness of the network because detection occurs as close as possible to the fault. Accordingly, a fault affecting the first output router is detected more quickly, as the information does not have to cross the network as far as the input router before being processed. The function for switching the data stream also being a function of the intermediate router, switching the data stream to the third link, set up between the intermediate router and the second output router and with the first link constituting the back-up pseudo-wire, occurs faster because it is triggered on detection of the fault by the intermediate router.

This kind of solution reduces the quantity of data lost following a fault affecting the first output router.

~~The~~ An embodiment of the invention relates to a computer program product downloadable from a communications network and/or stored on a computer-readable medium and/or executable by a processor, characterized in that it comprises program code instructions for implementing the setting-up method of an embodiment of the invention when said program is executed by a computer.

~~The~~ An embodiment of the invention relates to a second computer program product downloadable from a communications network and/or stored on a computer-readable medium and/or executable by a processor, characterized in that it comprises program code instructions for implementing the broadcasting method of an embodiment of the invention when said program is executed by a computer.

~~The~~ An embodiment of the invention relates finally to a signal adapted to be transmitted between an input router of a packet-switched network and an intermediate router of said packet-switched network, said signal carrying a message for setting up at least two pseudo-wires able to broadcast a stream of data, the first pseudo-wire being set up between said input router and a first output router of said packet-switched network, the second pseudo-wire being set up between said input router and a second output router of said packet-switched network, said set-up message including:

· an identifier of said input router;

· an identifier of said first output router;

· a field containing an identifier of said second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages become apparent on reading the description of preferred embodiments given with reference to the drawings, in which:

· Figure 1 represents a pseudo-wire set up as in the prior art between an input router and an output router of a packet-switched network;

· Figure 2 represents a solution implemented in the prior art to ensure continuity of service in a packet-switched network;

· Figure 3 represents two pseudo-wires set up by the method of an embodiment of the invention;

· Figure 4 is a timing diagram of the exchange of requests firstly between an input router and an intermediate router of a packet-switched network and secondly between the intermediate router and first and second output routers in order to set up pseudo-wires by the method of an embodiment of the invention;

· Figure 5 represents diagrammatically routing and switching tables of an intermediate router of an embodiment of the invention;

· Figures 6A, 6B, and 6C represent set-up messages used in the setting-up method of an embodiment of the invention;

· Figure 7 is a timing diagram of the exchange of messages in a first embodiment of the invention firstly between an input router and an intermediate router of a packet-switched network and secondly between the input router and first and second output routers when broadcasting data on pseudo-wires set up in the packet-switched network;

· Figure 8 is a timing diagram of the exchange of messages in a second embodiment of the invention firstly between an input router and an intermediate router of a packet-switched network and secondly between the input router and first and second output routers when broadcasting data on pseudo-wires set up in the packet-switched network;

· Figure 9 shows two pseudo-wires set up by a method conforming to a third embodiment of the invention;

· Figure 10 is a timing diagram of the exchange of requests firstly between a first edge router and intermediate routers of a packet-switched network and secondly between the intermediate routers and second and third edge routers in order to set up pseudo-wires by the method conforming to the third embodiment of the invention;

· Figures 11A, 11B, 11C represent set-up messages used in the method conforming to the third embodiment of the invention;

· Figure 12 is a timing diagram of the exchange of messages firstly between an edge router and an intermediate router of a packet-switched network and secondly between the intermediate router and second and third edge routers when broadcasting data on pseudo-wires set up in the packet-switched network in accordance with the third embodiment of the invention.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

Figure 3 represents a connection set up between an input router T-PE1 and two output routers T-PE2 and T-PE3, each of these three routers being at the edge of a packet-switched network PSN.

Referring to this figure, a first link L1 is set up between the input router T-PE1 and an intermediate router S-PE of the network PSN. A second link L2 is set up between the intermediate router S-PE and the first output router T-PE2. The first and second links

constitute a first pseudo-wire pw1 setting up a connection between the input router T-PE1 and the first output router T-PE2. The pseudo-wire pw1 set up in this way is used to broadcast data streams divided into packets between the input router T-PE1 and the first output router T-PE2.

A second pseudo-wire pw2 is set up between the input router T-PE1 and the second output router T-PE3. The pseudo-wire pw2 consists of the first link L1 and a second link L3 set up between the intermediate router S-PE and the second output router T-PE3.

Accordingly, the first link L1 is shared by the two pseudo-wires pw1 and pw2. This optimizes the use of network resources, such as bandwidth, between the input router T-PE1 and the intermediate router S-PE, as only one link is set up between these two routers.

One example of application of an embodiment of the invention is collecting traffic for a mobile network. In this kind of example, the input router T-PE1 is connected to a first equipment such as a base station (not represented in the figures), for which it sends data to other aggregation equipments such as a radio network controller RNC connected to the output routers T-PE2 and T-PE3.

Figure 4 is a timing diagram of the exchange of messages between the input router T-PE1, the intermediate router S-PE, and the output routers T-PE2 and T-PE3 when setting up the pseudo-wires pw1 and pw2.

According to an embodiment of the invention, the pseudo-wires pw1 and pw2 are set up at the initiative of the input router T-PE1 and setting them up is based on the exchange of set-up messages conforming to the label distribution protocol (LDP) as defined in the documents RFC 3036 and RFC 4477. Accordingly, a first set-up message SIG1 is sent by the input router T-PE1 to the intermediate router S-PE. This first set-up message includes an identifier SAII of the input router T-PE1, an identifier of an input interface IFE associated with an equipment connected to the input router, an identifier TAII2 of the first output router T-PE2, an identifier of an output interface IFS2 associated with an equipment connected to the first output router T-PE2, and a field containing an

identifier TAII3 of the second output router T-PE3, an identifier of an output interface IFS3 associated with an equipment connected to the first output router T-PE3, and a "backup" parameter specifying that the second pseudo-wire is a back-up pseudo-wire. Figure 6A shows one such setting up message SIG1.

A forwarding equivalent class (FEC) consists of the pair {identifier SAII of input router T-PE1/associated input interface IFE; identifier TAII2 of first output router T-PE2/associated output interface IFS2}. This information is necessary for setting up a pseudo-wire. The pair consisting of the identifier SAII of the input router T-PE1/associated input interface IFE and the identifier TAII3/associated output interface IFS of the first output router T-PE3 also constitutes an FEC.

The first set-up message SIG1 differs from a standard pseudo-wire set-up message because it includes additional data such as the identifier TAII3 of the second output router T-PE3 and the "backup" parameter indicating the nature of the second pseudo-wire pw2 to be set up.

The set-up message SIG1 also includes a label lbl1 associated with the first link L1. This label is used by the input router T-PE1 and the intermediate router S-PE when broadcasting data streams. It is added by the input router T-PE1 to each packet of data to be sent to the first output router T-PE2.

Referring to Figure 5, on reception of the first set-up message SIG1, the intermediate router S-PE extracts the identifier of the input router T-PE1, the identifier of the first output router T-PE2, and the information contained in the additional field of the message SIG1, namely the identifier of the second output router T-PE3 and the "backup" parameter.

The intermediate router S-PE uses this information to fill in a switching table TC. This switching table TC includes for a given FEC information indicating the label that must be inserted into the header of the message in order to perform the next hop and the output interface if2, if3 to which to direct the data streams. The "backup" parameter indicating the nature of the second pseudo-wire pw2 is also entered into the switching table TC.

Once the switching table TC has been filled in, the intermediate router sends two set-up messages SIG2 and SIG3. The set-up message SIG2 is sent to the first output router T-PE2 and the set-up message SIG3 is sent to the second output router T-PE3.

The message SIG2 includes the identifier SAII of the input router T-PE1, the identifier of an input interface IFE associated with an equipment connected to the input router, the identifier TAII2 of the first output router T-PE2, the identifier of an output interfere IFS2 associated with an equipment connected to the first output router T-PE2, and the label lbl2 associated with the link L2 and used when broadcasting data. Figure 6B shows a message of this kind.

The message SIG3 includes the identifier SAII of the input router T-PE1, the identifier of an input interface IFE associated with an equipment connected to the input router, the identifier TAII3 of the second output router T-PE3, the identifier of an output interface IFS3 associated with an equipment connected to the second output router T-PE3, and the label lbl3 associated with the link L3 and used when broadcasting data. Figure 6C shows a message of this kind.

Once the pseudo-wires pw1 and pw2 have been set up, data streams are broadcast between the input router T-PE1 and the first output router T-PE2.

On reception of a data packet sent by the input router T-PE1, the intermediate router S-PE uses the label added to the packet by the input router to determine to which output interface if2, if3 to direct the data packet, as a function of the information contained in the switching table TC. The packets sent to the first output router T-PE2 are directed to the interface if2 of the intermediate router S-PE. This interface if2 constitutes a first end of the link L2. Before the data packet is sent to the first output router T-PE2, the new label lb2 is added to the packet.

Figure 7 represents a timing diagram of the exchange of messages between the input router T-PE1, the intermediate router S-PE, the first output router T-PE2, and the second output router T-PE3 when broadcasting data streams in a first embodiment of the invention.

A data stream D1 is sent by the input router T-PE1 to the first output router T-PE2. This first data stream is broadcast over the network PSN by means of the first pseudo-wire pw1.

To ensure continuity of service, the input router T-PE1 includes a function for detecting a fault affecting the first output router T-PE2. In order to detect this kind of fault, the input router T-PE1 regularly exchanges "echo" messages with the first output router T-PE2 and with the intermediate router S-PE.

If the input router does not receive a response to an "echo" message, it deduces that the first output router T-PE2 or the intermediate router S-PE is faulty.

If the faulty router is the first output router T-PE1, it then sends the intermediate router S-PE a switching message MG1. On reception of this message, the intermediate router S-PE switches the data streams to the link L3.

A data stream D2 sent by the input router T-PE1 following detection of a fault affecting the first output router T-PE2 is then broadcast by the second pseudo-wire pw2 and received by the second output router T-PE3.

Figure 8 is a timing diagram of the exchange of messages between the input router T-PE1, the intermediate router S-PE, the first output router T-PE2, and the second output router T-PE3 when broadcasting data streams in a second embodiment of the invention.

A data stream D1' is sent by the input router T-PE1 to the first output router T-PE2. This data stream is broadcast over the network PSN by the first pseudo-wire pw1.

To ensure continuity of service, the intermediate router S-PE includes a function for detecting a fault affecting the first output router T-PE2. In order to detect such a fault, the intermediate router S-PE regularly exchanges "echo" messages with the first output router T-PE2.

If the intermediate router does not receive a response to its "echo" message, it deduces that the first output router T-PE2 is faulty. It then switches the data streams coming from the input router T-PE1 to the link L3 and advises the input router T-PE1 of this.

Thus a data stream D2' sent by the input router T-PE1 after detection of the fault affecting the first output router is then broadcast by the second pseudo-wire pw2 and received by the second output router T-PE3.

Figure 9 represents a packet-switched communications network PNS comprising a plurality of edge routers T-PE1, T-PE2, and T-PE3 and a plurality of intermediate routers S-PE1 to S-PE5. In such a network, a connection is set up between an input router T-PE1 and first and second output routers T-PE2 and T-PE3, each of these three routers being at the edge of a packet-switched network PSN.

Referring to this figure, a first link L10 is set up between the input router T-PE1 and a first intermediate router S-PE1 of the PSN. A second link L11 is set up between the first intermediate router S-PE1 and a second intermediate router S-PE4. A third link L12 is set up between the second intermediate router S-PE4 and the first output router T-PE2. The first connection 10, the second connection 11, and the third connection 12 constitute a first pseudo-wire pw3, referred to as the main pseudo-wire, setting up a connection between the input router T-PE1 and the first output router T-PE2. The pseudo-wire pw3 set up in this way is used to broadcast data streams divided into packets between the input router T-PE1 and the first output router T-PE2.

A second pseudo-wire pw4, called the back-up pseudo-wire, is set up between the input router T-PE1 and the second output router T-PE3. The pseudo-wire pw4 consists of the first link L10, the second link L11, and a third link L13 set up between a third intermediate router S-PE5 and the second output router T-PE3.

Accordingly, the link L10 and the link L11 are shared by the two pseudo-wires pw3 and pw4. This optimizes use of network resources, such as bandwidth, between the input router T-PE1and the second intermediate router S-PE4.

Figure 10 represents a timing diagram for the exchange of messages between the input router T-PE1, the first, second, and third intermediate routers S-PE1, S-PE4, and S-PE5, and the first and second output routers T-PE2 and T-PE3 when setting up the pseudo-wires pw3 and pw4.

According to an embodiment of the invention, the pseudo-wires pw3 and pw4 are set up at the initiative of the input router T-PE1 and setting them up relies on the exchange of LDP set-up messages. Thus a first set-up message SIG10 is sent by the input router T-PE1 to the first intermediate router S-PE1. This first set-up message includes an identifier SAII of the input router T-PE1, an identifier of an input interface IFE associated with an equipment connected to the input router, an identifier TAII2 of the first output router T-PE2, an identifier of an output interface IFS2 associated with an equipment connected to the first output router T-PE2, and a field containing an identifier TAII3 of the second output router T-PE3, an identifier of an output interface IFS3 associated with an equipment connected to the second output router T-PE3, a "backup" parameter specifying that the second pseudo-wire pw4 is a back-up pseudo-wire, and an identifier of an intermediate router S-PE4 handling switching from the first pseudo-wire pw3 to the second pseudo-wire pw4 in the event of a fault affecting the third link L12 that is part of the pseudo-wire pw3. Figure 11A represents one such-set up message SIG10.

The set-up message SIG10 can contain a plurality of identifiers of output routers to be reached in the event of a fault affecting a link of the first pseudo-wire pw3. Such a message contains as many "backup" parameters as there are output routers to be reached and therefore as there are back-up pseudo-wires to be set up.

A set-up message SIG10 can also contain an additional field containing an explicit list of intermediate routers between which the links of the first pseudo-wire pw3 must be set up.

The set-up message SIG10 also contains a label lbl10. This label is used by the input router T-PE1 and the first intermediate router S-PE1 when broadcasting data streams from the intermediate router S-PE1 to the input router T-PE1. It is added by the first intermediate router S-PE1 to each data packet to be sent to the input router T-PE1.

On reception of the first set-up message SIG10, the intermediate router S-PE1 extracts the identifier of the input router T-PE1, the identifier of the first output router T-

PE2, and where appropriate the explicit list of intermediate routers between which the links of the first pseudo-wire pw3 must be set up.

The first intermediate router S-PE1 uses this information to fill out an intermediate table. This intermediate table contains for a given FEC information indicating the label that must be inserted into the header of the message in order to perform the next hop and the output interface to which to direct the data streams.

Once the switching table has been filled out, the first intermediate router sends a second set-up message SIG11 to the second intermediate router S-PE4.

The hop that the set-up message SIG11 must perform to reach the second intermediate router S-PE4 is determined by the routing information contained in the switching table TC of the intermediate router S-PE1.

The set-up message SIG10 can optionally also contain this kind of additional field for each back-up pseudo-wire to be set up, thus specifying the intermediate routers between which the links of the pseudo-wires are set up.

The message SIG11 is identical to the message SIG10; the label lbl12 to be used when broadcasting data is the only thing that differs between the two messages.

The information relating to the back-up pseudo-wire pw4, such as the identifier of the intermediate router to effect switching from the first pseudo-wire pw3 to the back-up pseudo-wire pw4, is sent from one intermediate router to another until it reaches the intermediate router that is to effect the switching.

On reception of this set-up message SIG11, the intermediate router S-PE4 extracts the identifier of the input router T-PE1, the identifier of the first output router T-PE2, and where appropriate the explicit list of intermediate routers between which the links of the first pseudo-wire pw3 must be set up. The "backup" parameter indicating the nature of the second pseudo-wire pw4 is also entered into the switching table.

Once the switching table of the intermediate router S-PE4 has been filled out, said router sends two set-up messages SIG12 and SIG13 to the first output router T-PE2 and the third intermediate router S-PE5, respectively.

The message SIG12 contains the identifier SAII of the input router T-PE1, the identifier of an input interface IFE associated with an equipment connected to the input router, the identifier TA112 of the first output router T-PE2, the identifier of an output interface IFS2 associated with an equipment connected to the first output router T-PE2, and the label lbl12 to be associated with the link L12 and used when broadcasting data. Figure 11B represents such a message.

The message SIG13 contains the identifier SAII of the input router T-PE1, the identifier of an input interface IFE associated with an equipment connected to the input router, the identifier TAII3, the identifier of an output interface IFS3 associated with an equipment connected to the second output router T-PE3, and the label lbl13 associated with the link L13 to be set up and used when broadcasting data. Figure 11C shows such a message. Such a message can contain an explicit list of intermediate routers between which the links of the second pseudo-wire pw4 must be set up to connect the intermediate router S-PE4 to the second output router T-PE3.

Once the pseudo-wires pw3 and pw4 have been set up, the data streams are broadcast between the input router T-PE1 and the first output router T-PE2.

On reception of a data packet sent by the input router T-PE1, the first intermediate router S-PE1 uses the label added to the packet by the router T-PE1 to determine to which output interface if2, if3 to direct the data packet, as a function of the information contained in the switching table TC. The packets sent to the first output router T-PE2 are directed to the interface if2 of the first intermediate router S-PE1. This interface if2 constitutes a first end of the link L10. Before the data packet is sent to the second intermediate router S-PE4, the new label lb11 is added to the data packet.

Figure 12 is a timing diagram of the exchange of messages between the input router T-PE1, the first intermediate router S-PE1, the second intermediate router S-PE4, the third intermediate router S-PE5, the first output router T-PE2, and the second output router T-PE3 when broadcasting data streams.

A data stream D1 is sent by the input router T-PE1 to the first output router T-PE2. This data stream is broadcast over the network PSN by means of the first pseudo-wire pw3.

To ensure continuity of service, the intermediate router S-PE4 includes a function for detecting a fault affecting the first output router T-PE2. To detect such a fault, the intermediate router S-PE4 regularly exchanges "echo" messages with the first output router T-PE2.

If the input router does not receive a response to its "echo" message, it deduces that the first output router T-PE2 is faulty. It then switches the data streams coming from the input router T-PE1 onto the link L12 and advises the input router T-PE1 of this.

Accordingly, a data stream D'1 sent by the input router T-PE1 following detection of the a fault affecting the first output router T-PE2 is then broadcast by the second pseudo-wire pw4 and received by the second output router T-PE3.

~~The~~ An embodiment of the invention also protects the network from a fault affecting one of the links of the first pseudo-wire pw3 or one of the intermediate routers of the network PSN.

For example, when setting up the first pseudo-wire pw3, the set-up message SIG10 contains, in addition to the information necessary for setting up the back-up pseudo-wire pw4, such as the identifier TAII3 of the second output router T-PE3, the "backup" parameter, and the identifier of the intermediate router S-PE4, additional information necessary for setting up a third or back-up pseudo-wire pw5 (represented in dashed line in Figure 9).

This information consists of the identifier TAII3 of the second output router T-PE3, the identifier of an output interface IFS3 associated with an equipment connected to the second output router T-PE3, a "backup" parameter specifying that the third pseudo-wire pw5 is a back-up pseudo-wire, and an identifier of an intermediate router S-PE5 effecting switching from the first pseudo-wire pw3 to the third pseudo-wire pw5 in the event of a fault affecting the second link L11 of the pseudo-wire pw3 or the intermediate router S-PE4.

Accordingly, if the intermediate router S-PE1 detects a fault affecting the link L11 or the intermediate router S-PE4, it advises the input router T-PE1 of this and switches the data stream to be broadcast to the third pseudo-wire pw5.

Finally, an embodiment of the invention further ~~consists in~~ includes a computer program, notably a computer program on or in an information medium or memory, adapted to implement an embodiment of the invention. This program can use any programming language and take the form of source code, object code or a code intermediate between source code and object code, such as a partially-compiled form, or any other desirable form for implementing a method of an embodiment of the invention.

The information medium can be any entity or device capable of storing the program. For example, the medium can include storage means, such as a ROM, for example a CD ROM or a micro-electronic circuit ROM, or magnetic storage means, for example a floppy disk or a hard disk.

Moreover, the information medium can be a transmissible medium such as an electrical or optical signal, which can be routed via an electrical or optical cable, by radio or by other means. The program of an embodiment of the invention can in particular be downloaded over an Internet-type network.

Although the present disclosure has been described with reference to one or more examples, workers skilled in the art will recognize that changes may be made in form and detail without departing from the scope of the disclosure and/or the appended claims.

(12) DEMANDE INTERNATIONALE PUBLIÉE EN VERTU DU TRAITÉ DE COOPÉRATION EN MATIÈRE DE BREVETS (PCT)

(19) Organisation Mondiale de la Propriété Intellectuelle
Bureau international

(43) Date de la publication internationale
18 septembre 2008 (18.09.2008)

PCT

(10) Numéro de publication internationale
WO 2008/110735 A2

(51) Classification internationale des brevets : Non classée

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(25) Langue de dépôt : français

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(30) Données relatives à la priorité :
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(72) Inventeurs; et

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

(84) États désignés *(sauf indication contraire, pour tout titre de protection régionale disponible)* : ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), eurasien (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), européen (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL,

[Suite sur la page suivante]

(54) Title: MECHANISM FOR PROTECTING A PSEUDO LINK

(54) Titre : MECANISME DE PROTECTION D'UN PSEUDO-LIEN

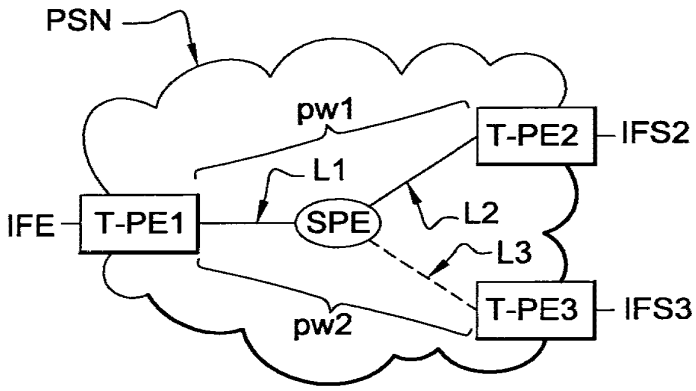


Fig. 3

(57) Abstract: The invention relates to a method for establishing at least two pseudo-links capable of broadcasting a data flow, the first pseudo-link being established between an input router and a first output router, and the second pseudo-link being established between said input router and a second output router, wherein said input and output routers belong to an intermediate packet network, a first connection representing the first pseudo-link being established between the first output router and an intermediate router that belongs to said network, a second connection representing the second pseudo-link being established between the second output router and said intermediate router, and a third connection representing the two pseudo-links being established between said intermediate router and said input router.

(57) Abrégé : La présente invention concerne un procédé d'établissement d'au moins deux pseudo-liens aptes à diffuser un flux de données, le premier pseudo-lien étant établi entre un routeur d'entrée et un premier routeur de sortie, le deuxième pseudo-lien étant établi entre ledit routeur d'entrée et un deuxième routeur de sortie, lesdits routeurs d'entrée et de sortie appartenant à un réseau de intermédiaire de paquets, une première liaison constitutive du premier pseudo-lien étant établie entre le premier routeur de sortie et un routeur intermédiaire appartenant audit réseau, et une deuxième liaison constitutive du deuxième pseudo-lien étant établie entre le deuxième routeur de sortie et ledit routeur intermédiaire, une troisième liaison constitutive des deux pseudo-liens, étant établie entre ledit routeur intermédiaire et ledit routeur d'entrée.

WO 2008/110735 A2

TRAITÉ DE COOPÉRATION EN MATIÈRE DE BREVETS

Expéditeur : L'ADMINISTRATION CHARGEE DE LA RECHERCHE INTERNATIONALE

Destinataire

FRANCE TELECOM
A l'att. de Coda, Sandrine
FTR&D/PIV/Brevets
38-40 Rue du Général Leclerc
92794 Issy-Les-Moulineaux Cedex 9
FRANCE

RR1 = RRP + D4 (nouveau)

PCT

NOTIFICATION DE TRANSMISSION DU RAPPORT DE RECHERCHE INTERNATIONALE ET DE L'OPINION ÉCRITE DE L'ADMINISTRATION CHARGÉE DE LA RECHERCHE INTERNATIONALE OU DE LA DÉCLARATION
(règle 44.1 du PCT)

	Date d'expédition *(jour/mois/année)* 01/04/2009
Référence du dossier du déposant ou du mandataire 06403-WO Sc/ AG	**POUR SUITE À DONNER** voir les paragraphes 1 et 4 ci-après
Demande internationale n° PCT/FR2008/050324	Date du dépôt international *(jour/mois/année)* 26/02/2008
Déposant FRANCE TELECOM	Arrivée Le - 1 AVR. 2009 PIV/Brevets

1. [X] Il est notifié au déposant que le rapport de recherche internationale a été établi et lui est transmis ci-joint.

Dépôt de modifications et d'une déclaration selon l'article 19 :
Le déposant peut, s'il le souhaite, modifier les revendications de la demande internationale (voir la règle 46):

Quand? Le délai dans lequel les modifications doivent être déposées est de deux mois à compter de la date de transmission du rapport de recherche internationale.

Où? Directement auprès du Bureau international de l'OMPI, 34, chemin des Colombettes 1211 Genève 20, Suisse, n° de télécopieur: +41 22 338 82 70

Pour des instructions plus détaillées, voir les notes sur la feuille d'accompagnement.

2. [ ] Il est notifié au déposant qu'il ne sera pas établi de rapport de recherche internationale et que la déclaration à cet effet, prévue à l'article 17.2)a), ainsi que l'opinion écrite de l'administration chargée de la recherche internationale sont transmises par le présent formulaire.

3. [ ] **En ce qui concerne la réserve** pouvant être formulée, conformément à la règle 40.2, à l'égard du paiement d'une ou de plusieurs taxes additionnelles, il est notifié au déposant que

[ ] la réserve ainsi que la décision y relative ont été transmises au Bureau international en même temps que la requête du déposant tendant à ce que le texte de la réserve et celui de la décision en question soient notifiés aux offices désignés.

[ ] la réserve n'a encore fait l'objet d'aucune décision; dès qu'une décision aura été prise, le déposant en sera avisé.

4. **Rappels**

Peu après l'expiration d'un délai de **18 mois** à compter de la date de priorité, la demande internationale sera publiée par le Bureau international. Si le déposant souhaite éviter ou différer la publication, il doit faire parvenir au Bureau international une déclaration de retrait de la demande internationale, ou de la revendication de priorité, conformément aux règles 90*bis*.1 et 90*bis*.3, respectivement, avant l'achèvement de la préparation technique de la publication internationale.

Le déposant a la possibilité de présenter des observations de manière informelle au Bureau international sur l'opinion écrite de l'administration chargée de la recherche internationale. Le Bureau international enverra aux offices désignés une copie de ces observations, à moins qu'un rapport d'examen préliminaire international ait été établi ou doive être établi. Ces observations seraient également mises à la disposition des tiers mais pas avant l'expiration d'un délai de 30 mois à compter de la date de priorité.

Dans un délai de **19 mois** à compter de la date de priorité, mais seulement en ce qui concerne certains offices désignés, le déposant doit présenter une demande d'examen préliminaire international s'il souhaite que l'ouverture de la phase nationale soit **reportée à 30 mois** à compter de la date de priorité (ou même au-delà dans certains offices); si tel n'est pas le cas, le déposant doit accomplir, dans un délai de **20 mois** à compter de la date de priorité, les démarches prescrites pour l'ouverture de la phase nationale auprès de ces offices désignés.

En ce qui concerne d'autres offices désignés, le délai de **30 mois** (ou plus) s'appliquera même si aucune demande d'examen préliminaire international n'est présentée dans le délai de 19 mois.

Voir l'annexe du formulaire PCT/IB/301 et, pour plus de précisions quant aux délais applicables, office par office, voir les chapitres nationaux dans le volume II du *Guide du déposant du PCT* et le site internet de l'OMPI.

Nom et adresse postale de l'administration chargée de la recherche internationale Office Européen des Brevets, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Fonctionnaire autorisé Alistair Finnie

NOTES RELATIVES AU FORMULAIRE PCT/ISA/220

Les présentes notes sont destinées à donner les instructions essentielles concernant le dépôt de modifications selon l'article 19. Les notes sont fondées sur les exigences du Traité de coopération en matière de brevets (PCT), du règlement d'exécution et des instructions administratives du PCT. En cas de divergence entre les présentes notes et ces exigences, ce sont ces dernières qui priment. Pour de plus amples renseignements, on peut aussi consulter le *Guide du déposant du PCT*, qui est une publication de l'OMPI.

Dans les présentes notes, les termes "article", "règle" et "instruction" renvoient aux dispositions du traité, de son règlement d'exécution et des instructions administratives du PCT, respectivement.

INSTRUCTIONS CONCERNANT LES MODIFICATIONS SELON L'ARTICLE 19

Après réception du rapport de recherche internationale et de l'opinion écrite de l'administration chargée de la recherche internationale, le déposant a la possibilité de modifier une fois les revendications de la demande internationale. On notera cependant que, comme toutes les parties de la demande internationale (revendications, description et dessins) peuvent être modifiées au cours de la procédure d'examen préliminaire international, il n'est généralement pas nécessaire de déposer de modifications des revendications selon l'article 19 sauf, par exemple, au cas où le déposant souhaite que ces dernières soient publiées aux fins d'une protection provisoire ou a une autre raison de modifier les revendications avant la publication internationale. En outre, il convient de rappeler que l'obtention d'une protection provisoire n'est possible que dans certains États (voir les annexes B1 et B2 du volume I du *Guide du déposant du PCT*).

L'attention du déposant est attirée sur le fait que des modifications des revendications selon l'article 19 ne sont pas permises lorsque l'administration chargée de la recherche internationale a déclaré, conformément à l'article 17.2), qu'aucun rapport de recherche internationale ne sera établi (voir le paragraphe 296 du volume I du *Guide du déposant du PCT*).

Quelles parties de la demande internationale peuvent être modifiées?

Selon l'article 19, les revendications exclusivement.

Durant la phase internationale, les revendications peuvent aussi être modifiées (ou modifiées à nouveau) selon l'article 34 auprès de l'administration chargée de l'examen préliminaire international. La description et les dessins ne peuvent être modifiées que selon l'article 34 auprès de l'administration chargée de l'examen préliminaire international.

Lors de l'ouverture de la phase nationale, toutes les parties de la demande internationale peuvent être modifiées selon l'article 28 ou, le cas échéant, selon l'article 41.

Quand? Dans un délai de deux mois à compter de la date de transmission du rapport de recherche internationale ou de 16 mois à compter de la date de priorité, selon l'échéance la plus tardive. Il convient cependant de noter que les modifications seront réputées avoir été reçues en temps voulu si elles parviennent au Bureau international après l'expiration du délai applicable mais avant l'achèvement de la préparation technique de la publication internationale (règle 46.1).

Où ne pas déposer les modifications?

Les modifications ne peuvent être déposées qu'auprès du Bureau international; elles ne peuvent être déposées ni auprès de l'office récepteur ni auprès de l'administration chargée de la recherche internationale (règle 46.2).

Lorsqu'une demande d'examen préliminaire international a été/est déposée, voir plus loin.

Comment? Soit en supprimant entièrement une ou plusieurs revendications, soit en ajoutant une ou plusieurs revendications nouvelles ou encore en modifiant le texte d'une ou de plusieurs des revendications telles que déposées.

Une feuille de remplacement doit être remise pour chaque feuille des revendications qui, en raison d'une ou de plusieurs modifications, diffère de la feuille initialement déposée.

Toutes les revendications figurant sur une feuille de remplacement doivent être numérotées en chiffres arabes. Si une revendication est supprimée, il n'est pas obligatoire de renuméroter les autres revendications. Chaque fois que des revendications sont renumérotées, elles doivent l'être de façon continue (instruction 205.b)).

Les modifications doivent être effectuées dans la langue dans laquelle la demande internationale est publiée.

Quels documents doivent/peuvent accompagner les modifications?

Lettre (instruction 205.b)):

Les modifications doivent être accompagnées d'une lettre.

La lettre ne sera pas publiée avec la demande internationale et les revendications modifiées. Elle ne doit pas être confondue avec la "déclaration selon l'article 19.1)" (voir plus loin sous "Déclaration selon l'article 19.1)").

La lettre doit être rédigée en anglais ou en français, au choix du déposant. Cependant, si la langue de la demande internationale est l'anglais, la lettre doit être rédigée en anglais; si la langue de la demande internationale est le français, la lettre doit être rédigée en français.

NOTES RELATIVES AU FORMULAIRE PCT/ISA/220 (suite)

La lettre doit indiquer les différences existant entre les revendications telles que déposées et les revendications telles que modifiées. Elle doit indiquer en particulier, pour chaque revendication figurant dans la demande internationale (étant) entendu que des indications identiques concernant plusieurs revendications peuvent être groupées), si

i) la revendication n'est pas modifiée;

ii) la revendication est supprimée;

iii) la revendication est nouvelle;

iv) la revendication remplace une ou plusieurs revendications telles que déposées;

v) la revendication est le résultat de la division d'une revendication telle que déposée.

Les exemples suivants illustrent la manière dont les modifications doivent être expliquées dans la lettre d'accompagnement:

1. [Lorsque le nombre des revendications déposées initialement s'élevait à 48 et qu'à la suite d'une modification de certaines revendications il s'élève à 51]:
"Revendications 1 à 29, 31, 32, 34, 35, 37 à 48 remplacées par les revendications modifiées portant les mêmes numéros; revendications 30, 33 et 36 pas modifiées; nouvelles revendications 49 à 51 ajoutées."

2. [Lorsque le nombre des revendications déposées initialement s'élevait à 15 et qu'à la suite d'une modification de toutes les revendications il s'élève à 11]:
"Revendications 1 à 15 remplacées par les revendications modifiées 1 à 11."

3. [Lorsque le nombre des revendications déposées initialement s'élevait à 14 et que les modifications consistent à supprimer certaines revendications et à en ajouter de nouvelles]:
"Revendications 1 à 6 et 14 pas modifiées; revendications 7 à 13 supprimées; nouvelles revendications 15, 16 et 17 ajoutées." ou
"Revendications 7 à 13 supprimées; nouvelles revendications 15, 16 et 17 ajoutées; toutes les autres revendications pas modifiées."

4. [Lorsque plusieurs sortes de modifications sont faites]:
"Revendications 1–10 pas modifiées; revendications 11 à 13, 18 et 19 supprimées; revendications 14, 15 et 16 remplacées par la revendication modifiée 14; revendication 17 divisée en revendications modifiées 15, 16 et 17; nouvelles revendications 20 et 21 ajoutées."

"Déclaration selon l'article 19.1)" (Règle 46.4)

Les modifications peuvent être accompagnées d'une déclaration expliquant les modifications et précisant l'incidence que ces dernières peuvent avoir sur la description et sur les dessins (qui ne peuvent pas être modifiés selon l'article 19.1)).

La déclaration sera publiée avec la demande internationale et les revendications modifiées.

Elle doit être rédigée dans la langue dans laquelle la demande internationale est publiée.

Elle doit être succincte (ne pas dépasser 500 mots si elle est établie ou traduite en anglais).

Elle ne doit pas être confondue avec la lettre expliquant les différences existant entre les revendications telles que déposées et les revendications telles que modifiées, et ne la remplace pas. Elle doit figurer sur une feuille distincte et doit être munie d'un titre permettant de l'identifier comme telle, constitué de préférence des mots "Déclaration selon l'article 19.1)"

Elle ne doit contenir aucun commentaire dénigrant relatif au rapport de recherche internationale ou à la pertinence des citations que ce dernier contient. Elle ne peut se référer à des citations se rapportant à une revendication donnée et contenues dans le rapport de recherche internationale qu'en relation avec une modification de cette revendication.

Conséquence du fait qu'une demande d'examen préliminaire international ait déjà été présentée

Si, au moment du dépôt de modifications et, le cas échéant, d'une déclaration, effectuées en vertu de l'article 19, une demande d'examen préliminaire international a déjà été présentée, le déposant doit de préférence, lors du dépôt des modifications (et, le cas échéant, de la déclaration) auprès du Bureau international, déposer également une copie de ces modifications (et, le cas échéant, de cette déclaration) auprès de l'administration chargée de l'examen préliminaire international et, si nécessaire, une traduction de ces modifications aux fins de la procédure auprès de cette administration (voir les règles 55.3.a) et 62.2, première phase). Pour plus de précisions, se référer aux notes du formulaire de demande d'examen préliminaire international (PCT/IPEA/401).

Si une demande d'examen préliminaire international est présentée, l'opinion écrite de l'administration chargée de la recherche internationale sera –sauf dans les cas dans lesquels l'administration chargée de l'examen préliminaire international n'a pas agi en qualité d'administration chargée de la recherche internationale et lorsqu'elle a effectué auprès du Bureau international la notification prévue à la règle 66.1 *bis*.b)– considérée comme une opinion écrite de l'administration chargée de l'examen préliminaire international. Si la demande d'examen est présentée, le déposant a la possibilité de remettre à l'administration chargée de l'examen préliminaire international une réponse à l'opinion écrite, accompagnée, le cas échéant, de modifications, et ce avant l'expiration d'un délai de 3 mois à compter de la date d'expédition du formulaire PCT/ISA/220 ou d'un délai de 22 mois à compter de la date de priorité, le délai expirant en dernier s'appliquant (règle 43*bis*.1.c)).

Conséquence au regard de la traduction de la demande internationale lors de l'ouverture de la phase nationale

L'attention du déposant est appelée sur le fait qu'il peut avoir à remettre aux offices désignés ou élus, lors de l'ouverture de la phase nationale, une traduction des revendications telles que modifiées en vertu de l'article 19 au lieu de la traduction des revendications telles que déposées ou en plus de celle–ci.

Pour plus de précisions sur les exigences de chaque office désigné ou élu, voir le volume II du *Guide du déposant du PCT.*

TRAITÉ DE COOPÉRATION EN MATIÈRE DE BREVETS

PCT

RAPPORT DE RECHERCHE INTERNATIONALE

(article 18 et règles 43 et 44 du PCT)

Référence du dossier du déposant ou du mandataire 06403-WO	**POUR SUITE À DONNER** voir le formulaire PCT/ISA/220 et, le cas échéant, le point 5 ci-après.	
Demande internationale n° PCT/FR2008/050324	Date du dépôt international *(jour/mois/année)* 26/02/2008	(Date de priorité (la plus ancienne) *(jour/mois/année)* 26/02/2007
Déposant FRANCE TELECOM		

Le présent rapport de recherche internationale, établi par l'administration chargée de la recherche internationale, est transmis au déposant conformément à l'article 18. Une copie en est transmise au Bureau international.

Ce rapport de recherche internationale comprend 5 feuilles.

[X] Il est aussi accompagné d'une copie de chaque document relatif à l'état de la technique qui y est cité.

1. **Base du rapport**
   a. En ce qui concerne la **langue**, la recherche internationale a été effectuée sur la base
      [X] de la demande internationale dans la langue dans laquelle elle a été déposée
      [ ] d'une traduction de la demande internationale dans la langue suivante _____, qui est la langue d'une traduction remise aux fins de la recherche internationale (règles 12.3.a) et 23.1.b))
   b. [ ] Le présent rapport de recherche internationale a été établi en prenant en considération la **rectification d'une erreur évidente** autorisée par ou notifiée à la presente administration vertu de la règle 91 (Règle 43.6*bis*(a)).
   c. [ ] En ce qui concerne **la ou les séquences de nucléotides ou d'acides aminés** divulguées dans la demande internationale, (le cas échéant), voir le cadre n° I.
2. [X] **Il a été estimé que certaines revendications ne pouvaient pas faire l'objet d'une recherche** (voir le cadre n° II).
3. [ ] **Il y a absence d'unité de l'invention** (voir le cadre n° III).
4. En ce qui concerne le **titre,**
   [X] le texte est approuvé tel qu'il a été remis par le déposant
   [ ] le texte a été établi par l'administration chargée de la recherche internationale et a la teneur suivante:
5. En ce qui concerne **l'abrégé,**
   [X] le texte est approuvé tel qu'il a été remis par le déposant
   [ ] le texte, reproduit dans le cadre n° IV, a été établi par l'administration chargée de la recherche internationale conformément à la règle 38.2(b). Le déposant peut présenter des observations à l'administration chargée de la recherche internationale dans un délai d'un mois à compter de la date d'expédition du présent rapport de recherche internationale
6. En ce qui concerne les **dessins,**
   a. La figure **des dessins** à publier avec l'abrégé est la figure n° 3
      [X] proposée par le déposant
      [ ] proposée par l'administration chargée de la recherche internationale, parce que le déposant n'a pas proposé de figure
      [ ] proposée par l'administration chargée de la recherche internationale, parce que cette figure caractérise mieux l'invention
   b. [ ] Aucune des figures n'est publiée avec l'abrégé

C(suite). DOCUMENTS CONSIDERES COMME PERTINENTS

Catégorie*	Identification des documents cités, avec, le cas échéant, l'indication des passages pertinents	no. des revendications visées
D2 X	BOCCI ALCATEL S BRYANT CISCO SYSTEMS M: "An Architecture for Multi-Segment Pseudo Wire Emulation Edge-to-Edge; draft-ietf-pwe3-ms-pw-arch-02.txt" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, vol. pwe3, no. 2, 20 octobre 2006 (2006-10-20), XP015048046 ISSN: 0000-0004 cité dans la demande alinéa [1.INTRODUCTION]; figures 1,2,7,8	1,2,4,6
D3 A	CCAMP GMPLS P&R DESIGN TEAM ERIC MANNIE DIMITRI PAPADIMITRIOU: "Recovery (Protection and Restoration) Terminology for Generalized Multi-Protocol Label Switching (GMPLS); draft-ietf-ccamp-gmpls-recovery-terminology-05.txt;" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, vol. ccamp, no. 5, octobre 2004 (2004-10), XP015016585 ISSN: 0000-0004 alinéa [6.PROTECTION.SCHEME] alinéa [7.1.PRE.PLANNED.LSP.RESTORATION]	1,2,4,6
D4 A	LUCA MARTINI (ED) CISCO SYSTEMS INC MATTHEW BOCCI (ED) ALCATEL FLORIN BALUS (ED) ALCATEL: "Dynamic Placement of Multi Segment Pseudo Wires; draft-ietf-pwe3-dynamic-ms-pw-02.txt" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, vol. pwe3, no. 2, octobre 2006 (2006-10), XP015048043 ISSN: 0000-0004 alinéa [7.1.PSEUDO.WIRE.ROUTING.PROCEDURE]	1,2,4,6

RAPPORT DE RECHERCHE INTERNATIONALE

Demande internationale n°
PCT/FR2008/050324

A. CLASSEMENT DE L'OBJET DE LA DEMANDE
INV. H04L12/56

Selon la classification internationale des brevets (CIB) ou à la fois selon la classification nationale et la CIB

B. DOMAINES SUR LESQUELS LA RECHERCHE A PORTE

Documentation minimale consultée (système de classification suivi des symboles de classement)
H04L

Documentation consultée autre que la documentation minimale dans la mesure où ces documents relèvent des domaines sur lesquels a porté la recherche

Base de données électronique consultée au cours de la recherche internationale (nom de la base de données, et si cela est réalisable, termes de recherche utilisés)
EPO-Internal

06403

C. DOCUMENTS CONSIDERES COMME PERTINENTS

Catégorie*	Identification des documents cités, avec, le cas échéant, l'indication des passages pertinents	no. des revendications visées
X	PAN (HAMMERHEAD SYSTEMS) M BOCCI MUSTAPHA AISSAOUI (ALCATEL) FLORIN BALUS HAMID OULD-BRAHIM (NORTEL) P: "Pseudo Wire Protection; draft-pan-pwe3-protection-03.txt" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, no. 3, 1 juillet 2006 (2006-07-01), XP015047198 ISSN: 0000-0004 page 5, alinéa 4EME alinéa [3.1.SIGNALING.A.BACKUP.PSEUDO.WIRE]; figure 4 alinéa [4.1.THE.PROTECTION.TLV] ----- -/--	1-7

D1

[X] Voir la suite du cadre C pour la fin de la liste des documents

[ ] Les documents de familles de brevets sont indiqués en annexe

* Catégories spéciales de documents cités:

"A" document définissant l'état général de la technique, non considéré comme particulièrement pertinent

"E" document antérieur, mais publié à la date de dépôt international ou après cette date

"L" document pouvant jeter un doute sur une revendication de priorité ou cité pour déterminer la date de publication d'une autre citation ou pour une raison spéciale (telle qu'indiquée)

"O" document se référant à une divulgation orale, à un usage, à une exposition ou tous autres moyens

"P" document publié avant la date de dépôt international, mais postérieurement à la date de priorité revendiquée

"T" document ultérieur publié après la date de dépôt international ou la date de priorité et n'appartenenant pas à l'état de la technique pertinent, mais cité pour comprendre le principe ou la théorie constituant la base de l'invention

"X" document particulièrement pertinent; l'invention revendiquée ne peut être considérée comme nouvelle ou comme impliquant une activité inventive par rapport au document considéré isolément

"Y" document particulièrement pertinent; l'invention revendiquée ne peut être considérée comme impliquant une activité inventive lorsque le document est associé à un ou plusieurs autres documents de même nature, cette combinaison étant évidente pour une personne du métier

"&" document qui fait partie de la même famille de brevets

Date à laquelle la recherche internationale a été effectivement achevée	Date d'expédition du présent rapport de recherche internationale
23 mars 2009	01/04/2009

Nom et adresse postale de l'administration chargée de la recherche internationale	Fonctionnaire autorisé
Office Européen des Brevets, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Lefebvre, Laurent

9

Formulaire PCT/ISA/210 (deuxième feuille) (avril 2005)

SUITE DES RENSEIGNEMENTS INDIQUES SUR PCT/ISA/ 210

Suite du cadre II.1

Revendications nos.: 8,9

Les revendications 8 et 9 n'a pas été recherchée car elle concerne un objet qui n'est pas brevetable. En effet, les signaux ,en particulier numériques, qui n'ont aucune caractéristique physique propre, ne représentent qu'une succession de 0 et de 1 qui n'ont en tant que tels aucune signification ni effet technique particulier et ne font que présenter de l'information.(Règle 67 v PCT)
L'effet technique d'une telle succession, dans le cadre de la demande, n'est réalisé qu'en combinaison avec une méthode ou un appareil interprétant/utilisant cette succession d'une manière particulière, produisant alors un effet technique.
Néanmoins, par raison de clarté, et d'auto confinement de l'objet à revendiquer, il nest pas permis d'incorporer les étapes d'une telle méthode ou les moyens d'un tel appareil, ce qui rend les revendications de signal non brevetables.

Demande internationale n°
PCT/FR2008/050324

RAPPORT DE RECHERCHE INTERNATIONALE

Cadre n°. II Observations – lorsqu'il a été estimé que certaines revendications ne pouvaient pas faire l'objet d'une recherche (suite du point 2 de la première feuille)

Le rapport de recherche internationale n'a pas été établi en ce qui concerne certaines revendications conformément à l'article 17.2)a) pour les raisons suivantes :

1. [X] Les revendications n°s 8,9
se rapportent à un objet à l'égard duquel l'administration chargée de la recherche internationale n'est pas tenue de procéder à la recherche, à savoir :
voir FEUILLE ANNEXÉE PCT/ISA/210

2. [ ] Les revendications n^{os}
parce qu'elles se rapportent à des parties de la demande internationale qui ne remplissent pas suffisamment les conditions prescrites pour qu'une recherche significative puisse être effectueé, en particulier :

3. [ ] Les revendications n^{os}
parce qu'elles sont des revendications dépendantes et ne sont pasrédigées conformément aux dispositions de la deuxième et de la troisième phrases de la règle 6.4.a).

Cadre n°. III Observations – lorsqu'il y a absence d'unité de l'invention (suite du point 3 de la première feuille)

L'administration chargée de la recherche internationale a trouvé plusieurs inventions dans la demande internationale, à savoir:

1. [ ] Comme toutes les taxes additionnelles exigées ont été payées dans les délais par le déposant, le présent rapport de recherche internationale porte sur toutes les revendications pouvant faire l'objet d'une recherche.

2. [ ] Comme toutes les revendications qui se prêtent à la recherche ont pu faire l'objet de cette recherche sans effort particulier justifiant des taxes additionnelles, l'administration chargée de la recherche internationale n'a sollicité le paiement d'aucunes taxes de cette nature.

3. [ ] Comme une partie seulement des taxes additionnelles demandées a été payée dans les délais par le déposant, le présent rapport de recherche internationale ne porte que sur les revendications pour lesquelles les taxes ont été payées, à savoir les revendications n^{os}:

4. [ ] Aucunes taxes additionnelles demandées n'ont été payées dans les délais par le déposant. En conséquence, le présent rapport de recherche internationale ne porte que sur l'invention mentionnée en premier lieu dans les revendications; elle est couverte par les revendications n^{os}:

Remarque quant à la réserve

[ ] Les taxes additionnelles étaient accompagnées d'une réserve de la part du déposant et, le cas échéant, du paiement de la taxe de réserve.

[ ] Les taxes additionnelles étaient accompagnées d'une réserve de la part du déposant mais la taxe de réserve n'a pas été payée dans le délai prescrit dans l'invitation.

[ ] Le paiement des taxes additionnelles n'était assorti d'aucune réserve.

TRAITÉ DE COOPÉRATION EN MATIÈRE DE BREVETS

Expéditeur : L'ADMINISTRATION CHARGEE DE LA RECHERCHE INTERNATIONALE

PCT

Destinataire

FRANCE TELECOM
A l'att. de Coda, Sandrine
FTR&D/PIV/Brevets
38-40 Rue du Général Leclerc
92794 Issy-Les-Moulineaux Cedex 9
FRANCE

NOTIFICATION DE REMBOURSEMENT DE LA TAXE DE RECHERCHE

(règles 16.3 et 41.1 et instruction administrative 510 du PCT)

	Date d'expédition *(jour/mois/année)* 31/03/2009
Référence du dossier du déposant ou du mandataire 06403-WO	**POUR INFORMATION SEULEMENT**
Demande internationale n° PCT/FR2008/050324	Date du dépôt international *(jour/mois/année)* 26/02/2008
Déposant FRANCE TELECOM	

1. [X] Il est notifié au déposant que le montant de EUR 1.615,00 (monnaie/montant) représentant tout ou une partie de la taxe de recherche payée pour la demande internationale, sera remboursé en temps utile. Ce montant a été calculé proportionnellement à l'utilisation qui a pu être faite:

   a. [ ] du rapport relatif à une recherche internationale antérieure

   b. [ ] du rapport relatif à une recherche de type international

   c. [X] du rapport relatif à une autre recherche FA690977

   mentionné dans la requête pour l'établissement du rapport de recherche international relatif à la demande internationale.

2. [ ] Il est notifié au déposant que le montant de _____ (monnaie/montant) qui a été payé en tant que taxe de recherche, sera remboursé en temps utile puisque la demande internationale a été retirée, ou a été considérée comme retirée, avant que la recherche internationale ait commencé

3. Le montant indiqué ci-dessus sera remboursé séparément.

Nom et adresse postale de l'administration chargée de la recherche internationale Office Européen des Brevets, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Fonctionnaire autorisé Alistair Finnie

Formulaire PCT/ISA/213 (juillet 1992)

TRAITÉ DE COOPÉRATION EN MATIÈRE DE BREVETS

Expéditeur : L'ADMINISTRATION CHARGÉE DE LA RECHERCHE INTERNATIONALE

Destinataire :

voir le formulaire PCT/ISA/220

PCT

OPINION ÉCRITE DE L'ADMINISTRATION CHARGÉE DE LA RECHERCHE INTERNATIONALE

(règle 43*bis*.1 du PCT)

Date d'expédition *(jour/mois/année)* PCT/ISA/210 (deuxième feuille)	voir le formulaire
Référence du dossier du déposant ou du mandataire voir le formulaire PCT/ISA/220	**POUR SUITE À DONNER** Voir le point 2 ci-dessous

Demande internationale No.	Date du dépôt international *(jour/mois/année)*	Date de priorité *(jour/mois/année)*
PCT/FR2008/050324	26.02.2008	26.02.2007

Classification internationale des brevets (CIB) ou à la fois classification nationale et CIB
INV. H04L12/56

Déposant
FRANCE TELECOM

1. La présente opinion contient des indications et les pages correspondantes relatives aux points suivants :

- ☒ Cadre n° I Base de l'opinion
- ☐ Cadre n° II Priorité
- ☒ Cadre n° III Absence de formulation d'opinion quant à la nouveauté, l'activité inventive et la possibilité d'application industrielle
- ☒ Cadre n° IV Absence d'unité de l'invention
- ☒ Cadre n° V Déclaration motivée selon la règle 43*bis*.1(a)(i) quant à la nouveauté, l'activité inventive et la possibilité d'application industrielle; citations et explications à l'appui de cette déclaration
- ☐ Cadre n° VI Certains documents cités
- ☐ Cadre n° VII Certaines irrégularités relevées dans la demande internationale
- ☐ Cadre n° VIII Certaines observations relatives à la demande internationale

2. **SUITE À DONNER**

Si une demande d'examen préliminaire internationale est présentée, la présente opinion sera considérée comme une opinion écrite de l'administration chargée de l'examen préliminaire international, sauf dans le cas où le déposant a choisi une administration différente de la présente administration aux fins de l'examen préliminaire international et que l'administration considérée a notifié au Bureau international, selon la règle 66.1bis.b), qu'elle n'entend pas considérer comme les siennes les opinions écrites de la présente administration chargée de la recherche internationale.

Si, comme cela est indiqué ci-dessus, la présente opinion écrite est considérée comme l'opinion écrite de l'administration chargée de l'examen préliminaire international, le déposant est invité à soumettre à l'administration chargée de l'examen préliminaire international une réponse écrite, avec le cas échéant des modifications, avant l'expiration d'un délai de 3 mois à compter de la date d'envoi du formulaire PCT/ISA/220 ou avant l'expiration d'un délai de 22 mois à compter de la date de priorité, le délai expirant le dernier devant être appliqué.

Pour plus de détails sur les possibilités offertes au déposant, se référer au formulaire PCT/ISA/220.

3. Pour de plus amples détails, se référer aux notes relatives au formulaire PCT/ISA/220.

Nom et adresse postale de l'adminstration chargée de la recherche internationale	Date à laquelle la présente opinion a été établie	Fonctionnaire autorisé
Office européen des brevets D-80298 Munich Tél. +49 89 2399 - 0 Fax: +49 89 2399 - 4465	voir le formulaire PCT/ISA/210	Lefebvre, Laurent N° de téléphone +49 89 2399-7564

Cadre n° I Base de l'opinion

1. En ce qui concerne la **langue**, la présente opinion a été établie sur la base

   ☒ de la demande internationale dans la langue dans laquelle elle a été déposée

   ☐ d'une traduction de la demande interationale dans la langue suivante , qui est la langue d'une traduction remise aux fins de la recherche internationale (règles 12.3.a) et 23.1.b)).

2. ☐ La présente opinion a été établie en prenant en considération la **rectification d'une erreur evidente** autorisée par ou notifiée à la présente administration en vertu de la règle 91 (règle 43bis.1.a)).

3. En ce qui concerne **la ou les séquences de nucléotides ou d'acides aminés** divulguées dans la demande internationale, le cas échéant, la recherche internationale a été effectuée sur la base des éléments suivants :

   a. Nature de l'élément :

   ☐ un listage de la ou des séquences

   ☐ un ou des tableaux relatifs au listage de la ou des séquences

   b. Type de support :

   ☐ sur papier

   ☐ sous forme électronique

   c. Moment du dépôt ou de la remise :

   ☐ contenu(s) dans la demande internationale telle que déposée

   ☐ déposé(s) avec la demande internationale, sous forme électronique

   ☐ remis ultérieurement à la présente administration aux fins de la recherche

4. ☐ De plus, lorsque plus d'une version ou d'une copie d'un listage des séquences ou d'un ou plusieurs tableaux y relatifs a été déposée, les déclarations requises selon lesquelles les informations fournies ultérieurement ou au titre de copies supplémentaires sont identiques à celles initialement fournies et ne vont pas au-delà de la divulgation faite dans la demande internationale telle que déposée initialement, selon le cas, ont été remises.

5. Commentaires complémentaires :

Cadre n° III Absence de formulation d'opinion quant à la nouveauté, l'activité inventive et la possibilité d'application industrielle

La question de savoir si l'objet de l'invention revendiquée semble être nouveau, impliquer une activité inventive (ne pas être évident) ou être susceptible d'application industrielle n'a pas été examinée pour ce qui concerne :

☐ l'ensemble de la demande internationale

☒ les revendications nos 8,9

parce que :

☐ la demande internationale ou les revendications nos en question, se rapportent à l'objet suivant, à l'égard duquel l'administration n'est pas tenue d'effectuer une recherche internationale *(préciser)* :

☐ la description, les revendications ou les dessins *(en indiquer les éléments ci-dessous)* ou les revendications nos. en question ne sont pas clairs, de sorte qu'il n'est pas possible de formuler une opinion valable *(préciser)* :

☐ les revendications, ou les revendications nos en question, ne se fondent pas de façon adéquate sur la description, de sorte qu'il n'est pas possible de formuler une opinion valable *(préciser)* :

☒ il n'a pas été établi de rapport de recherche internationale pour toute la demande ou pour les revendications nos 8,9 en question.

☐ une opinion valable n'a pas pu être formulée en l'absence d'un listage des séquences de nucléotides ou d'acides aminés, le déposant n'ayant pas, dans le délai prescrit,

- ☐ fourni le listage des séquences sur papier conforme à la norme prévue dans l'annexe C des instructions administratives, un tel listage n'étant pas accessible à l'administration chargée de la recherche internationale sous une forme et d'une manière qu'elle accepte.
- ☐ fourni le listage des séquences sous forme électronique conforme à la norme prévue dans l'annexe C des instructions administratives, un tel listage n'étant pas accessible à l'administration chargée de la recherche internationale sous une forme et d'une manière qu'elle accepte.
- ☐ payé la taxe pour remise tardive exigée pour la fourniture d'un listage des séquences en réponse à l'invitation selon les alinéas a) et b) de la règle 13*ter*.1.

☐ une opinion valable n'a pas pu être formulée en l'absence des tableaux relatifs au listage des séquences de nucléotides ou d'acides aminés; le déposant n'ayant pas, dans le délai prescrit, fourni lesdits tableaux sous forme électronique conformes aux exigences techniques prévues dans l'annexe C-*bis* des instructions administratives, de tels tableaux n'étant pas accessibles à l'administration chargée de la recherche internationale sous une forme et d'une manière qu'elle accepte.

☐ le ou les tableaux relatifs au listage des séquences de nucléotides ou d'acides aminés -lorsqu'ils sont sous forme électronique seulement- ne sont pas conformes aux exigences techniques prévues dans l'annexe C-*bis* des instructions administratives.

☐ Voir le cadre supplémentaire pour de plus amples détails.

Cadre n° IV Absence d'unité de l'invention

1. ☒ En réponse à l'invitation (formulaire PCT/ISA/206) à payer des taxes additionnelles, le déposant, dans le délai prescrit :

   ☐ a payé des taxes additionnelles

   ☒ a payé des taxes additionnelles sous réserve et, le cas échéant, la taxe de reserve

   ☐ a payé des taxes additionnelles sous réserve mais n'a pas payé la taxe de reserve

   ☐ n'a pas payé de taxes additionnelles

2. ☐ L'administration chargée de la recherche internationale estime qu'il n'est pas satisfait à l'exigence d'unité de l'invention et décide de ne pas inviter le déposant à payer de taxes additionnelles.

3. L'administration chargée de la recherche internationale estime que, aux termes des règles 13.1, 13.2 et 13.3 :

   ☐ il est satisfait à l'exigence d'unité de l'invention

   ☒ il n'est pas satisfait à l'exigence d'unité de l'invention, pour les raisons suivantes :

   voir feuille séparée

4. En conséquence, la présente opinion a été établie à partir des parties suivantes de la demande internationale :

   ☒ toutes les parties de la demande

   ☐ les parties relatives aux revendications nos

Cadre n° V Déclaration motivée selon la règle 43*bis*.1(a)(i) quant à la nouveauté, l'activité inventive et la possibilité d'application industrielle; citations et explications à l'appui de cette déclaration

1. Déclaration

Nouveauté	Oui :	Revendications	1,2,4,6,3,5,7
	Non :	Revendications	
Activité inventive	Oui :	Revendications	
	Non :	Revendications	1,2,4,6,3,5,7
Possibilité d'application industrielle	Oui :	Revendications	1,2,4,6,3,5,7
	Non :	Revendications	

2. Citations et explications

voir feuille séparée

Documents cités dans cette opinion

D1: BOCCI ALCATEL S BRYANT CISCO SYSTEMS M: "An Architecture for Multi-Segment Pseudo Wire Emulation Edge-to-Edge; draft-ietf-pwe3-ms-pw-arch-02.txt" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, vol. pwe3, no. 2, 20 octobre 2006 (2006-10-20), XP015048046 ISSN: 0000-0004 cité dans la demande

D2: PAN (HAMMERHEAD SYSTEMS) M BOCCI MUSTAPHA AISSAOUI (ALCATEL) FLORIN BALUS HAMID OULD-BRAHIM (NORTEL) P: "Pseudo Wire Protection; draft-pan-pwe3-protection-03.txt" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, no. 3, 1 juillet 2006 (2006-07-01), XP015047198 ISSN: 0000-0004

Point III: pas d'opinion fournie

Sur l'objet des revendications 8 et 9 qui concerne un "signal" non brevetable (voir raisons dans le rapport de recherche) (Règle 67 v PCT).

Point V: déclaration motivée quant à la nouveauté, l'activité inventive et l'application industrielle.

1. Comme il est connu de D1 et ceci est reconnu par le demandeur en p. 2, qu'il appartient à la pratique standard de l'homme du métier de créer des pseudo liens multi segment, il relève alors uniquement du besoin et/ou du nombre de routeurs disponibles de créer 1,2 ou 3 pseudo liens partageant un ou plusieurs segments (cf. D1, fig.4,5), conduisant à l'objet de la revendication 1 comme étant purement une option d'ingénierie (Article 33(3) PCT) et en conséquence ne peut être un concept inventif commun avec celui de la revendication 3 (Manque à posteriori d'unité, Règle 13 PCT).

   Comme déjà indiqué au paragraphe précédent , l'objet de la revendication 1 appartient aux options d'ingénierie dans la cadre de pseudo liens multi segment et donc son objet manque d'activité inventive (Article 33(3) PCT).

2. De plus, l'objet de la revendication 1 manque de clarté (Article 6 PCT), la terminologie "pseudo lien" n'étant que clairement définie et encadré par la

définition donné en p.1 l.22-25, qui doit être intégré à toute revendication indépendante.

3. De plus, l'objet de la revendication 1 ne résout aucun problème et se borne à vouloir construire des pseudo liens, alors qu'il est clair que l'objet de la demande (p.2 et 3) est de définir un comportement des routeurs de pseudo liens en cas de défaillance. Comme l'invention semble être dirigée cers un tel problème, la revendication 1 ne comprenant aucune caractéristique technique permettant de résoudre un tel problème, elle lui manque donc toutes les caractéristiques essentielles pour définir l'invention, aggravant encore le manque de clarté de son objet revendiqué (Article 6 PCT).

4. D2 supporte en fig.4 l'assertion du paragraphe 1.
En effet comme les PW sont bi directionnels, la situation en fig.4 peut donc être inversée et dans le cadre où A est rattaché par deux points ("dual homed" dans la terminologie des PWs) on obtient donc la liaison C (T-PE) - B(SP-PE) commune aux deux sorties B - T-PE(A,home 1) et B- T-PE (A,home 2), de manière identique, à la symétrie miroir près, aux figures 2 et 3 de la demande.
D2 supporte l'argument ci dessus relativement à l'option d'ingénierie signalée au paragraphe 1 par la phrase " the working and backup pseudo wires may arrive on the same PE nodes (S-PE's)" ce qui clairement indique un pur choix arbitraire pour déterminer le chemin que prend un chemin "normal" et un chemin "de secours".
Le paramètre en p.13 "F-Flag: Fate sharing allowed" finit de démontrer qu'il est arbitraire de choisir des segments communs puisque les chemins normaux et de secours peuvent partager leur destin "fate share".
L'objet de la revendication 1 manque donc d'activité inventive (Article 33(3) PCT), à la limite de la nouveauté vis à vis de D2.

5. De plus D2 décrit en paragraphe 3.4 le mode classique de protection dit "hot standy" dans lequel "Upon detection of network failure, the edge nodes will switch data traffic into pre established back up pseudo wires directly" ce qui indique clairement que dans l'architecture PW, une étape de basculement du flux de données sur une troisième liaison" (le "backup") comme dans la revendication 3 .
Il est aussi implicite qu'il y a réception d'une information de défaillance pour

déclencher la protection "hot standy".

Aussi l'objet de la revendication 3 n'implique t il pas d'activité inventive (Article 33(3) PCT.

6. Ce raisonnement s'applique mutatis mutandis aux revendications correspondantes 5 et 7 dont les objets manquent d'activité inventive.

7. D2 divulgue donc le fait que le deuxième pseudo lien est un pseudo lien de secours comme dans la revendication 2 et la revendication correspondante 4 et 6 dont les objets manquent d'activité inventive (Article 33(3)PCT).

Etapes possibles après réception du rapport de recherche internationale (ISR) et de l'opinion écrite de l'administration chargée de la recherche internationale (WO-ISA)

Informations générales	Pour toutes les demandes internationales déposées depuis le 1er janvier 2004, l'ISA compétente établit un ISR. Cet ISR est accompagné de la WO-ISA. Contrairement à l'ancienne opinion écrite de l'IPEA (règle 66.2 PCT), la WO-ISA n'est pas censée recevoir une réponse, mais doit être prise en considération pour les étapes suivantes de la procédure. Le présent document expose les diverses possibilités.
Modification des revendications au titre de l'article 19 PCT	Dans un délai de deux mois à compter de la date de transmission de l'ISR et de la WO-ISA, le déposant peut produire des revendications modifiées au titre de l'article 19 PCT directement auprès du Bureau international de l'OMPI. La réforme du PCT de 2004 n'a pas changé cette procédure. Pour plus d'informations, cf. règle 46 PCT et formulaire PCT/ISA/220 ainsi que les notes correspondantes relatives à ce formulaire.
Dépôt d'une demande d'examen préliminaire international	En principe, la WO-ISA est considérée comme l'opinion écrite de l'IPEA. Dans de nombreux cas, cela devrait rendre superflu le dépôt d'une demande d'examen préliminaire international. Si le déposant souhaite néanmoins déposer une telle demande, il doit le faire avant l'expiration de trois mois à compter de la date de transmission de l'ISR/WO-ISA, ou de 22 mois à compter de la date de priorité, selon celui de ces deux délais qui expire le plus tard (règle 54bis PCT). Comme auparavant, le déposant peut présenter auprès de l'IPEA des modifications en vertu de l'article 34 PCT, normalement en même temps qu'il présente sa demande d'examen préliminaire international (règle 66.1 b) PCT). Si une demande d'examen préliminaire international est présentée et qu'aucune observation/modification n'a été reçue, l'IPEA transforme la WO-ISA en un IPRP (rapport préliminaire international sur la brevetabilité), qui reprendra simplement le contenu de la WO-ISA. La demande pourra toujours être retirée en vertu de l'article 37 PCT.
Dépôt d'observations informelles	Après avoir reçu l'ISR/WO-ISA, le déposant peut présenter des observations informelles relatives à la WO-ISA directement auprès du Bureau international de l'OMPI. Ces observations sont communiquées aux offices désignés en même temps que l'IPRP (rapport préliminaire international sur la brevetabilité) au plus tôt 30 mois à compter de la date de priorité. Cf. également la case suivante.
Fin de la phase internationale	A la fin de la phase internationale, le Bureau international de l'OMPI transforme la WO-ISA ou, si une demande a été présentée, l'opinion écrite de l'IPEA, en un IPRP qui sera transmis en même temps que les éventuelles observations informelles communiquées aux offices désignés. L'IPRP remplace l'ancien IPER (rapport d'examen préliminaire international).
Règles PCT pertinentes & complément d'informations	Règle 43 PCT, règle 43bis PCT, règle 44 PCT, règle 44bis PCT, PCT Newsletter 12/2003, JO 11/2003, JO 12/2003.

BNSDOCID: <XS ___ 2007040100L_1 >

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A MECHANISM FOR PROTECTING A PSEUDO-WIRE

The field of the invention is telecommunications, and more particularly packet-switched networks.

In a packet-switched network, data is transmitted in the form of packets processed by routers of the network until they reach their destination. Together the packets for transmission constitute a data stream.

One example of a technology used for routing data packets in packet-switched networks is the multi-protocol label switching (MPLS) technology. The MPLS technology adds one or more labels to the data packet headers, said labels containing information enabling the routers of the network to determine the next hop for a packet to reach its destination. The MPLS technology is described in more detail in Internet Engineering Task Force (IETF) Request For Comments (RFC) 3031.

However, the MPLS protocol can process only packets conforming to the Internet Protocol (IP).

To alleviate this problem, the IETF Pseudo-Wire Emulation Edge-To-Edge (PWE3) standardization group has defined a pseudo-wire concept for emulating a point-to-point link between two equipments of a packet-switched network based on the IP/MPLS technology. Such pseudo-wires, defined in the document RFC 3985, enable data packets to be transmitted that do not conform to the Internet Protocol, for example data packets conforming to the ATM protocol.

Referring to Figure 1, a pseudo-wire pw1 is set up between a first router T-PE1 at the edge of a packet-switched network PSN and a second router T-PE2, also at the edge of the network PSN. A first link L1 that is part of the pseudo-wire pw1 is set up between the first router T-PE1 and an intermediate router S-PE of the network PSN. A second link L2 that is also part of the pseudo-wire pw1 is set up between the intermediate router S-PE and the second router T-PE2. The first router T-PE1 is called the input router and constitutes a first end of

the pseudo-wire pw1 and the second router T-PE2 is called the output router and constitutes a second end of the pseudo-wire pw1. Once the pseudo-wire pw1 has been set up, the input router T-PE1 transmits a data stream routed via the pseudo-wire pw1 to the output router T-PE2. This kind of pseudo-wire pw1 is defined in more detail in the document "An Architecture for Multi-Segment Pseudo-Wire Emulation Edge-to-Edge" (draft-ietf-pwe3-ms-pw-arch-02.txt).

To ensure continuity of service in the event of a fault affecting the output router, the working group PWE3 proposes a solution that backs up the first pseudo-wire set up between the input router and the output router by a second pseudo-wire serving as a back-up pseudo-wire so that, in the event of a fault affecting the output router constituting one end of the first pseudo-wire, the data packets are routed by the back-up pseudo-wire, one end of which consists of a different output router.

Accordingly, referring to Figure 2, a first pseudo-wire pw1 is set up between an input router T-PE1 at the edge of a packet-switched network PSN and an output router T-PE2 also at the edge of the network PSN. A first link L1 that is part of the pseudo-wire pw1 is set up between the input router T-PE1 and an intermediate router S-PE of the network PSN. A second link L2 that is also part of the pseudo-wire pw1 is set up between the intermediate router S-PE and the output router T-PE2. A second pseudo-wire pw2 is then set up between the input router T-PE1 constituting a first end of the pseudo-wire and a second output router T-PE3 constituting a second end of the pseudo-wire. A first link L3 that is part of the second pseudo-wire is set up between the input router T-PE1 and the intermediate router S-PE and a second link L4 that is also part of the second pseudo-wire is set up between the intermediate router S-PE and the second output router T-PE3.

To ensure continuity of service, the input router T-PE1 includes a function for detecting a fault affecting the first output router T-PE2 and a function for switching the data stream from the first pseudo-wire pw1 to the second pseudo-wire pw2.

A fault affecting the first output router T-PE2 is detected in the input router T-PE1, for example from a message indicating the occurrence of a fault sent via the public switched network PSN to the input router T-PE1. Once informed of the fault, the input router T-PE1 triggers switching of the data stream from the first pseudo-wire pw1 to the second pseudo-wire pw2, thus routing the data to the output router T-PE3.

However, this kind of solution has the drawback of consuming network resources, for example processing resources in the network equipments (storage capacity, computation capacity, etc.), signaling streams for setting-up two pseudo-wires, and bandwidth, especially between the input router and the intermediate router. This increases the restore time in the event of a fault affecting an output router, with a negative impact on quality of service.

The solution proposed in the context of the invention is free of those problems of the prior art.

It is based on a method of setting up at least two pseudo-wires able to broadcast a data stream wherein a first pseudo-wire is set up between an input router of a packet-switched network and a first output router of said packet-switched network, the second pseudo-wire is set up between said input router and a second output router of said packet-switched network, a first link that is part of the first pseudo-wire is set up between the first output router and an intermediate router of said packet-switched network, and a second link that is part of the second pseudo-wire is set up between said second output router and said intermediate router.

This kind of setting up method is noteworthy in that a third link that is part of the two pseudo-wires is set up between said intermediate router and said input router.

This optimizes the use of network resources, for example bandwidth, between the input router and the intermediate router by setting up between them a single link common to the two pseudo-wires. This solution has never been envisaged in the prior art. In the prior art, when a main pseudo-wire and a back-up pseudo-wire are set up between an input router and a first, respectively a second, output router, a link is set up between the input router and the intermediate router for each pseudo-wire, i.e. two links. The person skilled in the art has always considered a pseudo-wire as a point-to-point link set up between an input router and an output router, with the result that each input router/output router pair is associated with a pseudo-wire. Moreover, this kind of approach is recommended in the standards.

Going against this received wisdom of the person skilled in the art, the inventors of the present application propose, in contrast, to share the link set up between the input router and the intermediate router, which improves the use of network resources and reduces the restore time in the event of a fault affecting the first output router. In the prior art, the back-up pseudo-wire, although used only to broadcast data in the event of a fault affecting the main pseudo-wire, reserves resources used to set it up over the whole of the network between the input router and the output router. Because the main pseudo-wire and the back-up pseudo-wire share the link set up between the input router and the intermediate router, the network resources that in the past were reserved for the back-up pseudo-wire are released and can be used in a manner closer to the optimum.

In this kind of embodiment, the first, second, and third links are not necessarily direct links between routers. For example, the second link set up between the intermediate router and the first output router can comprise one or more hops and possibly pass through one or more other intermediate routers before reaching the output router. The same applies to the link set up between the input router and the intermediate router and to the link set up between the intermediate router and the second output router.

The data broadcast on the pseudo-wires can be payload data, for example an ATM stream transporting a service, or service data, for example a message indicating detection of a fault affecting a network equipment. Accordingly, in the situation of exchanging service data, the solution proposed in the present application makes the network equipments more responsive.

According to one feature of the method of the invention, the pseudo-wires are set up at the initiative of said input router by sending said intermediate router a message for setting-up said third link including an identifier of said input router, an identifier of said first output router, and a field containing an identifier of said second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire

In this kind of embodiment, setting up the pseudo-wires is at the initiative of the input router. It is assumed, in the context of the invention, that in order to be able to initiate the setting up of the main and back-up pseudo-wires the input router has in a routing table information on the hops to reach the first and second output routers. By means of this information, the input router knows to which router of the network it must send the pseudo-wire set-up message, which router is then considered the intermediate router. It is then necessary to configure only the input router, which reduces network maintenance. The parameter in the set-up message

indicating that the second pseudo-wire is a back-up pseudo-wire enables the intermediate router to be configured for subsequent broadcasting of data.

The invention also relates to a method of broadcasting data streams between an input router of a packet-switched network and a first output router of said packet-switched network, wherein a data stream is broadcast on a first pseudo-wire consisting of a first link set up between said input router and an intermediate router of said packet-switched network and a second link set up between said intermediate router and said first output router, said method including a step of detecting a fault affecting said first output router.

Moreover, a method of this kind includes a step, on reception by the intermediate router of information relating to a fault, of switching the data stream to a third link set up between said intermediate router and a second output router, said first link and said third link constituting a second pseudo-wire.

An embodiment of this kind improves the restore time in the event of a fault affecting the first output router because the data stream is switched as close as possible to the fault.

The invention further consists in a router adapted to be connected by a first link to an input router of a packet-switched network and by a second link to a first output router of said packet-switched network, said first and second links constituting a first pseudo-wire able to broadcast a data stream, the router being characterized in that it includes:

· means for receiving a first message for setting up the first link including an identifier of said input router, an identifier of said first output router, and a field containing an identifier of a second output router of said network;

· means for sending a second message for setting up said second link between said router and said first

output router and a third message for setting up a third link between said router and said second output router, the second message including the identifier of said input router and the identifier of said first output router, the third message including the identifier of said input router and the identifier of said second output router, and said first and third links constituting a second pseudo-wire;

· means for configuring at least one switching table for said broadcasting with a parameter specifying that the second pseudo-wire is a back-up pseudo-wire, said parameter being included in the first set-up message.

This kind of intermediate router is able, on reception of a set-up message sent by the input router, to set up two pseudo-wires having a shared link between the input router and the output router and then its own link between the intermediate router and a first, respectively a second, output router. This optimizes use of the resources of the network between the first router and the intermediate router, which improves the restore time on detection of a fault affecting the first output router.

According to another feature, the router of the invention includes means for detecting a fault affecting said first output router and means for switching the data stream from the second link to the third link.

Providing in the intermediate router a function for detecting a fault affecting the first output router and a function for switching the data stream improves the restore time on detection of a fault affecting the first output router.

This improves the responsiveness of the network because detection occurs as close as possible to the fault. Accordingly, a fault affecting the first output router is detected more quickly, as the information does not have to cross the network as far as the input router before being processed. The function for switching the

data stream also being a function of the intermediate router, switching the data stream to the third link, set up between the intermediate router and the second output router and with the first link constituting the back-up pseudo-wire, occurs faster because it is triggered on detection of the fault by the intermediate router.

This kind of solution reduces the quantity of data lost following a fault affecting the first output router.

The invention relates to a computer program product downloadable from a communications network and/or stored on a computer-readable medium and/or executable by a processor, characterized in that it comprises program code instructions for implementing the setting-up method of the invention when said program is executed by a computer.

The invention relates to a second computer program product downloadable from a communications network and/or stored on a computer-readable medium and/or executable by a processor, characterized in that it comprises program code instructions for implementing the broadcasting method of the invention when said program is executed by a computer.

The invention relates finally to a signal adapted to be transmitted between an input router of a packet-switched network and an intermediate router of said packet-switched network, said signal carrying a message for setting up at least two pseudo-wires able to broadcast a stream of data, the first pseudo-wire being set up between said input router and a first output router of said packet-switched network, the second pseudo-wire being set up between said input router and a second output router of said packet-switched network, said set-up message including:

- an identifier of said input router;
- an identifier of said first output router;

· a field containing an identifier of said second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire.

Other features and advantages become apparent on reading the description of preferred embodiments given with reference to the drawings, in which:

· Figure 1 represents a pseudo-wire set up as in the prior art between an input router and an output router of a packet-switched network;

· Figure 2 represents a solution implemented in the prior art to ensure continuity of service in a packet-switched network;

· Figure 3 represents two pseudo-wires set up by the method of the invention;

· Figure 4 is a timing diagram of the exchange of requests firstly between an input router and an intermediate router of a packet-switched network and secondly between the intermediate router and first and second output routers in order to set up pseudo-wires by the method of the invention;

· Figure 5 represents diagrammatically routing and switching tables of an intermediate router of the invention;

· Figures 6A, 6B, and 6C represent set-up messages used in the setting-up method of the invention;

· Figure 7 is a timing diagram of the exchange of messages in a first embodiment of the invention firstly between an input router and an intermediate router of a packet-switched network and secondly between the input router and first and second output routers when broadcasting data on pseudo-wires set up in the packet-switched network;

· Figure 8 is a timing diagram of the exchange of messages in a second embodiment of the invention firstly between an input router and an intermediate router of a packet-switched network and secondly between the input router and first and second output routers when

broadcasting data on pseudo-wires set up in the packet-switched network;

· Figure 9 shows two pseudo-wires set up by a method conforming to a third embodiment of the invention;

· Figure 10 is a timing diagram of the exchange of requests firstly between a first edge router and intermediate routers of a packet-switched network and secondly between the intermediate routers and second and third edge routers in order to set up pseudo-wires by the method conforming to the third embodiment of the invention;

· Figures 11A, 11B, 11C represent set-up messages used in the method conforming to the third embodiment of the invention;

· Figure 12 is a timing diagram of the exchange of messages firstly between an edge router and an intermediate router of a packet-switched network and secondly between the intermediate router and second and third edge routers when broadcasting data on pseudo-wires set up in the packet-switched network in accordance with the third embodiment of the invention.

Figure 3 represents a connection set up between an input router T-PE1 and two output routers T-PE2 and T-PE3, each of these three routers being at the edge of a packet-switched network PSN.

Referring to this figure, a first link L1 is set up between the input router T-PE1 and an intermediate router S-PE of the network PSN. A second link L2 is set up between the intermediate router S-PE and the first output router T-PE2. The first and second links constitute a first pseudo-wire pw1 setting up a connection between the input router T-PE1 and the first output router T-PE2. The pseudo-wire pw1 set up in this way is used to broadcast data streams divided into packets between the input router T-PE1 and the first output router T-PE2.

A second pseudo-wire pw2 is set up between the input router T-PE1 and the second output router T-PE3. The

pseudo-wire pw2 consists of the first link L1 and a second link L3 set up between the intermediate router S-PE and the second output router T-PE3.

Accordingly, the first link L1 is shared by the two pseudo-wires pw1 and pw2. This optimizes the use of network resources, such as bandwidth, between the input router T-PE1 and the intermediate router S-PE, as only one link is set up between these two routers.

One example of application of the invention is collecting traffic for a mobile network. In this kind of example, the input router T-PE1 is connected to a first equipment such as a base station (not represented in the figures), for which it sends data to other aggregation equipments such as a radio network controller RNC connected to the output routers T-PE2 and T-PE3.

Figure 4 is a timing diagram of the exchange of messages between the input router T-PE1, the intermediate router S-PE, and the output routers T-PE2 and T-PE3 when setting up the pseudo-wires pw1 and pw2.

According to the invention, the pseudo-wires pw1 and pw2 are set up at the initiative of the input router T-PE1 and setting them up is based on the exchange of set-up messages conforming to the label distribution protocol (LDP) as defined in the documents RFC 3036 and RFC 4477. Accordingly, a first set-up message SIG1 is sent by the input router T-PE1 to the intermediate router S-PE. This first set-up message includes an identifier SAII of the input router T-PE1, an identifier of an input interface IFE associated with an equipment connected to the input router, an identifier TAII2 of the first output router T-PE2, an identifier of an output interface IFS2 associated with an equipment connected to the first output router T-PE2, and a field containing an identifier TAII3 of the second output router T-PE3, an identifier of an output interface IFS3 associated with an equipment connected to the first output router T-PE3, and a "backup" parameter specifying that the second pseudo-wire

is a back-up pseudo-wire. Figure 6A shows one such setting up message SIG1.

A forwarding equivalent class (FEC) consists of the pair {identifier SAII of input router T-PE1/associated input interface IFE; identifier TAII2 of first output router T-PE2/associated output interface IFS2}. This information is necessary for setting up a pseudo-wire. The pair consisting of the identifier SAII of the input router T-PE1/associated input interface IFE and the identifier TAII3/associated output interface IFS of the first output router T-PE3 also constitutes an FEC.

The first set-up message SIG1 differs from a standard pseudo-wire set-up message because it includes additional data such as the identifier TAII3 of the second output router T-PE3 and the "backup" parameter indicating the nature of the second pseudo-wire pw2 to be set up.

The set-up message SIG1 also includes a label lbl1 associated with the first link L1. This label is used by the input router T-PE1 and the intermediate router S-PE when broadcasting data streams. It is added by the input router T-PE1 to each packet of data to be sent to the first output router T-PE2.

Referring to Figure 5, on reception of the first set-up message SIG1, the intermediate router S-PE extracts the identifier of the input router T-PE1, the identifier of the first output router T-PE2, and the information contained in the additional field of the message SIG1, namely the identifier of the second output router T-PE3 and the "backup" parameter.

The intermediate router S-PE uses this information to fill in a switching table TC. This switching table TC includes for a given FEC information indicating the label that must be inserted into the header of the message in order to perform the next hop and the output interface if2, if3 to which to direct the data streams. The "backup" parameter indicating the nature of the second

pseudo-wire pw2 is also entered into the switching table TC.

Once the switching table TC has been filled in, the intermediate router sends two set-up messages SIG2 and SIG3. The set-up message SIG2 is sent to the first output router T-PE2 and the set-up message SIG3 is sent to the second output router T-PE3.

The message SIG2 includes the identifier SAII of the input router T-PE1, the identifier of an input interface IFE associated with an equipment connected to the input router, the identifier TAII2 of the first output router T-PE2, the identifier of an output interfere IFS2 associated with an equipment connected to the first output router T-PE2, and the label lbl2 associated with the link L2 and used when broadcasting data. Figure 6B shows a message of this kind.

The message SIG3 includes the identifier SAII of the input router T-PE1, the identifier of an input interface IFE associated with an equipment connected to the input router, the identifier TAII3 of the second output router T-PE3, the identifier of an output interface IFS3 associated with an equipment connected to the second output router T-PE3, and the label lbl3 associated with the link L3 and used when broadcasting data. Figure 6C shows a message of this kind.

Once the pseudo-wires pw1 and pw2 have been set up, data streams are broadcast between the input router T-PE1 and the first output router T-PE2.

On reception of a data packet sent by the input router T-PE1, the intermediate router S-PE uses the label added to the packet by the input router to determine to which output interface if2, if3 to direct the data packet, as a function of the information contained in the switching table TC. The packets sent to the first output router T-PE2 are directed to the interface if2 of the intermediate router S-PE. This interface if2 constitutes a first end of the link L2. Before the data packet is

sent to the first output router T-PE2, the new label lb2 is added to the packet.

Figure 7 represents a timing diagram of the exchange of messages between the input router T-PE1, the intermediate router S-PE, the first output router T-PE2, and the second output router T-PE3 when broadcasting data streams in a first embodiment of the invention.

A data stream D1 is sent by the input router T-PE1 to the first output router T-PE2. This first data stream is broadcast over the network PSN by means of the first pseudo-wire pw1.

To ensure continuity of service, the input router T-PE1 includes a function for detecting a fault affecting the first output router T-PE2. In order to detect this kind of fault, the input router T-PE1 regularly exchanges "echo" messages with the first output router T-PE2 and with the intermediate router S-PE.

If the input router does not receive a response to an "echo" message, it deduces that the first output router T-PE2 or the intermediate router S-PE is faulty.

If the faulty router is the first output router T-PE1, it then sends the intermediate router S-PE a switching message MG1. On reception of this message, the intermediate router S-PE switches the data streams to the link L3.

A data stream D2 sent by the input router T-PE1 following detection of a fault affecting the first output router T-PE2 is then broadcast by the second pseudo-wire pw2 and received by the second output router T-PE3.

Figure 8 is a timing diagram of the exchange of messages between the input router T-PE1, the intermediate router S-PE, the first output router T-PE2, and the second output router T-PE3 when broadcasting data streams in a second embodiment of the invention.

A data stream D1' is sent by the input router T-PE1 to the first output router T-PE2. This data stream is

broadcast over the network PSN by the first pseudo-wire pw1.

To ensure continuity of service, the intermediate router S-PE includes a function for detecting a fault affecting the first output router T-PE2. In order to detect such a fault, the intermediate router S-PE regularly exchanges "echo" messages with the first output router T-PE2.

If the intermediate router does not receive a response to its "echo" message, it deduces that the first output router T-PE2 is faulty. It then switches the data streams coming from the input router T-PE1 to the link L3 and advises the input router T-PE1 of this.

Thus a data stream D2' sent by the input router T-PE1 after detection of the fault affecting the first output router is then broadcast by the second pseudo-wire pw2 and received by the second output router T-PE3.

Figure 9 represents a packet-switched communications network PNS comprising a plurality of edge routers T-PE1, T-PE2, and T-PE3 and a plurality of intermediate routers S-PE1 to S-PE5. In such a network, a connection is set up between an input router T-PE1 and first and second output routers T-PE2 and T-PE3, each of these three routers being at the edge of a packet-switched network PSN.

Referring to this figure, a first link L10 is set up between the input router T-PE1 and a first intermediate router S-PE1 of the PSN. A second link L11 is set up between the first intermediate router S-PE1 and a second intermediate router S-PE4. A third link L12 is set up between the second intermediate router S-PE4 and the first output router T-PE2. The first connection 10, the second connection 11, and the third connection 12 constitute a first pseudo-wire pw3, referred to as the main pseudo-wire, setting up a connection between the input router T-PE1 and the first output router T-PE2. The pseudo-wire pw3 set up in this way is used to

broadcast data streams divided into packets between the input router T-PE1 and the first output router T-PE2.

A second pseudo-wire pw4, called the back-up pseudo-wire, is set up between the input router T-PE1 and the second output router T-PE3. The pseudo-wire pw4 consists of the first link L10, the second link L11, and a third link L13 set up between a third intermediate router S-PE5 and the second output router T-PE3.

Accordingly, the link L10 and the link L11 are shared by the two pseudo-wires pw3 and pw4. This optimizes use of network resources, such as bandwidth, between the input router T-PE1and the second intermediate router S-PE4.

Figure 10 represents a timing diagram for the exchange of messages between the input router T-PE1, the first, second, and third intermediate routers S-PE1, S-PE4, and S-PE5, and the first and second output routers T-PE2 and T-PE3 when setting up the pseudo-wires pw3 and pw4.

According to the invention, the pseudo-wires pw3 and pw4 are set up at the initiative of the input router T-PE1 and setting them up relies on the exchange of LDP set-up messages. Thus a first set-up message SIG10 is sent by the input router T-PE1 to the first intermediate router S-PE1. This first set-up message includes an identifier SAII of the input router T-PE1, an identifier of an input interface IFE associated with an equipment connected to the input router, an identifier TAII2 of the first output router T-PE2, an identifier of an output interface IFS2 associated with an equipment connected to the first output router T-PE2, and a field containing an identifier TAII3 of the second output router T-PE3, an identifier of an output interface IFS3 associated with an equipment connected to the second output router T-PE3, a "backup" parameter specifying that the second pseudo-wire pw4 is a back-up pseudo-wire, and an identifier of an intermediate router S-PE4 handling switching from the

first pseudo-wire pw3 to the second pseudo-wire pw4 in the event of a fault affecting the third link L12 that is part of the pseudo-wire pw3. Figure 11A represents one such-set up message SIG10.

The set-up message SIG10 can contain a plurality of identifiers of output routers to be reached in the event of a fault affecting a link of the first pseudo-wire pw3. Such a message contains as many "backup" parameters as there are output routers to be reached and therefore as there are back-up pseudo-wires to be set up.

A set-up message SIG10 can also contain an additional field containing an explicit list of intermediate routers between which the links of the first pseudo-wire pw3 must be set up.

The set-up message SIG10 also contains a label lbl10. This label is used by the input router T-PE1 and the first intermediate router S-PE1 when broadcasting data streams from the intermediate router S-PE1 to the input router T-PE1. It is added by the first intermediate router S-PE1 to each data packet to be sent to the input router T-PE1.

On reception of the first set-up message SIG10, the intermediate router S-PE1 extracts the identifier of the input router T-PE1, the identifier of the first output router T-PE2, and where appropriate the explicit list of intermediate routers between which the links of the first pseudo-wire pw3 must be set up.

The first intermediate router S-PE1 uses this information to fill out an intermediate table. This intermediate table contains for a given FEC information indicating the label that must be inserted into the header of the message in order to perform the next hop and the output interface to which to direct the data streams.

Once the switching table has been filled out, the first intermediate router sends a second set-up message SIG11 to the second intermediate router S-PE4.

The hop that the set-up message SIG11 must perform to reach the second intermediate router S-PE4 is determined by the routing information contained in the switching table TC of the intermediate router S-PE1.

The set-up message SIG10 can optionally also contain this kind of additional field for each back-up pseudo-wire to be set up, thus specifying the intermediate routers between which the links of the pseudo-wires are set up.

The message SIG11 is identical to the message SIG10; the label lbl12 to be used when broadcasting data is the only thing that differs between the two messages.

The information relating to the back-up pseudo-wire pw4, such as the identifier of the intermediate router to effect switching from the first pseudo-wire pw3 to the back-up pseudo-wire pw4, is sent from one intermediate router to another until it reaches the intermediate router that is to effect the switching.

On reception of this set-up message SIG11, the intermediate router S-PE4 extracts the identifier of the input router T-PE1, the identifier of the first output router T-PE2, and where appropriate the explicit list of intermediate routers between which the links of the first pseudo-wire pw3 must be set up. The "backup" parameter indicating the nature of the second pseudo-wire pw4 is also entered into the switching table.

Once the switching table of the intermediate router S-PE4 has been filled out, said router sends two set-up messages SIG12 and SIG13 to the first output router T-PE2 and the third intermediate router S-PE5, respectively.

The message SIG12 contains the identifier SAII of the input router T-PE1, the identifier of an input interface IFE associated with an equipment connected to the input router, the identifier TA112 of the first output router T-PE2, the identifier of an output interface IFS2 associated with an equipment connected to the first output router T-PE2, and the label lbl12 to be

associated with the link L12 and used when broadcasting data. Figure 11B represents such a message.

The message SIG13 contains the identifier SAII of the input router T-PE1, the identifier of an input interface IFE associated with an equipment connected to the input router, the identifier TAII3, the identifier of an output interface IFS3 associated with an equipment connected to the second output router T-PE3, and the label lbl13 associated with the link L13 to be set up and used when broadcasting data. Figure 11C shows such a message. Such a message can contain an explicit list of intermediate routers between which the links of the second pseudo-wire pw4 must be set up to connect the intermediate router S-PE4 to the second output router T-PE3.

Once the pseudo-wires pw3 and pw4 have been set up, the data streams are broadcast between the input router T-PE1 and the first output router T-PE2.

On reception of a data packet sent by the input router T-PE1, the first intermediate router S-PE1 uses the label added to the packet by the router T-PE1 to determine to which output interface if2, if3 to direct the data packet, as a function of the information contained in the switching table TC. The packets sent to the first output router T-PE2 are directed to the interface if2 of the first intermediate router S-PE1. This interface if2 constitutes a first end of the link L10. Before the data packet is sent to the second intermediate router S-PE4, the new label lb11 is added to the data packet.

Figure 12 is a timing diagram of the exchange of messages between the input router T-PE1, the first intermediate router S-PE1, the second intermediate router S-PE4, the third intermediate router S-PE5, the first output router T-PE2, and the second output router T-PE3 when broadcasting data streams.

A data stream D1 is sent by the input router T-PE1 to the first output router T-PE2. This data stream is broadcast over the network PSN by means of the first pseudo-wire pw3.

To ensure continuity of service, the intermediate router S-PE4 includes a function for detecting a fault affecting the first output router T-PE2. To detect such a fault, the intermediate router S-PE4 regularly exchanges "echo" messages with the first output router T-PE2.

If the input router does not receive a response to its "echo" message, it deduces that the first output router T-PE2 is faulty. It then switches the data streams coming from the input router T-PE1 onto the link L12 and advises the input router T-PE1 of this.

Accordingly, a data stream D'1 sent by the input router T-PE1 following detection of the a fault affecting the first output router T-PE2 is then broadcast by the second pseudo-wire pw4 and received by the second output router T-PE3.

The invention also protects the network from a fault affecting one of the links of the first pseudo-wire pw3 or one of the intermediate routers of the network PSN.

For example, when setting up the first pseudo-wire pw3, the set-up message SIG10 contains, in addition to the information necessary for setting up the back-up pseudo-wire pw4, such as the identifier TAII3 of the second output router T-PE3, the "backup" parameter, and the identifier of the intermediate router S-PE4, additional information necessary for setting up a third or back-up pseudo-wire pw5 (represented in dashed line in Figure 9).

This information consists of the identifier TAII3 of the second output router T-PE3, the identifier of an output interface IFS3 associated with an equipment connected to the second output router T-PE3, a "backup" parameter specifying that the third pseudo-wire pw5 is a

back-up pseudo-wire, and an identifier of an intermediate router S-PE5 effecting switching from the first pseudo-wire pw3 to the third pseudo-wire pw5 in the event of a fault affecting the second link L11 of the pseudo-wire pw3 or the intermediate router S-PE4.

Accordingly, if the intermediate router S-PE1 detects a fault affecting the link L11 or the intermediate router S-PE4, it advises the input router T-PE1 of this and switches the data stream to be broadcast to the third pseudo-wire pw5.

Finally, the invention further consists in a computer program, notably a computer program on or in an information medium or memory, adapted to implement the invention. This program can use any programming language and take the form of source code, object code or a code intermediate between source code and object code, such as a partially-compiled form, or any other desirable form for implementing a method of the invention.

The information medium can be any entity or device capable of storing the program. For example, the medium can include storage means, such as a ROM, for example a CD ROM or a micro-electronic circuit ROM, or magnetic storage means, for example a floppy disk or a hard disk.

Moreover, the information medium can be a transmissible medium such as an electrical or optical signal, which can be routed via an electrical or optical cable, by radio or by other means. The program of the invention can in particular be downloaded over an Internet-type network.

CLAIMS

1. A method of setting up at least two pseudo-wires able to broadcast a data stream, wherein a first pseudo-wire consists of a first link set up between an input router of a packet-switched network and an intermediate router of the packet-switched network and a second link set up between said intermediate router and a first output router of the packet-switched network and a second pseudo-wire is set up between said input router and a second output router of the packet-switched network, the method being characterized in that the second pseudo-wire consists of said first link and a third link set up between said intermediate router and said second output router, said first link being shared by the two pseudo-wires.

2. A method according to claim 1, wherein the pseudo-wires are set up at the initiative of said input router by sending said intermediate router a message for setting-up said third link including an identifier of said input router, an identifier of said first output router, and a field containing an identifier of said second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire.

3. A method of broadcasting data streams over a first pseudo-wire consisting of a first link set up between an input router of a packet-switched network and an intermediate router of said packet-switched network and a second link set up between said intermediate router and a first output router of said packet-switched network, said method including a step of detecting a fault affecting the first output router, the method being characterized in that the broadcasting method further includes, on reception of information on a fault affecting said first output router, a step of switching the data stream to a second pseudo-wire consisting of said first link and a

third link set up between said intermediate router and a second output router of said packet-switched network, said first link being shared by the two pseudo-wires.

4. A router adapted to be connected by a first link to an input router of a packet-switched network and by a second link to a first output router of said packet-switched network, said first and second links constituting a first pseudo-wire able to broadcast a data stream, the router being characterized in that it includes:

· means for receiving a first message for setting up the first link including an identifier of said input router, an identifier of said first output router, and a field containing an identifier of a second output router of said network;

· means for sending a second message for setting up said second link between said router and said first output router and a third message for setting up a third link between said router and said second output router, the second message including the identifier of said input router and the identifier of said first output router, the third message including the identifier of said input router and the identifier of said second output router, and said first and third links constituting a second pseudo-wire;

· means for configuring at least one switching table for said broadcasting with a parameter specifying that the second pseudo-wire is a back-up pseudo-wire, said parameter being included in the first set-up message.

5. A router according to claim 4, characterized in that it includes means for detecting a fault affecting said first output router and means for switching the stream of data from the second link to the third link.

6. A computer program product downloadable from a communications network and/or stored on a computer-

readable medium and/or executable by a processor, characterized in that it comprises program code instructions for implementing the setting-up method according to claim 2 when said program is executed by a computer.

7. A computer program product downloadable from a communications network and/or stored on a computer-readable medium and/or executable by a processor, characterized in that it comprises program code instructions for implementing the broadcasting method according to claim 3 when said program is executed by a computer.

8. A signal adapted to be transmitted between an input router of a packet-switched network and an intermediate router of said packet-switched network, said signal carrying a message for setting up at least two pseudo-wires able to broadcast a stream of data, the first pseudo-wire being set up between said input router and a first output router of said packet-switched network, the second pseudo-wire being set up between said input router and a second output router of said packet-switched network, said set-up message including:

- an identifier of said input router;
- an identifier of said first output router;
- a field containing an identifier of said second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire.

9. A signal according to claim 9, wherein the field further contains an identifier of said intermediate router.

A B S T R A C T

A MECHANISM FOR PROTECTING A PSEUDO-WIRE

The present invention relates to a method of setting up at least two pseudo-wires able to broadcast a stream of data, wherein a first pseudo-wire is set up between an input router of a packet-switched network and first output router of said packet-switched network, a second pseudo-wire is set up between said input router and a second output router of said packet-switched network, a first link of the first pseudo-wire is set up between said first output router and an intermediate router of said packet-switched network, a second link of the second pseudo-wire is set up between said second output router and said intermediate router, and a third link of both pseudo-wires is set up between said intermediate router and said input router.

Translation of the title and the abstract as they were when originally filed by the Applicant. No account has been taken of any changes that might have been made subsequently by the PCT Authorities acting ex officio, e.g. under PCT Rules 37.2, 38.2, and/or 48.3.

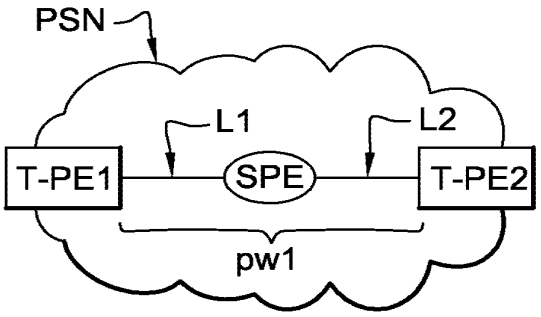
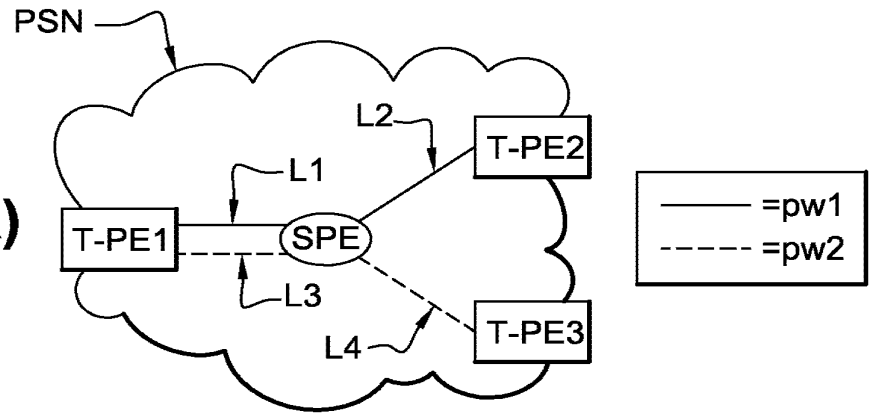


Fig. 1(AA)

Fig. 2(AA)



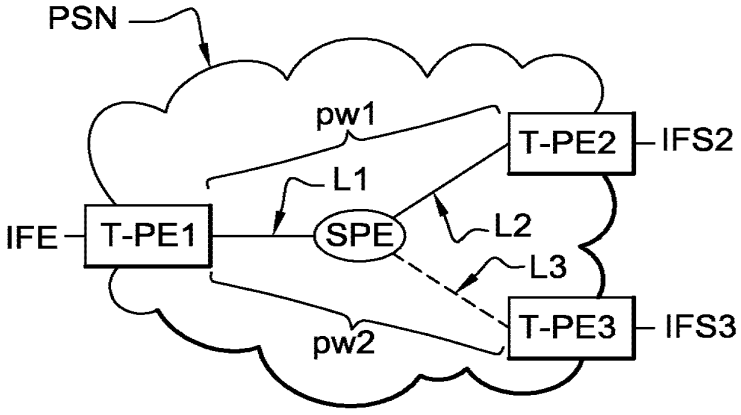


Fig. 3

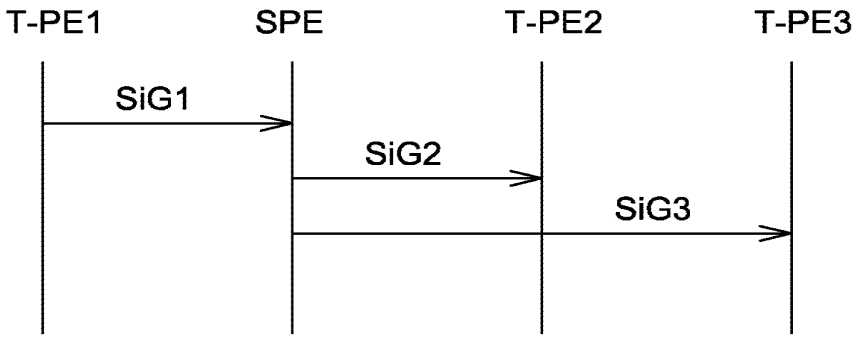


Fig. 4

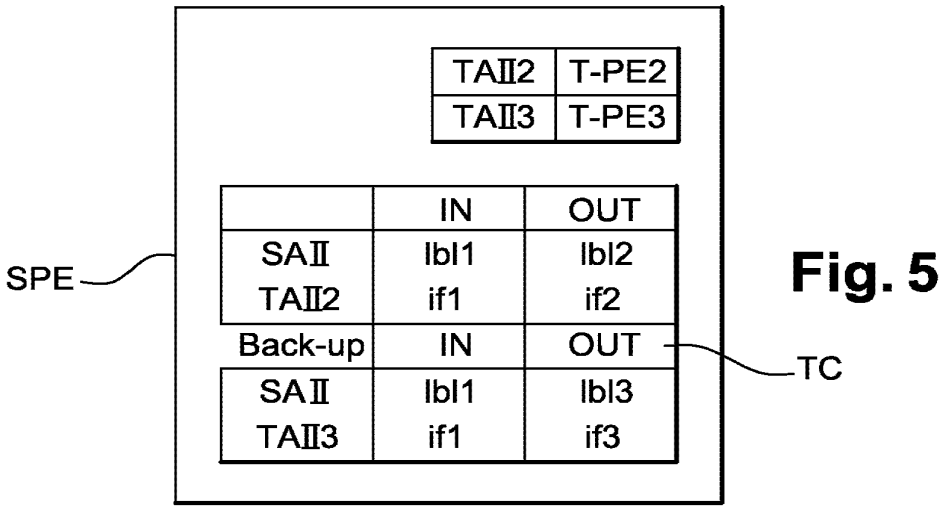


Fig. 5

SAII / IFE	TAII2 / IFS2	lbl1	TAII3 / IFS3	Back-up

Fig. 6A

SAII / IFE	TAII2 / IFS2	lbl2

Fig. 6B

SAII / IFE	TAII3 / IFS3	lbl3

Fig. 6C

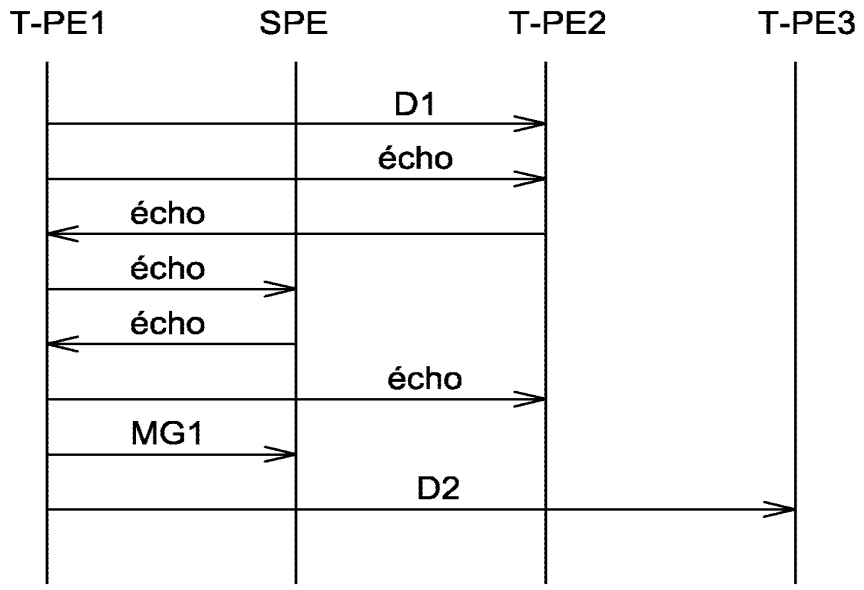

T-PE1
SPE
T-PE2
T-PE3
D1
écho
écho
écho
écho
écho
MG1
D2

Fig. 7

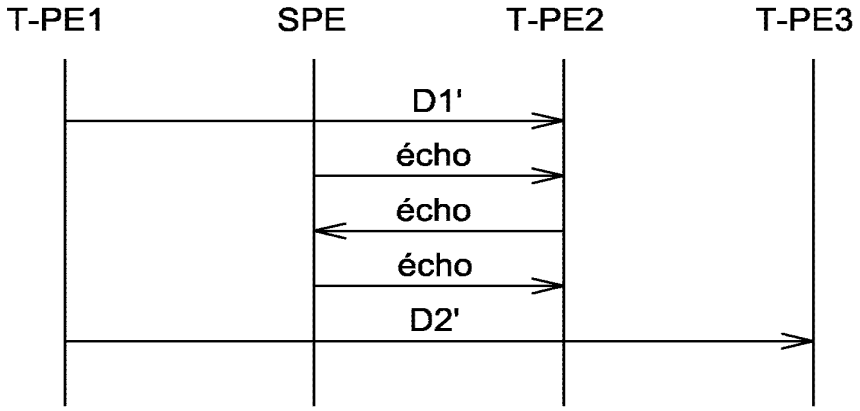

T-PE1
SPE
T-PE2
T-PE3
D1'
écho
écho
écho
D2'

Fig. 8

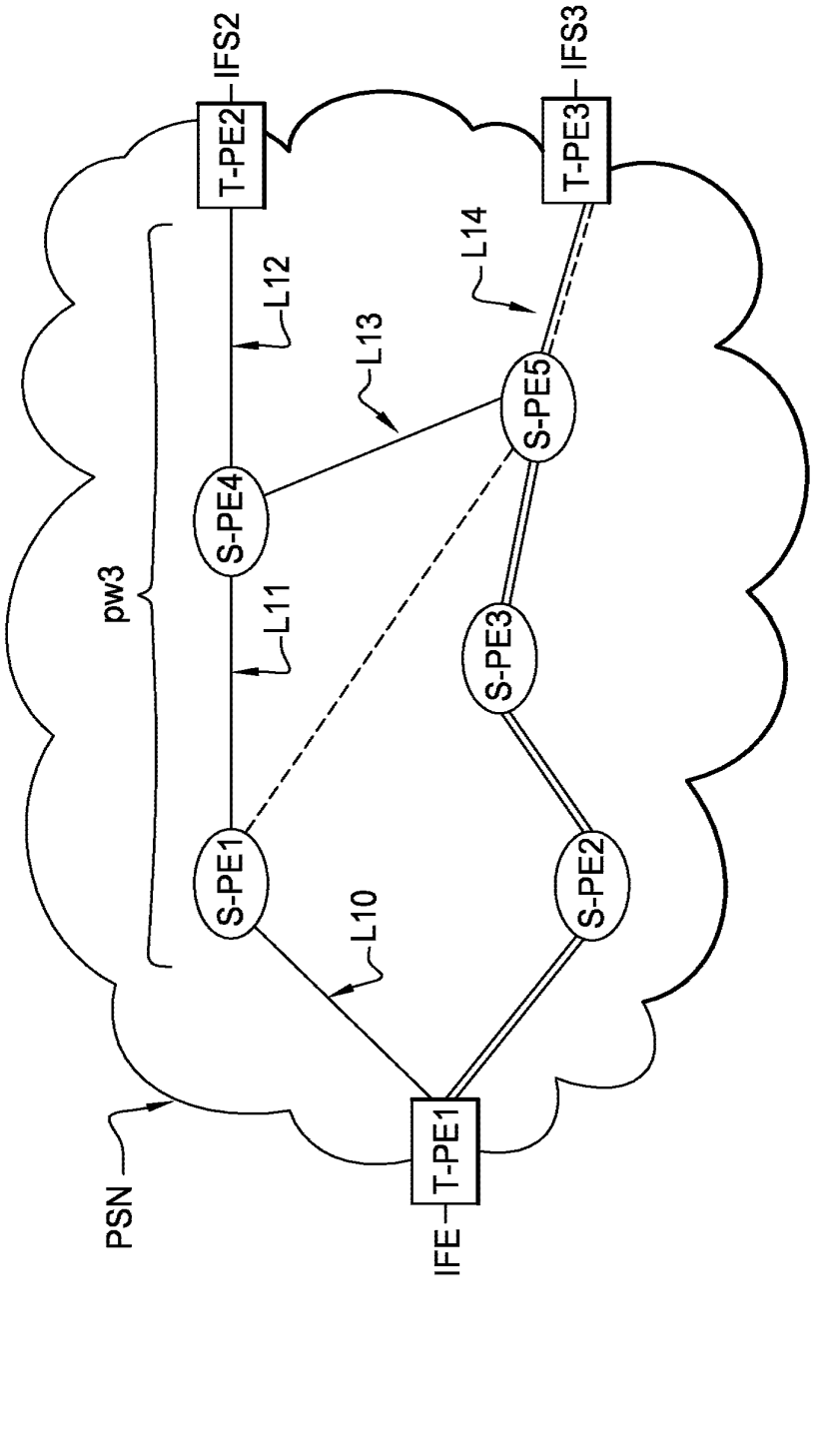

PSN
IFE
T-PE1
T-PE2
T-PE3
IFS2
IFS3
S-PE1
S-PE2
S-PE3
S-PE4
S-PE5
L10
L11
L12
L13
L14
pw3
=pw5

Fig. 9

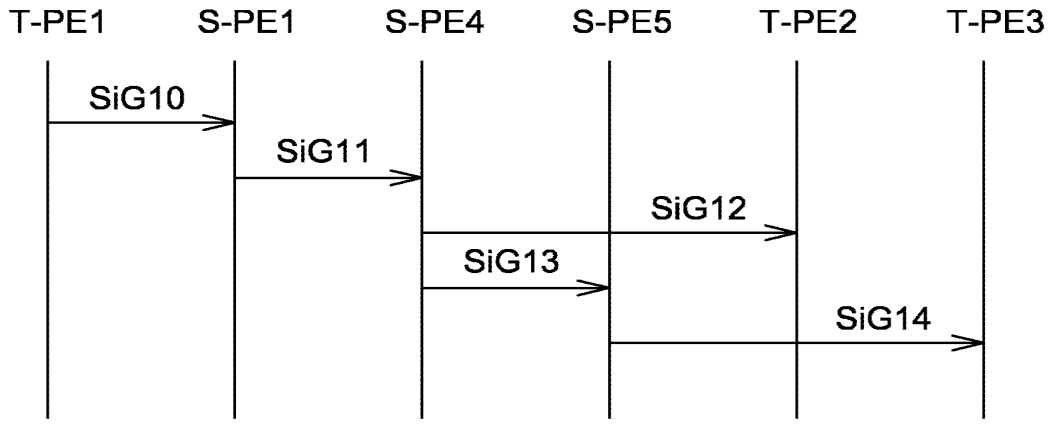


Fig. 10

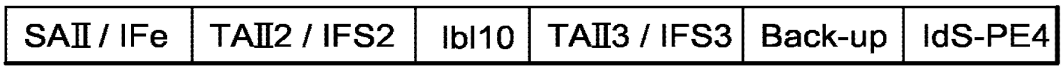


Fig. 11A



Fig. 11B

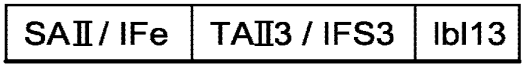


Fig. 11C

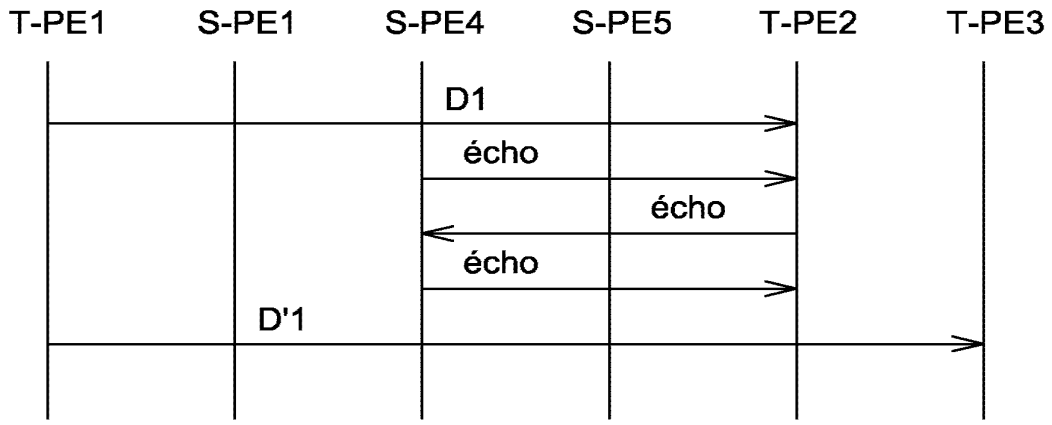


Fig. 12

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Art Unit	
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	Art Unit	
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	Attorney Docket Number	F71.12-0022

	1	P. PAN (HAMMERHEAD SYSTEMS); M. BOCCI, and M. AISSAOUI (ALCATEL); F. BLAUS and H. OULD-BRAHIM (NORTEL), "Pseudo Wire Protection" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, Chapter No. 3, July 1, 2006	☐
	2	M. BOCCI (ALCATEL); S. BRYANT (CISCO SYSTEMS), "An Architecture for Multi-Segment Pseudo Wire Emulation Edge-to-Edge" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, Vol. pwe3, no. 2, October 20, 2006	☐
	3	E. MANNIE, D. PAPADIMITRIOU: "Recovery (Protection and Restoration) Terminology for Generalized Multi-Protocol Label Switching (GMPLS)" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, October 5, 2004	☐
	4	L. MARTINI (CISCO SYSTEMS INC); M. BOCCI and F. BALUS (ALCATEL): "Dynamic Placement of Multi Segment Pseudo Wires" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, Vol. pwe3, no., October 2, 2006	☐
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Signature	/David D. Brush/	Date (YYYY-MM-DD)	2009-08-21
Name/Print	David D. Brush	Registration Number	34,557

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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.

UNITED STATES RECEIVING OFFICE (RO/US)

Re	International Appln. No. PCT/FR2008/050324
Applicant	JOUNAY Frédéric et al.
International Filing Date	26 February 2008 (26.02.2008)
Title of Invention	Mechanism for Protecting a Pseudo-Wire
Agent's File	F71.12-0022

PRELIMINARY AMENDMENT AND REQUEST NOT TO ENTER ANY AMENDMENTS UNDER ARTICLES 19 AND 34 OF THE PCT

ELECTRONICALLY FILED AUGUST 21, 2009

Sir:

Prior to calculation of the filing fee for this application, please enter the following Preliminary Amendment.

If any amendments have been filed under Articles 19 or 34 of the Patent Cooperation Treaty, applicant requests that these amendments not be entered as a part of this national filing.

IN THE SPECIFICATION

Please replace the specification with the enclosed specification, which is labeled "Substitute Specification (Clean Version)".

IN THE ABSTRACT

Please replace the Abstract with the enclosed, replacement Abstract.

IN THE CLAIMS

Please amend the presently pending claims as follows :

1. (Currently Amended) A method of setting up at least two pseudo-wires able to broadcast a data stream, comprising:

setting up ~~wherein~~ a first pseudo-wire ~~consists of~~ comprising a first link set up between an input router of a packet-switched network and an intermediate router of the packet-switched network and a second link set up between said intermediate router and a first output router of the packet-switched network; and

setting up a second pseudo-wire ~~is set up~~ between said input router and a second output router of the packet-switched network, ~~the method being characterized in that~~ wherein the second pseudo-wire ~~consists of~~ comprises said first link and a third link set up between said intermediate router and said second output router, said first link being shared by the two pseudo-wires.

2. (Currently Amended) ~~A~~ The method according to claim 1, wherein the steps of setting up the first and second pseudo-wires are ~~set up~~ performed at the initiative of said input router by sending said intermediate router a message for setting-up said third link including an identifier of said input router, an identifier of said first output router, and a field containing an identifier of said second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire.

3. (Currently Amended) A method of broadcasting data streams over a first pseudo-wire ~~consisting of~~ comprising a first link set up between an input router of a packet-switched network and an intermediate router of said packet-switched network and a second link set up between said intermediate router and a first output router of said packet-switched network, said method ~~including~~ comprising:

a step of detecting a fault affecting the first output router; ~~, the method being characterized in that the broadcasting method further includes,~~ and

on reception of information on a fault affecting said first output router, a step of switching the data stream to a second pseudo-wire ~~consisting of~~ comprising said first link and a third link set up between said intermediate router and a second output router of said packet-switched network, said first link being shared by the ~~two~~ first and second pseudo-wires.

4. (Currently Amended) A router adapted to be connected by a first link to an input router of a packet-switched network and by a second link to a first output router of said packet-switched network, said first and second links constituting a first pseudo-wire able to broadcast a data stream, the router ~~being characterized in that it includes~~comprising:

· means for receiving a first message for setting up the first link including an identifier of said input router, an identifier of said first output router, and a field containing an identifier of a second output router of said network;

· means for sending a second message for setting up said second link between said router and said first output router and a third message for setting up a third link between said router and said second output router, the second message including the identifier of said input router and the identifier of said first output router, the third message including the identifier of said input router and the identifier of said second output router, and said first and third links constituting a second pseudo-wire;

· means for configuring at least one switching table for said broadcasting with a parameter specifying that the second pseudo-wire is a back-up pseudo-wire, said parameter being included in the first set-up message.

5. (Currently Amended) ~~A~~ The router according to claim 4, ~~characterized in that it~~ wherein the router includes means for detecting a fault affecting said first output router and means for switching the stream of data from the second link to the third link.

6. (Currently Amended) A computer program product ~~downloadable from a communications network and/or~~ stored on a computer-readable medium ~~and/or executable by a processor, characterized in that it comprises~~ and comprising program code instructions for implementing

~~the setting-up method according to claim 2~~ a method of setting up at least two pseudo-wires able to broadcast a data stream when said program is executed by a computer, the method comprising:

setting up a first pseudo-wire comprising a first link set up between an input router of a packet-switched network and an intermediate router of the packet-switched network and a second link set up between said intermediate router and a first output router of the packet-switched network; and

setting up a second pseudo-wire between said input router and a second output router of the packet-switched network, wherein the second pseudo-wire comprises said first link and a third link set up between said intermediate router and said second output router, said first link being shared by the two pseudo-wires.

7. (Currently Amended) A computer program product ~~downloadable from a communications network and/or~~ stored on a computer-readable medium ~~and/or executable by a processor, characterized in that it comprises~~ and comprising program code instructions for implementing ~~the broadcasting method according to claim 3~~ a method of broadcasting data streams over a first pseudo-wire when said program is executed by a computer, wherein the first pseudo-wire comprises a first link set up between an input router of a packet-switched network and an intermediate router of said packet-switched network and a second link set up between said intermediate router and a first output router of said packet-switched network, said method comprising:

a step of detecting a fault affecting the first output router; and

on reception of information on a fault affecting said first output router, a step of switching the data stream to a second pseudo-wire comprising said first link and a third link set up between said intermediate router and a second output router of said packet-switched network, said first link being shared by the first and second pseudo-wires.

8. (Currently Amended) A method comprising:

generating a signal adapted to be transmitted between an input router of a packet-switched network and an intermediate router of said packet-switched network, said signal carrying a message for setting up at least two pseudo-wires able to

broadcast a stream of data, the first pseudo-wire being set up between said input router and a first output router of said packet-switched network, the second pseudo-wire being set up between said input router and a second output router of said packet-switched network, said set-up message including:

an identifier of said input router;

an identifier of said first output router; and

a field containing an identifier of said second output router and a parameter specifying that the second pseudo-wire is a back-up pseudo-wire; and

transmitting the signal between the input router of the packet-switched network and the intermediate router of said packet-switched network.

9. (Currently Amended) ~~A~~ The signal according to ~~claim 9~~ claim 8, wherein the field further contains an identifier of said intermediate router.

REMARKS

I. CLAIM AMENDMENTS

This Preliminary Amendment includes amendments made to remove multiple dependent claims and to place the claims and specification in a format more consistent with U.S. practice.

II. SUBSTITUTE SPECIFICATION

Applicants respectfully request that the specification be replaced with the enclosed, clean "substitute specification". No new matter has been added. Applicants also enclose an annotated version that illustrates the marked changes from the immediate prior version.

Entry of the Amendment prior to calculating the filing fee is respectfully requested.

Respectfully submitted,

/David D. Brush/

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DDB:dmm

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Mechanism for Protecting a Pseudo-Wire
First Named Inventor/Applicant Name:	Frederic Jounay et al.
Filer:	David D. Brush/Danel Morrison
Attorney Docket Number:	F71.12-0022

Filed as Large Entity

U.S. National Stage under 35 USC 371 Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
National Stage Fee	1631	1	330	330
Natl Stage Search Fee - Report provided	1642	1	430	430
National Stage Exam - all other cases	1633	1	220	220
Pages:				
Claims:				
Independent claims in excess of 3	1614	3	220	660
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1640**

Electronic Acknowledgement Receipt

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First Named Inventor/Applicant Name:	Frederic Jounay et al.
Customer Number:	27367
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Document Number	**Document Description**	**File Name**	**File Size(Bytes)/ Message Digest**	**Multi Part /.zip**	**Pages (if appl.)**
1	Transmittal of New Application	Letter.pdf	18943 65c64cf30a0b3f09b7bbab7394deb05d5c6cdac4	no	1
Warnings:					
Information:					
2	Transmittal Letter	Transmittal_Letter.pdf	4927044 8c050a63912f5e8ac03709f14f0a2396c444a70b	no	4
Warnings:					
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3	Application Data Sheet	ADS.pdf	836435 9d39f4662583c6cb081228905d5b698c7b13179c	no	5
Warnings:					
Information:					
4	Oath or Declaration filed	Declaration.pdf	28856 4de8722d8041fbfff1cfe960f228a3a4216762f7	no	3
Warnings:					
Information:					
5	Abstract	Abstract.pdf	6942 95a1fcb1e36dd50250b0ad9d622c641bb53f5056	no	1
Warnings:					
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6	Specification	Substitute-Spec_clean-version.pdf	89363 6edf92673b73a53433d16f3d19c098d0f67dcc80	no	20
Warnings:					
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7	Specification	Substitute-Spec_marked-up.pdf	90896 3a490acf421fc9bad1b2bc1cd8ea809966928033	no	20
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Information:					
8	Documents submitted with 371 Applications	Front-Page.pdf	79470 9efbaccb3b435965bb84a8ba42e2f302464a384b	no	1
Warnings:					
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9	Documents submitted with 371 Applications	International_Search_Report.pdf	834483 d9f811e0414a3e59fb05246a5c8d5a0914148fce	no	18
Warnings:					
Information:					
10	Specification	Original-Application.pdf	883838 1c6f66f38e66475c7994aea5ef4ebc3c6f5f235e	no	25
Warnings:					
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11	Drawings-only black and white line drawings	Drawings.pdf	100227 b430e97134c882d8fc00ab9beb2f8ea60e22e47b	no	6
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12	NPL Documents	Pseudo-Wire-Protection.pdf	797499 18c28dac3605954df404b92ea8cb45856abaee61	no	20
Warnings:					
Information:					
13	NPL Documents	An-Architecture-for-multi-segment.pdf	692800 8022863528db68bb1acb3503785570c49e1997a5	no	21
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14	NPL Documents	Recovery-Terminology.pdf	1018632 45b52925f7ae2adceec3180765863e0105af6075	no	20
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Information:					
15	NPL Documents	Dynamic-Placement.pdf	674455 be7fa4ef6f7c912dbbc61d972218162ffe7c4a16	no	21
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17		Preliminary-Amendment.pdf	38313 396004d5fdaed8900b7af16c9c9d57bec05d75e5	yes	8

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Preliminary Amendment	1	1
Specification	2	2
Abstract	3	3
Claims	4	7
Applicant Arguments/Remarks Made in an Amendment	8	8

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18	Fee Worksheet (PTO-875)	fee-info.pdf	36218 7970efd47c1786c72ba5d5f16c28e9f92d7debda	no	2

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New Applications Under 35 U.S.C. 111

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

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

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

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(12) DEMANDE INTERNATIONALE PUBLIÉE EN VERTU DU TRAITÉ DE COOPÉRATION EN MATIÈRE DE BREVETS (PCT)

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

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[Suite sur la page suivante]

(54) **Title:** MECHANISM FOR PROTECTING A PSEUDO LINK

(54) **Titre :** MECANISME DE PROTECTION D'UN PSEUDO-LIEN

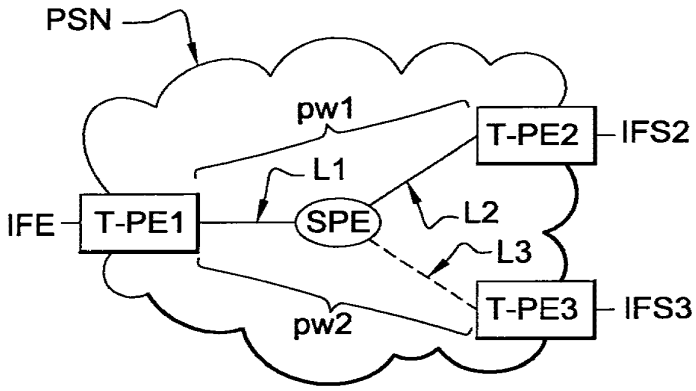


Fig. 3

(57) Abstract: The invention relates to a method for establishing at least two pseudo-links capable of broadcasting a data flow, the first pseudo-link being established between an input router and a first output router, and the second pseudo-link being established between said input router and a second output router, wherein said input and output routers belong to an intermediate packet network, a first connection representing the first pseudo-link being established between the first output router and an intermediate router that belongs to said network, a second connection representing the second pseudo-link being established between the second output router and said intermediate router, and a third connection representing the two pseudo-links being established between said intermediate router and said input router.

(57) Abrégé : La présente invention concerne un procédé d'établissement d'au moins deux pseudo-liens aptes à diffuser un flux de données, le premier pseudo-lien étant établi entre un routeur d'entrée et un premier routeur de sortie, le deuxième pseudo-lien étant établi entre ledit routeur d'entrée et un deuxième routeur de sortie, lesdits routeurs d'entrée et de sortie appartenant à un réseau de intermédiaire de paquets, une première liaison constitutive du premier pseudo-lien étant établie entre le premier routeur de sortie et un routeur intermédiaire appartenant audit réseau, et une deuxième liaison constitutive du deuxième pseudo-lien étant établie entre le deuxième routeur de sortie et ledit routeur intermédiaire, une troisième liaison constitutive des deux pseudo-liens, étant établie entre ledit routeur intermédiaire et ledit routeur d'entrée.

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NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Déclaration en vertu de la règle 4.17 :

— *relative à la qualité d'inventeur (règle 4.17.iv))*

Publiée :

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Mécanisme de protection d'un pseudo-lien

L'invention se situe dans le domaine des télécommunications, et plus particulièrement le domaine des réseaux de commutation de paquets.

Dans un réseau de commutation de paquets ou Paquet Switched Network en anglais, les données à transmettre se présentent sous forme de paquets traités par des routeurs du réseau jusqu'à atteindre leur destination. L'ensemble des paquets à transmettre constitue un flux de données.

Un exemple de technologie utilisé dans les réseaux de commutation de paquets pour acheminer des paquets de données, est la technologie MPLS (MultiProtocol Label Switching ou en français : commutation multi-protocole par étiquette). La technologie MPLS propose de rajouter en entête des paquets de données une ou plusieurs étiquettes contenant des informations permettant aux routeurs du réseau de déterminer le prochain saut qu'un paquet doit effectuer pour atteindre sa destination. La technologie MPLS est décrit plus en détail dans un document de l'IETF (groupe de standardisation de l'Internet, abréviation des termes anglais Internet Engineering Task Force), référencé RFC 3031 (RFC signifiant "requête pour commentaires, ou en anglais Request For Comments).

Cependant, le protocole MPLS ne permet de traiter que des paquets conformes au protocole IP (Internet Protocol, ou protocole internet).

Afin de palier cet inconvénient, le groupe de standardisation PWE3 (PseudoWire Emulation Edge to Edge) de l'IETF définit un concept de pseudo-lien permettant d'émuler un lien point à point entre deux équipements d'un réseau de commutation de paquets reposant sur la technologie IP/MPLS. De tels pseudo-liens, définis dans le document RFC 3985, permettent la transmission de paquets de données non-conformes au protocole IP, tels que par exemple des paquets de données conformes au protocole ATM.

En référence à la figure 1, un pseudo-lien pw1 est établi entre un premier routeur T-PE1 disposé en bordure d'un réseau de commutation de paquets PSN et un deuxième routeur T-PE2 également disposé en bordure du réseau PSN. Une première liaison L1 constitutive du pseudo-lien pw1 est établie entre le routeur d'entrée et un routeur intermédiaire S-PE du réseau PSN. Une deuxième liaison L2,

elle aussi constitutive du pseudo-lien pw1, est, quant à elle, établie entre le routeur intermédiaire S-PE et le deuxième routeur T-PE2. Le premier routeur T-PE1 est appelé routeur d'entrée et constitue une première extrémité du pseudo-lien pw1et le deuxième routeur T-PE2, est appelé routeur de sortie et constitue une deuxième extrémité du pseudo-lien pw1. Une fois le pseudo-lien pw1 établi, le routeur d'entrée T-PE1 émet un flux de données acheminé via le pseudo-lien pw1 jusqu'au routeur de sortie T-PE2. Un tel pseudo-lien pw1 est défini plus en détail dans le document « An Architecture for Multi-Segment Pseudo-Wire Emulation Edge-to-Edge. draft-ietf-pwe3-ms-pw-arch-02.txt ».

Afin d'assurer la continuité du service en cas de défaillance du routeur de sortie, le groupe de travail PWE3 propose une solution consistant à doubler le premier pseudo-lien, établi entre le routeur d'entrée et le routeur de sortie, par un deuxième pseudo-lien servant de pseudo-lien de secours de sorte que, lorsque le routeur de sortie constituant une extrémité du premier pseudo-lien tombe en panne les paquets de données sont acheminés au moyen du pseudo-lien de secours dont une extrémité est constituée par un routeur de sortie différent.

Ainsi, en référence à la figure 2, un premier pseudo-lien pw1 est établi entre un routeur d'entrée T-PE1 disposé en bordure d'un réseau de commutation de paquets PSN et un routeur de sortie T-PE2 également disposé en bordure du réseau PSN. Une première liaison L1 constitutive du pseudo-lien pw1 est établie entre le routeur d'entrée T-PE1 et un routeur intermédiaire S-PE du réseau PSN. Une deuxième liaison L2, elle aussi constitutive du pseudo-lien pw1, est établie entre le routeur intermédiaire S-PE et le routeur de sortie T-PE2. Un deuxième pseudo-lien pw2 est ensuite établi entre le routeur d'entrée T-PE1, constituant une première extrémité du pseudo-lien, et un deuxième routeur de sortie T-PE3 constituant une deuxième extrémité du pseudo-lien. Une première liaison L3 constitutive du deuxième pseudo-lien est établie entre le routeur d'entrée T-PE1 et le routeur intermédiaire S-PE et une seconde liaison L4, également constitutive du deuxième pseudo-lien est établie entre le routeur intermédiaire S-PE et le deuxième routeur de sortie T-PE3.

Afin d'assurer la continuité du service, le routeur d'entrée T-PE1 comporte des moyens mettant en œuvre une fonction de détection d'une panne du premier routeur de sortie T-PE2 et une fonction de basculement du flux des données du premier pseudo-lien pw1 vers le deuxième pseudo-lien pw2.

Lorsqu'une défaillance intervient au niveau du premier routeur de sortie T-PE2, celle-ci est détectée au niveau du routeur d'entrée T-PE1, par exemple à partir d'un message indiquant l'apparition d'une défaillance émis à travers le réseau PSN à destination du routeur d'entrée T-PE1. Une fois informé de la défaillance, le routeur d'entrée T-PE1 déclenche le basculement du flux de données du premier pseudo-lien pw1 vers le deuxième pseudo-lien pw2 assurant ainsi l'acheminement des données vers le routeur de sortie T-PE3.

Cependant, une telle solution présente l'inconvénient d'être consommatrice en ressources du réseau telles que par exemple des ressources de traitement au niveau des équipements (capacité de mémoire de stockage, capacité de calcul, etc ;), les flux de signalisation en vu de l'établissement des deux pseudo-liens, la bande passante, notamment entre le routeur d'entrée et le routeur intermédiaire. Ceci a pour conséquence un allongement du temps de restauration en cas de défaillance d'un routeur de sortie impactant de manière négative sur la qualité de service.

La solution proposée dans le cadre de l'invention ne présente pas ces inconvénients de l'art antérieur.

En effet, elle repose sur un procédé d'établissement d'au moins deux pseudo-liens aptes à diffuser un flux de données, le premier pseudo-lien étant établi entre un routeur d'entrée et un premier routeur de sortie, le deuxième pseudo-lien étant établi entre ledit routeur d'entrée et un deuxième routeur de sortie, lesdits routeurs d'entrée et de sortie appartenant à un réseau de commutation de paquets, une première liaison constitutive du premier pseudo-lien étant établie entre le premier routeur de sortie et un routeur intermédiaire appartenant audit réseau, et une deuxième liaison constitutive du deuxième pseudo-lien étant établie entre le deuxième routeur de sortie et ledit routeur intermédiaire,

Un tel procédé d'établissement est particulier en ce qu'une troisième liaison constitutive des deux pseudo-liens, est établie entre ledit routeur intermédiaire et ledit routeur d'entrée.

De cette manière, on optimise l'utilisation des ressources du réseau, telle que la bande passante, entre le routeur d'entrée et le routeur intermédiaire en établissant, entre ces deux équipements, une liaison unique commune aux deux pseudo-liens. Cette solution n'a jamais été envisagée dans l'art antérieur. En effet, dans l'art

antérieur, lorsqu'un pseudo-lien principal et un pseudo-lien de secours sont établis entre un routeur d'entrée et un premier, respectivement, un deuxième routeur de sortie, une liaison est établie entre le routeur d'entrée et le routeur intermédiaire pour chaque pseudo-lien, soit deux liaisons. L'homme du métier a en effet toujours considéré un pseudo-lien comme une liaison point à point établie entre un routeur d'entrée et un routeur de sortie, de sorte qu'à chaque couple routeur d'entrée/routeur de sortie, est associé un pseudo-lien. En outre, une telle approche est préconisée dans les normes.

Allant à l'encontre de ces préjugés de l'homme du métier, les inventeurs de la présente demande proposent, au contraire, de mettre en commun la liaison établie entre le routeur d'entrée et le routeur intermédiaire ce qui permet d'améliorer l'utilisation des ressources du réseau et ainsi de réduire le temps de restauration en cas de défaillance du premier routeur de sortie. En effet dans l'état de l'art, le pseudo-lien de secours, bien que n'étant utilisé pour diffuser les données que lorsque le pseudo-lien principal est défaillant, réserve, de part son établissement, des ressources sur l'ensemble du réseau entre le routeur d'entrée et le routeur de sortie. En rendant commune au pseudo-lien principal et au pseudo-lien de secours la liaison établie entre le routeur d'entrée et le routeur intermédiaire, les ressources du réseau précédemment réservées pour le pseudo-lien de secours sont libérées et peuvent être utilisées de manière plus optimale.

Dans une telle réalisation, les première, deuxième et troisième liaisons ne sont pas forcément des liaisons directes entre les différents routeurs. Ainsi, par exemple, la deuxième liaison établie entre le routeur intermédiaire et le premier routeur de sortie peut comprendre un ou plusieurs sauts et traverser, éventuellement, un ou plusieurs autres routeurs intermédiaires avant d'atteindre le routeur de sortie. il en est de même pour la liaison établie entre le routeur d'entrée et le routeur intermédiaire et pour la liaison établie entre le routeur intermédiaire et le deuxième routeur de sortie.

Les données diffusées dans les pseudo-liens peuvent être des données utiles, comme par exemple un flux ATM transportant un service ou encore des données de services, telle que par exemple un message de détection de défaillance d'un équipement du réseau. Ainsi dans le cas d'échanges de données de services, la solution proposée dans la présente demande permet d'améliorer la réactivité des équipements présents dans le réseau.

Selon une caractéristique du procédé d'établissement objet de l'invention, les pseudo-liens sont établis à l'initiative du routeur d'entrée par émission, à destination du routeur intermédiaire, d'un message d'établissement de ladite troisième liaison comportant un identifiant dudit routeur d'entrée, un identifiant du premier routeur de sortie, et un champ comprenant un identifiant du deuxième routeur de sortie ainsi qu'un paramètre précisant que le deuxième pseudo-lien est un pseudo-lien de secours.

Dans une telle réalisation, l'établissement des pseudo-liens est à l'initiative du routeur d'entrée. Afin de pouvoir initier l'établissement des pseudo-liens principaux et de secours, on suppose, dans le cadre de l'invention, que le routeur d'entrée possède, dans une table de routage, les informations sur les sauts à effectuer pour atteindre les premiers et deuxièmes routeurs de sortie. Grâce à ces informations, le routeur d'entrée sait à destination de quel routeur du réseau, qui est considéré alors comme le routeur intermédiaire, il doit envoyer le message d'établissement des pseudo-liens. Il n'est alors nécessaire de configurer que le routeur d'entrée, ce qui allège les opérations de maintenance du réseau. Le paramètre, compris dans le message d'établissement et indiquant que le deuxième pseudo-lien est un pseudo-lien de secours, permet de configurer le routeur intermédiaire, en vue de la diffusion ultérieure des données.

L'invention concerne également un procédé de diffusion de flux de données entre un routeur d'entrée et un premier routeur de sortie, lesdits routeurs appartenant à un réseau à commutation de paquets, un flux de données étant diffusé dans un premier pseudo-lien constitué d'une première liaison établie entre ledit routeur d'entrée et un routeur intermédiaire appartenant audit réseau et d'une deuxième liaison établie entre ledit routeur intermédiaire et ledit premier routeur de sortie, ledit procédé comportant une étape de détection d'une défaillance du premier routeur de sortie.

Un tel procédé de diffusion comporte, en outre, une étape de basculement, sur réception, par le routeur intermédiaire, d'une information de défaillance, du flux de données sur une troisième liaison établie entre ledit routeur intermédiaire et un deuxième routeur de sortie, ladite première liaison et ladite troisième liaison constituant un deuxième pseudo-lien.

Une telle réalisation permet d'améliorer le temps de restauration en cas de défaillance du premier routeur de sortie puisque le basculement du flux de données intervient au plus près de la défaillance.

L'invention a, en outre, pour objet un routeur destiné à être connecté par une première liaison à un routeur d'entrée et par une deuxième liaison à un premier routeur de sortie, lesdits routeurs ainsi connectés appartenant à un réseau de commutation de paquets, lesdites premières et deuxièmes liaisons étant constitutives d'un premier pseudo-lien apte à diffuser un flux de données.

Ce routeur comprend : des moyens de réception d'un premier message d'établissement de la première liaison, comportant un identifiant dudit routeur d'entrée, un identifiant du premier routeur de sortie, et un champ contenant un identifiant d'un deuxième routeur de sortie appartenant au réseau, des moyens d'émission d'un deuxième message d'établissement de ladite deuxième liaison et d'un troisième message d'établissement d'une troisième liaison entre ledit routeur et ledit deuxième routeur de sortie, le deuxième message comportant l'identifiant du routeur d'entrée, et l'identifiant du premier routeur de sortie, le troisième message comportant l'identifiant du routeur d'entrée et l'identifiant du deuxième routeur de sortie, lesdites première et troisième liaisons constituant un deuxième pseudo-lien, et des moyens de configuration d'au moins une table de commutation, en vu de ladite diffusion avec un paramètre précisant que le deuxième pseudo-lien est un pseudo-lien de secours, ledit paramètre étant compris dans le premier message d'établissement.

Un tel routeur intermédiaire est apte à établir sur réception d'un message d'établissement émis par le routeur d'entrée deux pseudo-liens ayant une liaison commune entre le routeur d'entrée et le routeur de sortie puis une liaison propre entre le routeur intermédiaire et un premier, respectivement, un deuxième routeur de sortie. Ceci permet une optimisation des ressources du réseau entre le premier routeur et le routeur intermédiaire ce qui a pour conséquence l'amélioration du temps de restauration lors de la détection d'une défaillance intervenant au niveau du premier routeur de sortie.

Selon une autre caractéristique, le routeur selon l'invention comporte des moyens de détection d'une défaillance du premier routeur de sortie et des moyens de basculement du flux de données de la deuxième liaison vers la troisième liaison.

En embarquant une fonction de détection d'une défaillance du premier routeur de sortie et une fonction de basculement du flux de données dans le routeur intermédiaire, on améliore le temps de restauration lors de la détection d'une défaillance intervenant au niveau du premier routeur de sortie.

Ceci a pour conséquence une amélioration de la réactivité réseau car la détection intervient au plus près de la défaillance. Ainsi, la défaillance du premier routeur de sortie est détectée plus rapidement, l'information n'ayant pas à traverser le réseau jusqu'au routeur d'entrée avant d'être traitée. La fonction de basculement du flux de données étant également embarquée dans le routeur intermédiaire, le basculement du flux de données vers la troisième liaison, établie entre le routeur intermédiaire et le deuxième routeur de sortie et constitutive avec la première liaison du pseudo-lien de secours, intervient plus rapidement puisque le basculement est déclenché à détection de la défaillance par le routeur intermédiaire.

Une telle solution permet de diminuer la quantité de données perdues consécutivement à la défaillance du premier routeur de sortie.

L'invention concerne un produit programme d'ordinateur téléchargeable depuis un réseau de communication et/ou enregistré sur un support lisible par ordinateur et/ou exécutable par un processeur, un tel produit programme d'ordinateur comprend des instructions de code de programme pour la mise en œuvre du procédé d'établissement objet de l'invention lorsque ledit programme est exécuté par un ordinateur.

L'invention concerne un second produit programme d'ordinateur téléchargeable depuis un réseau de communication et/ou enregistré sur un support lisible par ordinateur et/ou exécutable par un processeur, un tel produit programma d'ordinateur comprend des instructions de code de programme pour la mise en œuvre du procédé de diffusion objet de l'invention lorsque ledit programme est exécuté par un ordinateur.

L'invention concerne enfin un signal destiné à être transmis entre un routeur d'entrée et un routeur intermédiaire appartenant à un réseau de commutation de paquets, ledit signal étant porteur d'un message d'établissement d'au moins deux pseudo-liens apte à diffuser un flux de données, le premier pseudo-lien étant établi entre le routeur d'entrée et un premier routeur de sortie, le deuxième pseudo-lien

étant établi entre ledit routeur d'entrée et un deuxième routeur de sortie, lesdits routeurs de sortie appartenant audit réseau, ledit message d'établissement comprenant : un identifiant dudit routeur d'entrée, un identifiant du premier routeur de sortie, et un champ contenant un identifiant du deuxième routeur de sortie ainsi qu'un paramètre précisant que le deuxième pseudo-lien est un pseudo-lien de secours.

D'autres caractéristiques et avantages apparaîtront à la lecture de modes de réalisation préférés décrits en référence aux dessins dans lesquels :

- la figure 1 représente un pseudo-lien établi conformément à l'état de l'art, entre un routeur d'entrée et un routeur de sortie appartenant à un réseau de commutation de paquets,

- la figure 2 représente la solution mise en œuvre dans l'état de l'art afin d'assurer la continuité du service dans un réseau de commutation de paquets,

- la figure 3 représente deux pseudo-liens établis conformément au procédé d'établissement objet de l'invention,

- la figure 4 propose un diagramme temporel d'échanges de requêtes entre un routeur d'entrée et un routeur intermédiaire appartenant à un réseau de commutation de paquets d'une part et le routeur intermédiaire et un premier et un deuxième routeur de sortie d'autre part, afin d'établir des pseudo-liens, conformément au procédé d'établissement objet de l'invention,

- la figure 5 représente de manière schématique les tables de routage et de commutation d'un routeur intermédiaire conforme à l'invention,

- les figures 6A, 6B et 6C représentent des messages d'établissement utilisés dans le procédé d'établissement objet de l'invention,

- la figure 7 propose un diagramme temporel d'échanges de messages entre un routeur d'entrée et un routeur intermédiaire appartenant à un réseau de commutation de paquets d'une part et le routeur d'entrée et un premier et un deuxième routeur de sortie d'autre part, lors de la diffusion de données dans les pseudo-liens établis dans le réseau de commutation de paquets, dans un premier mode de réalisation de l'invention,

- la figure 8 propose un diagramme temporel d'échanges de messages entre un routeur d'entrée et un routeur intermédiaire appartenant à un réseau de commutation

de paquets d'une part et le routeur intermédiaire et un premier et un deuxième routeur de sortie d'autre part, lors de la diffusion de données dans les pseudo-liens établis dans le réseau de commutation de paquets, dans un deuxième mode de réalisation de l'invention,

- la figure 9 illustre deux pseudo-liens établis conformément au procédé d'établissement objet de l'invention selon un troisième mode de réalisation de l'invention,

- la figure 10 propose un diagramme temporel d'échanges de requêtes entre un premier routeur d'extrémité et des routeurs de intermédiaire appartenant à un réseau de commutation de paquets d'une part et les routeurs de intermédiaire et un deuxième et un troisième routeur d'extrémité d'autre part, afin d'établir des pseudo-liens, conformément au procédé d'établissement selon le troisième mode de réalisation de l'invention,

- les figures 11A, 11B, 11C représentent des messages d'établissement utilisés dans le procédé d'établissement selon le troisième mode de réalisation de l'invention,

- la figure 12 propose un diagramme temporel d'échanges de messages entre un routeur d'extrémité et un routeur de intermédiaire appartenant à un réseau de intermédiaire de paquets d'une part et le routeur intermédiaire et un deuxième et un troisième routeur d'extrémité d'autre part, lors de la diffusion de données dans les pseudo-liens établis dans le réseau de commutation de paquets, selon le troisième mode de réalisation de l'invention.

La figure 3 représente une connexion établie entre un routeur d'entrée T-PE1 et deux routeurs de sortie T-PE2 et T-PE3, chacun de ces trois routeurs étant disposé en bordure d'un réseau de commutation de paquets PSN.

En référence à cette figure, une première liaison L1 est établie entre le routeur d'entrée T-PE1 et un routeur intermédiaire S-PE appartenant au réseau PSN. Une deuxième liaison L2 est établie entre le routeur intermédiaire S-PE et le premier routeur de sortie T-PE2. La première et la deuxième liaison constituent un premier pseudo-lien pw1 établissant une connexion entre le routeur d'entrée T-PE1 et le premier routeur de sortie T-PE2. Le pseudo-lien pw1 ainsi établi permet de diffuser des flux de données découpées en paquets entre le routeur d'entrée T-PE1 et le premier routeur de sortie T-PE2.

Un deuxième pseudo-lien pw2 est établi entre le routeur d'entrée T-PE1 le deuxième routeur de sortie T-PE3. Le pseudo-lien pw2 est constitué de la première liaison L1 et d'une deuxième liaison L3 établie entre le routeur intermédiaire S-PE et le deuxième routeur de sortie T-PE3.

Ainsi, la première liaison L1 est commune aux deux pseudo-liens pw1 et pw2. Une telle solution permet d'optimiser les ressources du réseau, telles que la bande passante, entre le routeur d'entrée T-PE1 et le routeur intermédiaire S-PE puisqu'une unique liaison est établie entre ces deux routeurs.

Un exemple d'application de l'invention est la collecte de trafic pour un réseau mobile. Dans un tel exemple, le routeur d'entrée T-PE1 est connecté à un premier équipement tel qu'une station de base (non représentée sur les figures) dont il assure la transmission des données vers d'autres équipements d'agrégation tels que un RNC (Radio Network Controller, ou contrôleur de réseau radio en français), connectés aux routeurs de sortie T-PE2 et T-PE3.

La figure 4 représente un diagramme temporel d'échange de messages entre les routeurs d'entrée T-PE1, intermédiaire S-PE et de sortie T-PE2 et T-PE3 lors de l'établissement des pseudo-liens pw1 et pw2.

Conformément à l'invention, l'établissement des pseudo-liens pw1 et pw2 est à l'initiative du routeur d'entrée T-PE1 et repose sur l'échange de messages d'établissement conformes au protocole LDP (Label Distribution Protocol, ou protocole de distribution d'étiquette en français) tel que défini dans les documents RFC3036 et RFC4477. Ainsi, un premier message d'établissement SIG1 est émis par le routeur d'entrée T-PE1 à destination du routeur intermédiaire S-PE. Ce premier message d'établissement comporte un identifiant SAII du routeur d'entrée T-PE1, un identifiant d'une interface d'entrée IFE associée à un équipement connecté au routeur d'entrée, un identifiant TAII2 du premier routeur de sortie T-PE2, un identifiant d'une interface de sortie IFS2 associée à un équipement connecté au premier routeur de sortie T-PE2, ainsi qu'un champ comportant un identifiant TAII3 du deuxième routeur de sortie T-PE3, un identifiant d'une interface de sortie IFS3 associée à un équipement connecté au premier routeur de sortie T-PE3, et un paramètre « backup » précisant que le deuxième pseudo-lien est un pseudo-lien de secours. Un tel message d'établissement SIG1 est représenté à la figure 6A.

Le couple {identifiant SAII du routeur d'entrée T-PE1/interface d'entrée associée IFE ; identifiant TAII2 du premier routeur de sortie T-PE2/interface de sortie associée IFS2} constitue une FEC (*Forwarding Equivalent Class*, ou en français classe équivalente de transfert. Ces informations sont nécessaires à l'établissement d'un pseudo-lien. Le couple constitué par l'identifiant SAII du routeur d'entrée T-PE1/interface d'entrée associée IFE et l'identifiant TAII3/interface de sortie associée IFS du premier routeur de sortie T-PE3 constitue également une FEC.

Le premier message d'établissement SIG1 se distingue d'un message classique d'établissement d'un pseudo-lien car il comporte des données supplémentaires telles que l'identifiant TAII3 du deuxième routeur de sortie T-PE3 et le paramètre « backup » renseignant sur la nature du deuxième pseudo-lien pw2 à établir.

Le message d'établissement SIG1 comporte également une étiquette lbl1 associée à la première liaison L1. Cette étiquette est utilisée par le routeur d'entrée T-PE1 et le routeur intermédiaire S-PE lors de la diffusion des flux de données. Cette étiquette est ajoutée par le routeur d'entrée T-PE1 à chaque paquet de données destiné à être émis vers le premier routeur de sortie T-PE2.

En référence à la figure 5, à réception du premier message d'établissement SIG1, le routeur intermédiaire S-PE extrait l'identifiant du routeur d'entrée T-PE1, l'identifiant du premier routeur de sortie T-PE2 ainsi que les informations contenues dans le champ supplémentaire du message SIG1, à savoir l'identifiant du deuxième routeur de sortie T-PE3 et le paramètre « backup ».

Fort de ces informations, le routeur intermédiaire S-PE complète une table de commutation TC. Cette table de commutation TC comporte pour une FEC donnée une information indiquant l'étiquette qui doit être insérée dans l'entête du message afin de procéder au saut suivant, ainsi que l'interface de sortie if2, if3 vers laquelle diriger les flux de données. La table de commutation TC est également complétée avec le paramètre « backup » indiquant la nature du deuxième pseudo-lien pw2.

Une fois la table de commutation TC complétée, le routeur intermédiaire émet deux messages d'établissement SIG2 et SIG3. Le message d'établissement SIG2 est émis à destination du premier routeur de sortie T-PE2, et le message d'établissement SIG3 est à destination du deuxième routeur de sortie T-PE3.

Le message SIG2 comporte l'identifiant SAII du routeur d'entrée T-PE1, l'identifiant d'une interface d'entrée IFE associée à un équipement connecté au routeur d'entrée, l'identifiant TAII2 du premier routeur de sortie T-PE2, l'identifiant d'une interface de sortie IFS2 associée à un équipement connecté au premier routeur de sortie T-PE2 ainsi que l'étiquette lbl2 associée à la liaison L2 et utilisée lors de la diffusion des données. Un tel message est représenté à la figure 6B.

Le message SIG3, quant à lui, comporte l'identifiant SAII du routeur d'entrée T-PE1 l'identifiant d'une interface d'entrée IFE associée à un équipement connecté au routeur d'entrée, l'identifiant TAII3 du deuxième routeur de sortie T-PE3, l'identifiant d'une interface de sortie IFS3 associée à un équipement connecté au premier routeur de sortie T-PE3 ainsi que l'étiquette lbl3 associée à la liaison L3 et utilisée lors de la diffusion des données. Un tel message est représenté à la figure 6C.

Une fois les pseudo-liens pw1 et pw2 établis, des flux de données sont diffusés entre le routeur d'entrée T-PE1 et le premier routeur de sortie T-PE2.

A réception d'un paquet de données émis par le routeur d'entrée T-PE1, le routeur intermédiaire S-PE utilise l'étiquette ajoutée au paquet par le routeur d'entrée pour déterminer, en fonction des informations contenues dans la table de commutation TC, vers quelle interface de sortie if2, if3 diriger le paquet de données. Les paquets émis à destination du premier routeur de sorite T-PE2 sont dirigés vers l'interface if2 du routeur intermédiaire S-PE. Cette interface if2 constitue une première extrémité de la liaison L2. Avant l'émission du paquet de données à destination du premier routeur de sortie T-PE2, la nouvelle étiquette lb2 est ajoutée au paquet de données.

La figure 7 représente un diagramme temporel d'échange de messages entre le routeur d'entrée T-PE1, le routeur intermédiaire S-PE, le premier routeur de sortie T-PE2 et le troisième routeur de sortie T-PE3 lors de la diffusion de flux de données, dans une première variante de réalisation.

Un flux de données D1 est émis par le routeur d'entrée T-PE1 à destination du premier routeur de sortie T-PE2. Ce flux de données est diffusé à travers le réseau PSN au moyen du premier pseudo-lien pw1.

Afin d'assurer la continuité du service, le routeur d'entrée T-PE1 embarque une fonction de détection d'une défaillance du premier routeur de sortie T-PE2. Afin

de détecter une telle défaillance, le routeur d'entrée T-PE1 échange régulièrement des messages « écho » avec le premier routeur de sortie T-PE2 ainsi qu'avec le routeur intermédiaire S-PE.

Lorsque le routeur d'entrée ne reçoit pas de réponse à un message « écho », il en déduit que le premier routeur de sortie T-PE2 ou le routeur intermédiaire S-PE est défaillant.

Si le routeur défaillant est le premier routeur de sortie T-PE1, il émet alors un message MG1 de basculement à destination du routeur intermédiaire S-PE. A réception de ce message, le routeur intermédiaire S-PE bascule les flux de données sur la liaison L3.

Un flux de données D2 émit par le routeur d'entrée T-PE1 suite à la détection de la défaillance du premier routeur de sortie T-PE2 est alors diffusé par le deuxième pseudo-lien pw2 et reçu par le deuxième routeur de sortie T-PE3.

La figure 8 représente un diagramme temporel d'échange de messages entre le routeur d'entrée T-PE1, le routeur intermédiaire S-PE, le premier routeur de sortie T-PE2 et le troisième routeur de sortie T-PE3 lors de la diffusion de flux de données, dans une deuxième variante de réalisation.

Un flux de données D1' est émis par le routeur d'entrée T-PE1 à destination du premier routeur de sortie T-PE2. Ce flux de données est diffusé à travers le réseau PSN au moyen du premier pseudo-lien pw1.

Afin d'assurer la continuité du service, le routeur intermédiaire S-PE embarque une fonction de détection d'une défaillance du premier routeur de sortie T-PE2. Afin de détecter une telle défaillance, le routeur intermédiaire S-PE échange régulièrement des messages « écho » avec le premier routeur de sortie T-PE2.

Lorsque le routeur intermédiaire ne reçoit pas de réponse à son message « écho », il en déduit que le premier routeur de sortie T-PE2 est défaillant. Il bascule alors les flux de données provenant du routeur d'entrée T-PE1 sur la liaison L3 et en informe le routeur d'entrée T-PE1.

Ainsi, un flux de données D2' émit par le routeur d'entrée T-PE1 suite à la détection de la défaillance du premier routeur de sortie est alors diffusé par le deuxième pseudo-lien pw2 et reçu par le deuxième routeur de sortie T-PE3.

La figure 9 représente un réseau de commutation de paquets PNS comprenant une pluralité de routeurs d'extrémités T-PE1, T-PE2 et T-PE3 et une pluralité de routeurs intermédiaires S-PE1 à S-PE5. Dans un tel réseau, une connexion est établie entre un premier routeur d'entrée T-PE1 et un deuxième et un troisième routeur de sortie T-PE2 et T-PE3, chacun de ces trois routeurs étant disposé en bordure d'un réseau de commutation de paquets PSN.

En référence à cette figure, une première liaison L10 est établie entre le premier routeur d'entrée T-PE1 et un premier routeur intermédiaire S-PE1 appartenant au réseau PSN. Une deuxième liaison L11 est établie entre le premier routeur intermédiaire S-PE1 et un deuxième routeur intermédiaire S-PE4. Une troisième liaison L12 est établie entre le deuxième routeur intermédiaire S-PE4 et le deuxième routeur de sortie T-PE2. La première liaison 10, la deuxième liaison 11 et la troisième liaison 12 constituent un premier pseudo-lien pw3, dit pseudo-lien principal, établissant une connexion entre le premier routeur d'entrée T-PE1 et le deuxième routeur de sortie T-PE2. Le pseudo-lien pw3 ainsi établi permet de diffuser des flux de données découpées en paquets entre le routeur d'entrée T-PE1 et le routeur de sortie T-PE2.

Un deuxième pseudo-lien pw4, dit pseudo-lien de secours, est établi entre le premier routeur d'entrée T-PE1 et le troisième routeur de sortie T-PE3. Le pseudo-lien pw4 est constitué de la première liaison L10 et de la deuxième liaison L11, d'une troisième liaison L13 établie entre un troisième routeur intermédiaire S-PE5 et le troisième routeur de sortie T-PE3.

Ainsi, la liaison L10 et la liaison L11 sont communes aux deux pseudo-liens pw3 et pw4. Une telle solution permet d'optimiser les ressources du réseau, telles que la bande passante, entre le premier routeur d'entrée et le deuxième routeur intermédiaire S-PE4.

La figure 10 représente un diagramme temporel d'échange de messages entre le premier routeur d'entrée T-PE1, le premier, le deuxième et le troisième routeur intermédiaire S-PE1, S-PE4 et S-PE5 et le deuxième et le troisième routeur de sortie T-PE2 et T-PE3 lors de l'établissement des pseudo-liens pw3 et pw4.

Conformément à l'invention, l'établissement des pseudo-liens pw3 et pw4 est à l'initiative du premier routeur d'entrée T-PE1 et repose sur l'échange de

messages d'établissement conformes au protocole LDP. Ainsi, un premier message d'établissement SIG10 est émis par le premier routeur d'entrée T-PE1 à destination du premier routeur intermédiaire S-PE1. Ce premier message d'établissement comporte un identifiant SAII du premier routeur d'entrée T-PE1, un identifiant d'une interface d'entrée IFE associée à un équipement connecté au routeur d'entrée, un identifiant TAII2 du deuxième routeur de sortie T-PE2, un identifiant d'une interface de sortie IFS2 associée à un équipement connecté au deuxième routeur de sortie T-PE2, ainsi qu'un champ comportant un identifiant TAII3 du troisième routeur de sortie T-PE3, un identifiant d'une interface de sortie IFS3 associée à un équipement connecté au troisième routeur de sortie T-PE3, un paramètre « backup » précisant que le deuxième pseudo-lien pw4 est un pseudo-lien de secours et un identifiant d'un routeur intermédiaire S-PE4 réalisant le basculement du premier pseudo-lien pw3 vers le deuxième pseudo-lien pw4 en cas de défaillance de la troisième liaison L12 constitutive du pseudo-lien pw3. Un tel message d'établissement SIG10 est représenté à la figure 11A.

Le message d'établissement SIG10 peut comprendre plusieurs identifiants de routeurs de sortie à atteindre en cas de défaillance d'une liaison constitutive du premier pseudo-lien pw3. Un tel message comprend autant de paramètres « backup » qu'il ya de routeurs de sortie à atteindre et donc qu'il y a de pseudo-liens de secours à établir.

Un message d'établissement SIG10 peut également comprendre un champ supplémentaire comprenant une liste explicite des routeurs intermédiaire entre lesquels les liaisons constitutives du premier pseudo-lien pw3 doivent être établies.

Le message d'établissement SIG10 comporte également une étiquette lbl10. Cette étiquette est utilisée par le premier routeur d'entrée T-PE1 et le premier routeur intermédiaire S-PE1 lors de la diffusion des flux de données du routeur intermédiaire S-PE1 vers le premier routeur d'entrée T-PE1. Cette étiquette est ajoutée par le premier routeur intermédiaire S-PE1 à chaque paquet de données destiné à être émis vers le premier routeur d'entrée T-PE1.

A réception du premier message d'établissement SIG10, le routeur intermédiaire S-PE1 extrait l'identifiant du premier routeur d'entrée T-PE1, l'identifiant du deuxième routeur de sortie T-PE2 et le cas échéant la liste explicite des routeurs

intermédiaires entre lesquels les liaisons constitutives du premier pseudo-lien pw3 doivent être établies.

Fort de ces informations, le premier routeur intermédiaire S-PE1 complète une table intermédiaire. Cette table intermédiaire comporte pour une FEC donnée une information indiquant l'étiquette qui doit être insérée dans l'entête du message afin de procéder au saut suivant, ainsi que l'interface de sortie vers laquelle diriger les flux de données.

Une fois la table de commutation complétée, le premier routeur intermédiaire émet un deuxième message d'établissement SIG11. Le message d'établissement SIG11 est émis à destination du deuxième routeur intermédiaire S-PE4.

Le saut que doit effectuer le message d'établissement SIG11 pour atteindre le deuxième routeur intermédiaire S-PE4 est déterminé au moyens des informations de routage contenues dans la table de commutation TC du routeur intermédiaire S-PE1.

De manière optionnelle, le message d'établissement SIG10 peut comprendre également un tel champ supplémentaire pour chaque pseudo-lien de secours à établir, spécifiant ainsi les routeurs intermédiaire entre lesquels les liaisons constitutives des pseudo-liens sont établies.

Le message SIG11 est identique au message SIG10, seule l'étiquette lbl12 à utiliser lors de la diffusion des données distingue les deux messages.

Les informations relatives au pseudo-lien de secours pw4, telles que l'identifiant du routeur intermédiaire devant réaliser le basculement du premier pseudo-lien pw3 vers le pseudo-lien de secours pw4 sont transmises d'un routeur intermédiaire à un autre jusqu'à ce que routeur intermédiaire devant réaliser le basculement soit atteint.

A réception de ce message d'établissement SIG11, le routeur intermédiaire S-PE4 extrait l'identifiant du premier routeur d'entrée T-PE1, l'identifiant du deuxième routeur de sortie T-PE2 et le cas échéant la liste explicite des routeurs intermédiaires entre lesquels les liaisons constitutives du premier pseudo-lien pw3 doivent être

établies. La table de commutation est également complétée avec le paramètre « backup » indiquant la nature du deuxième pseudo-lien pw4.

Une fois la table de commutation du routeur intermédiaire S-PE4 complétée, celui-ci émet deux messages d'établissement SIG12 et SIG13 à destination respectivement du deuxième routeur de sortie T-PE2 et du troisième routeur intermédiaire S-PE5.

Le message SIG12 comporte l'identifiant SAII du premier routeur d'entrée T-PE1, l'identifiant d'une interface d'entrée IFE associée à un équipement connecté au routeur d'entrée, l'identifiant TAII2 du deuxième routeur de sortie T-PE2, l'identifiant d'une interface de sortie IFS2 associée à un équipement connecté au deuxième routeur de sortie T-PE2 ainsi que l'étiquette lbl12 à associer à la liaison L12 et utilisée lors de la diffusion des données. Un tel message est représenté à la figure 11B.

Le message SIG13, quant à lui, comporte l'identifiant SAII du premier routeur d'entrée T-PE1, l'identifiant d'une interface d'entrée IFE associée à un équipement connecté au premier routeur d'entrée, l'identifiant TAII3 du troisième routeur de sortie T-PE3, l'identifiant d'une interface de sortie IFS3 associée à un équipement connecté au troisième routeur de sortie T-PE3 ainsi que l'étiquette lbl13 associée à la liaison L13 à établir et utilisée lors de la diffusion des données. Un tel message est représenté à la figure 11C. Un tel message peut comporter une liste explicite des routeurs intermédiaire entre lesquels les liaisons constitutives du deuxième pseudo-lien pw4 doivent être établies pour connecter le routeur intermédiaire S-PE4 au troisième routeur de sortie T-PE3.

Une fois les pseudo-liens pw3 et pw4 établis, des flux de données sont diffusés entre le routeur d'entrée T-PE1 et le premier routeur de sortie T-PE2.

A réception d'un paquet de données émis par le premier routeur d'entrée T-PE1, le premier routeur intermédiaire S-PE1 utilise l'étiquette ajoutée au paquet par le routeur T-PE1 pour déterminer, en fonction des informations contenues dans la table de commutation TC, vers quelle interface de sortie if2, if3 diriger le paquet de données. Les paquets émis à destination du deuxième routeur de sortie T-PE2 sont dirigés vers l'interface if2 du premier routeur intermédiaire S-PE1. Cette interface if2 constitue une première extrémité de la liaison L10. Avant l'émission du paquet de

données à destination du deuxième routeur intermédiaire S-PE4, la nouvelle étiquette lb11 est ajoutée au paquet de données.

La figure 12 représente un diagramme temporel d'échange de messages entre le premier routeur d'entrée T-PE1, le premier routeur intermédiaire S-PE1, le deuxième routeur intermédiaire S-PE4, le troisième routeur intermédiaire S-PE5, le deuxième routeur de sortie T-PE2 et le troisième routeur de sortie T-PE3 lors de la diffusion de flux de données.

Un flux de données D1 est émis par le premier routeur d'entrée T-PE1 à destination du deuxième routeur de sortie T-PE2. Ce flux de données est diffusé à travers le réseau PSN au moyen du premier pseudo-lien pw3.

Afin d'assurer la continuité du service, le routeur intermédiaire S-PE4 embarque une fonction de détection d'une défaillance du deuxième routeur de sortie T-PE2. Afin de détecter une telle défaillance, le routeur intermédiaire S-PE4 échange régulièrement des messages « écho » avec le deuxième routeur de sortie T-PE2.

Lorsque le routeur intermédiaire ne reçoit pas de réponse à son message « écho », il en déduit que le deuxième routeur de sortie T-PE2 est défaillant. Il bascule alors les flux de données provenant du premier routeur d'entrée T-PE1 sur la liaison L12 et en informe le premier routeur d'entrée T-PE1.

Ainsi, un flux de données D'1 émis par le premier routeur d'entrée T-PE1 suite à la détection de la défaillance du deuxième routeur de sortie est alors diffusé par le deuxième pseudo-lien pw4 et reçu par le troisième routeur de sortie T-PE3.

L'invention permet également de protéger le réseau d'une défaillance de l'une des liaisons constitutives du premier pseudo-lien pw3 ou de l'un des routeurs intermédiaires appartenant au réseau PSN.

Par exemple, lors de l'établissement du premier pseudo-lien pw3, le message d'établissement SIG10, en plus des informations nécessaires à l'établissement du pseudo-lien pw4 de secours telles que l'identifiant TAII3 du troisième routeur de sortie T-PE3, le paramètre « backup » et l'identifiant du routeur de intermédiaire S-PE4, contient des informations supplémentaires nécessaire à l'établissement d'un troisième pseudo-lien de secours pw5 (représenté par les lignes en pointillés sur la figure 9).

Ces informations consistent en l'identifiant TAII3 du troisième routeur de sortie T-PE3, l'identifiant d'une interface de sortie IFS3 associée à un équipement

connecté au troisième routeur de sortie T-PE3, un paramètre « backup » précisant que le troisième pseudo-lien pw5 est un pseudo-lien de secours et un identifiant d'un routeur intermédiaire S-PE5 réalisant le basculement du premier pseudo-lien pw3 vers le troisième pseudo-lien pw5 en cas de défaillance de la deuxième liaison L11 constitutive du pseudo-lien pw3 ou du routeur intermédiaire S-PE4.

Ainsi, lorsque le routeur intermédiaire S-PE1 détecte une défaillance de la liaison L11 ou du routeur intermédiaire S-PE4, il en informe le premier routeur d'entrée T-PE1 et procède au basculement du flux de données à diffuser vers le troisième pseudo-lien pw5.

Enfin, l'invention a aussi pour objet un programme d'ordinateur, notamment un programme d'ordinateur sur ou dans un support d'informations ou mémoire, adapté à mettre en œuvre l'invention. Ce programme peut utiliser n'importe quel langage de programmation, et être sous la forme de code source, code objet, ou de code intermédiaire entre code source et code objet tel que dans une forme partiellement compilée, ou dans n'importe quelle autre forme souhaitable pour implémenter un procédé selon l'invention.

Le support d'informations peut être n'importe quelle entité ou dispositif capable de stocker le programme. Par exemple, le support peut comporter un moyen de stockage, tel qu'une ROM, par exemple un CD ROM ou une ROM de circuit microélectronique, ou encore un moyen d'enregistrement magnétique, par exemple une disquette (floppy disc) ou un disque dur.

D'autre part, le support d'informations peut être un support transmissible tel qu'un signal électrique ou optique, qui peut être acheminé via un câble électrique ou optique, par radio ou par d'autres moyens. Le programme selon l'invention peut être en particulier téléchargé sur un réseau de type Internet.

REVENDICATIONS

1. Procédé d'établissement d'au moins deux pseudo-liens aptes à diffuser un flux de données, un premier pseudo-lien étant constitué d'une première liaison établie entre un routeur d'entrée et un routeur intermédiaire, et d'une deuxième liaison établie entre le routeur intermédiaire et un premier routeur de sortie, un deuxième pseudo-lien étant établi entre ledit routeur d'entrée et un deuxième routeur de sortie, lesdits routeurs appartenant à un réseau de intermédiaire de paquets,

caractérisé en ce que le deuxième pseudo-lien est constitué de ladite première liaison et d'une troisième liaison établie entre le routeur intermédiaire et le deuxième routeur de sortie, ladite première liaison étant commune aux deux pseudo-liens.

2. Procédé d'établissement selon la revendication 1 dans lequel les pseudo-liens sont établis à l'initiative du routeur d'entrée par émission, à destination du routeur intermédiaire, d'un message d'établissement de ladite troisième liaison comportant un identifiant dudit routeur d'entrée, un identifiant du premier routeur de sortie, et un champ comprenant un identifiant du deuxième routeur de sortie ainsi qu'un paramètre précisant que le deuxième pseudo-lien est un pseudo-lien de secours.

3. Procédé de diffusion de flux de données au travers d'un premier pseudo-lien constitué d'une première liaison établie entre un routeur d'entrée et un routeur intermédiaire, et d'une deuxième liaison établie entre le routeur intermédiaire et un premier routeur de sortie, lesdits routeurs appartenant à un réseau de intermédiaire de paquets, ledit procédé comportant une étape de détection d'une défaillance du premier routeur de sortie,

caractérisé en ce que le procédé de diffusion comporte, en outre, une étape de basculement, sur réception d'une information de défaillance du premier routeur de sortie, de la diffusion du flux de données vers un deuxième pseudo-lien constitué de ladite première liaison et d'une troisième liaison établie entre le routeur intermédiaire et un deuxième routeur de sortie, ladite première liaison étant commune aux deux pseudo-liens.

4. Routeur destiné à être connecté par une première liaison à un routeur d'entrée et par une deuxième liaison à un premier routeur de sortie, lesdits routeurs ainsi connectés appartenant à un réseau de intermédiaire de paquets, lesdites premières et deuxièmes liaisons étant constitutives d'un premier pseudo-lien apte à diffuser un flux de données, caractérisé en ce que ledit routeur comprend :

- des moyens de réception d'un premier message d'établissement de la première liaison, comportant un identifiant dudit routeur d'entrée, un identifiant du premier routeur de sortie, et un champ contenant un identifiant d'un deuxième routeur de sortie appartenant au réseau,

- des moyens d'émission d'un deuxième message d'établissement de ladite deuxième liaison entre ledit routeur et ledit premier routeur de sortie et d'un troisième message d'établissement d'une troisième liaison entre ledit routeur et ledit deuxième routeur de sortie, le deuxième message comportant l'identifiant du routeur d'entrée, et l'identifiant du premier routeur de sortie, le troisième message comportant l'identifiant du routeur d'entrée et l'identifiant du deuxième routeur de sortie, lesdites première et troisième liaisons constituant un deuxième pseudo-lien,

- des moyens de configuration d'au moins une table de commutation, en vu de ladite diffusion avec un paramètre précisant que le deuxième pseudo-lien est un pseudo-lien de secours, ledit paramètre étant compris dans le premier message d'établissement.

5. Routeur selon la revendication 4, caractérisé en ce qu'il comporte des moyens de détection d'une défaillance du premier routeur de sortie et des moyens de basculement du flux de données de la deuxième liaison vers la troisième liaison.

6. Produit programme d'ordinateur téléchargeable depuis un réseau de communication et/ou enregistré sur un support lisible par ordinateur et/ou exécutable par un processeur, caractérisé en ce qu'il comprend des instructions de code de programme pour la mise en œuvre du procédé d'établissement selon la revendication 2 lorsque ledit programme est exécuté par un ordinateur.

7. Produit programme d'ordinateur téléchargeable depuis un réseau de communication et/ou enregistré sur un support lisible par ordinateur et/ou exécutable par un processeur, caractérisé en ce qu'il comprend des instructions de code de

programme pour la mise en œuvre du procédé de diffusion selon la revendication 3 lorsque ledit programme est exécuté par un ordinateur.

8. Signal destiné à être transmis entre un routeur d'entrée et un routeur intermédiaire appartenant à un réseau de intermédiaire de paquets, ledit signal étant porteur d'un message d'établissement d'au moins deux pseudo-liens apte à diffuser un flux de données, le premier pseudo-lien étant établi entre le routeur d'entrée et un premier routeur de sortie, le deuxième pseudo-lien étant établi entre ledit routeur d'entrée et un deuxième routeur de sortie, lesdits routeurs de sortie appartenant audit réseau, ledit message d'établissement comprenant :

- un identifiant dudit routeur d'entrée,

- un identifiant du premier routeur de sortie,

- un champ contenant un identifiant du deuxième routeur de sortie ainsi qu'un paramètre précisant que le deuxième pseudo-lien est un pseudo-lien de secours.

9. Signal selon la revendication 9, dans lequel le champ comprend en outre un identifiant dudit routeur intermédiaire.

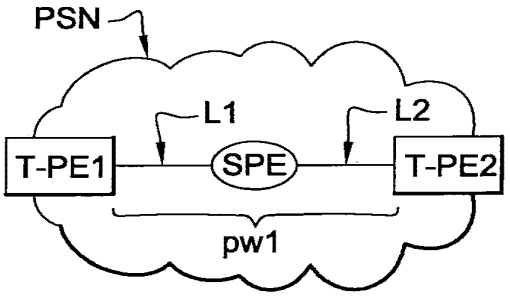
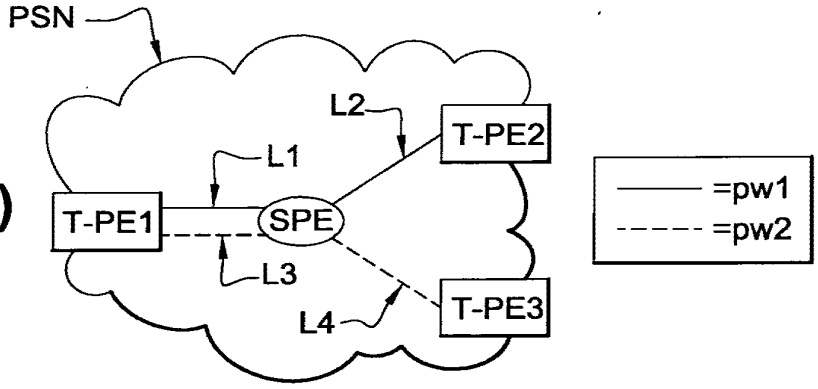


Fig. 1(AA)

Fig. 2(AA)



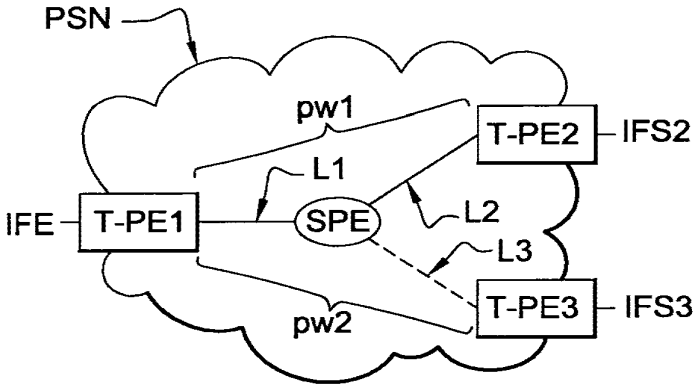


Fig. 3

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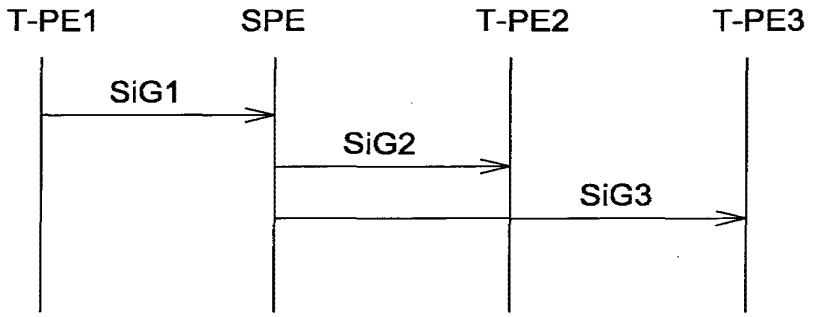


Fig. 4

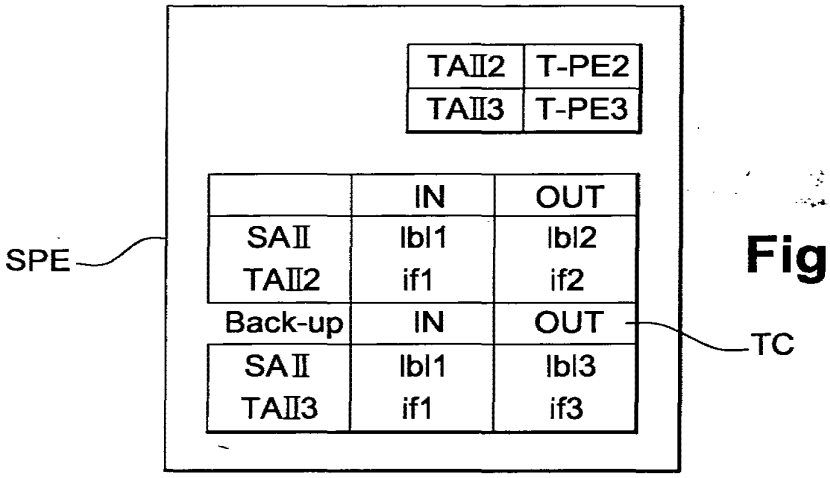


Fig. 5

SAII / IFE	TAII2 / IFS2	lbl1	TAII3 / IFS3	Back-up

Fig. 6A

SAII / IFE	TAII2 / IFS2	lbl2

Fig. 6B

SAII / IFE	TAII3 / IFS3	lbl3

Fig. 6C

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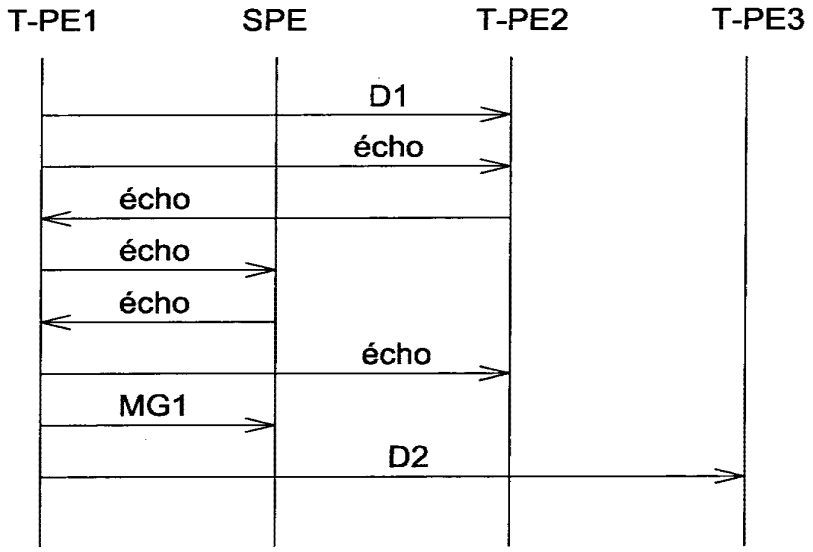


Fig. 7

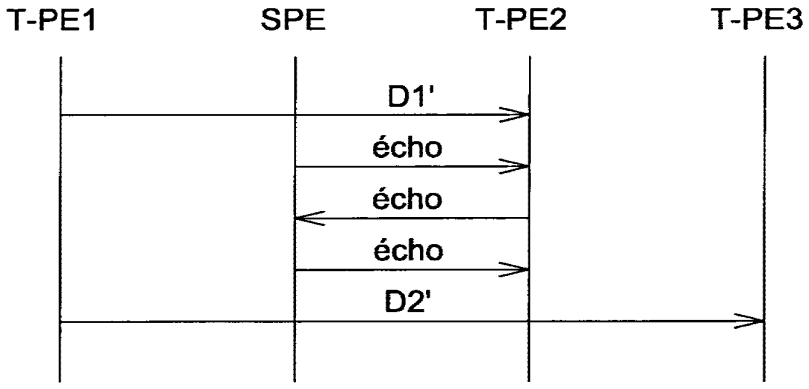


Fig. 8

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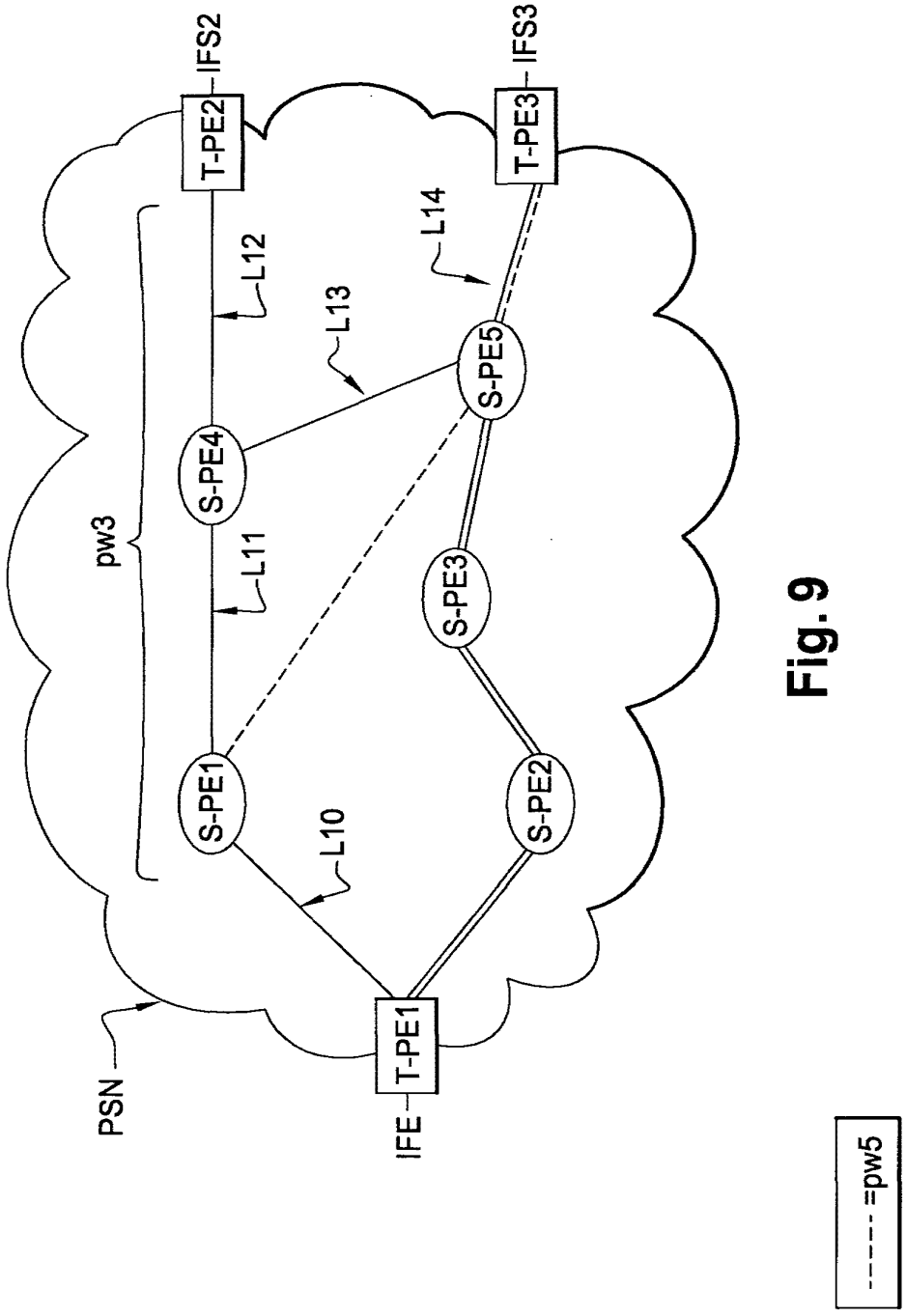


Fig. 9

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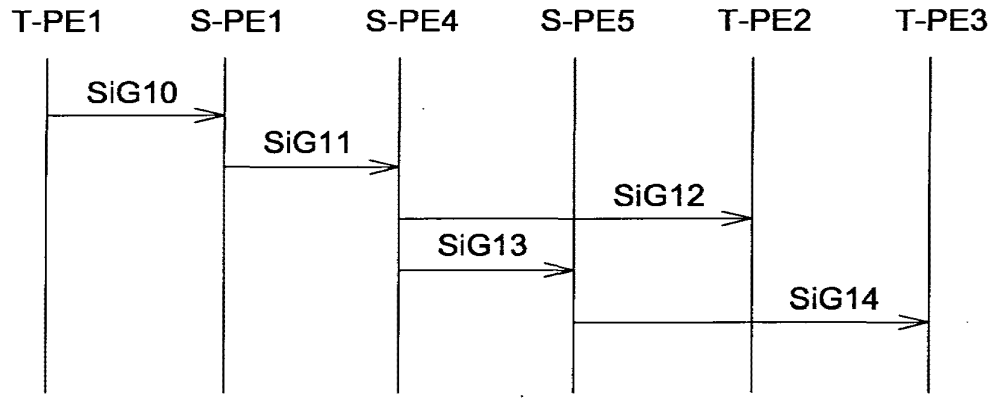


Fig. 10

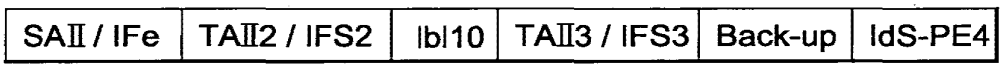


Fig. 11A

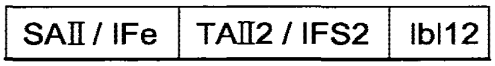


Fig. 11B



Fig. 11C

Juniper Exhibit 1002, page 300

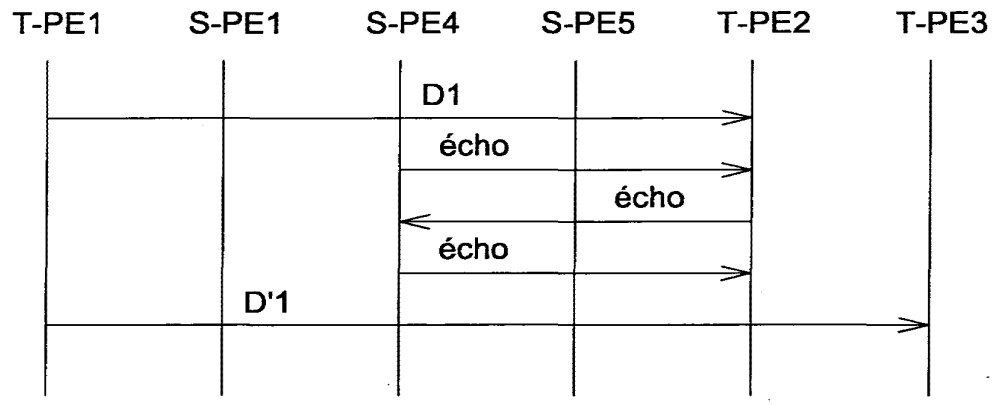


Fig. 12

Juniper Exhibit 1002, page 301

(12) DEMANDE INTERNATIONALE PUBLIÉE EN VERTU DU TRAITÉ DE COOPÉRATION EN MATIÈRE DE BREVETS (PCT)

(19) Organisation Mondiale de la Propriété Intellectuelle
Bureau international

(43) Date de la publication internationale
18 septembre 2008 (18.09.2008)

PCT

(10) Numéro de publication internationale
WO 2008/110735 A3

(51) Classification internationale des brevets :
H04L 12/56 (2006.01)

(21) Numéro de la demande internationale :
PCT/FR2008/050324

(22) Date de dépôt international :
26 février 2008 (26.02.2008)

(25) Langue de dépôt : français

(26) Langue de publication : français

(30) Données relatives à la priorité :
0753489 26 février 2007 (26.02.2007) FR

(71) Déposant *(pour tous les États désignés sauf US)* : **FRANCE TELECOM** [FR/FR]; 6 Place d'Alleray, F-75015 Paris (FR).

(72) Inventeurs; et

(75) Inventeurs/Déposants *(pour US seulement)* : **JOUNAY, Frédéric** [FR/FR]; 19 Le Dossen, F-22560 Pleumeur Bodou (FR). **NIGER, Philippe** [FR/FR]; 47 Hent Ar Vouden Servel, F-22300 Lannion (FR). **CAUVIN, Arnaud** [FR/FR]; 15 avenue Parmentier, F-75011 Paris (FR).

(74) Mandataire : **FRANCE TELECOM/FTR & D/PIV/BREVETS**; CODA Sandrine, 38-40 rue du Général Leclerc, F-92794 Issy Moulineaux Cédex 9 (FR).

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

(84) États désignés *(sauf indication contraire, pour tout titre de protection régionale disponible)* : ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), eurasien (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), européen (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL,

[Suite sur la page suivante]

(54) **Title:** MECHANISM FOR PROTECTING A PSEUDO LINK

(54) **Titre :** MECANISME DE PROTECTION D'UN PSEUDO-LIEN

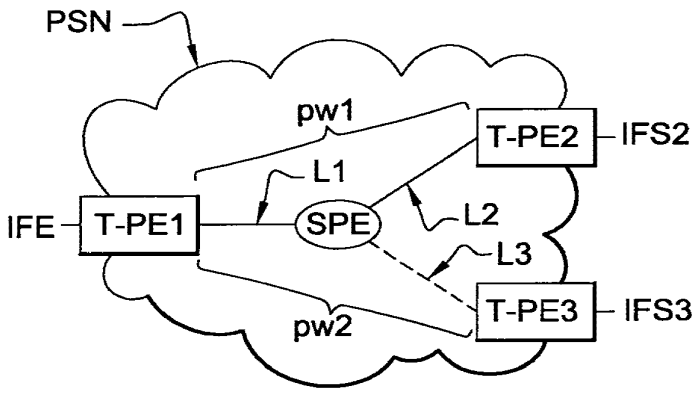


Fig. 3

(57) Abstract: The invention relates to a method for establishing at least two pseudo-links capable of broadcasting a data flow, the first pseudo-link being established between an input router and a first output router, and the second pseudo-link being established between said input router and a second output router, wherein said input and output routers belong to an intermediate packet network, a first connection representing the first pseudo-link being established between the first output router and an intermediate router that belongs to said network, a second connection representing the second pseudo-link being established between the second output router and said intermediate router, and a third connection representing the two pseudo-links being established between said intermediate router and said input router.

(57) Abrégé : La présente invention concerne un procédé d'établissement d'au moins deux pseudo-liens aptes à diffuser un flux de données, le premier pseudo-lien étant établi entre un routeur d'entrée et un premier routeur de sortie, le deuxième pseudo-lien étant établi entre ledit routeur d'entrée et un deuxième routeur de sortie, lesdits routeurs d'entrée et de sortie appartenant à un réseau de intermédiaire de paquets, une première liaison constitutive du premier pseudo-lien étant établie entre le premier routeur de sortie et un routeur intermédiaire appartenant audit réseau, et une deuxième liaison constitutive du deuxième pseudo-lien étant établie entre le deuxième routeur de sortie et ledit routeur intermédiaire, une troisième liaison constitutive des deux pseudo-liens, étant établie entre ledit routeur intermédiaire et ledit routeur d'entrée.

WO 2008/110735 A3

NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Déclaration en vertu de la règle 4.17 :

— *relative à la qualité d'inventeur (règle 4.17.iv))*

Publiée :

— *avec rapport de recherche internationale*

— *avant l'expiration du délai prévu pour la modification des revendications, sera republiée si des modifications sont reçues*

(88) Date de publication du rapport de recherche internationale: 14 mai 2009

INTERNATIONAL SEARCH REPORT

International application No
PCT/FR2008/050324

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04L12/56

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PAN (HAMMERHEAD SYSTEMS) M BOCCI MUSTAPHA AISSAOUI (ALCATEL) FLORIN BALUS HAMID OULD-BRAHIM (NORTEL) P: "Pseudo Wire Protection; draft-pan-pwe3-protection-03.txt" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, no. 3, 1 July 2006 (2006-07-01), XP015047198 ISSN: 0000-0004 page 5, paragraph 4EME paragraph [3.1.SIGNALING.A.BACKUP.PSEUDO.WIRE]; figure 4 paragraph [4.1.THE.PROTECTION.TLV] ----- -/--	1-7

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 mars 2009	01/04/2009

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Fax: (+31–70) 340–3016	Lefebvre, Laurent

Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	BOCCI ALCATEL S BRYANT CISCO SYSTEMS M: "An Architecture for Multi-Segment Pseudo Wire Emulation Edge-to-Edge; draft-ietf-pwe3-ms-pw-arch-02.txt" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, vol. pwe3, no. 2, 20 October 2006 (2006-10-20), XP015048046 ISSN: 0000-0004 cited in the application paragraph [1.INTRODUCTION]; figures 1,2,7,8	1,2,4,6
A	CCAMP GMPLS P&R DESIGN TEAM ERIC MANNIE DIMITRI PAPADIMITRIOU: "Recovery (Protection and Restoration) Terminology for Generalized Multi-Protocol Label Switching (GMPLS); draft-ietf-ccamp-gmpls-recove ry-terminology-05.txt;" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, vol. ccamp, no. 5, October 2004 (2004-10), XP015016585 ISSN: 0000-0004 paragraph [6.PROTECTION.SCHEME] paragraph [7.1.PRE.PLANNED.LSP.RESTORATION]	1,2,4,6
A	LUCA MARTINI (ED) CISCO SYSTEMS INC MATTHEW BOCCI (ED) ALCATEL FLORIN BALUS (ED) ALCATEL: "Dynamic Placement of Multi Segment Pseudo Wires; draft-ietf-pwe3-dynamic-ms-pw-02.txt" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, vol. pwe3, no. 2, October 2006 (2006-10), XP015048043 ISSN: 0000-0004 paragraph [7.1.PSEUDO.WIRE.ROUTING.PROCEDURE]	1,2,4,6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FR2008/050324

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [X] Claims Nos.: **Claims 8 and 9:**
because they relate to subject matter not required to be searched by this Authority, namely:

see sheet in annex PCT/ISA/210

2. [ ] Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. [ ] Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. [ ] As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. [ ] As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. [ ] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

[ ] The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

[ ] No protest accompanied the payment of additional search fees.

International application No.
PCT/FR2008/050324

Continuation of Box II.1

No search has been carried out on claims 8 and 9, since said claims relate to subject matter that is not patentable. Indeed, signals, in particular digital signals, have no specific physical property, consist merely of a sequence of zeros and ones that have, per se, no meaning or special technical effect and merely represent information (PCT Rule 67(v)).
The technical effect of such a sequence, in the context of the present application, is only achieved in combination with a method or apparatus that interprets/uses the sequence in a particular manner, thereby producing a technical effect. However, in the interests of clarity and voluntarily limiting the claimed subject matter, the steps of such a method or the means of such an apparatus cannot be included, which renders the signal claims unpatentable.

RAPPORT DE RECHERCHE INTERNATIONALE

Demande internationale n°
PCT/FR2008/050324

A. CLASSEMENT DE L'OBJET DE LA DEMANDE
INV. H04L12/56

Selon la classification internationale des brevets (CIB) ou à la fois selon la classification nationale et la CIB

B. DOMAINES SUR LESQUELS LA RECHERCHE A PORTE

Documentation minimale consultée (système de classification suivi des symboles de classement)
H04L

Documentation consultée autre que la documentation minimale dans la mesure où ces documents relèvent des domaines sur lesquels a porté la recherche

Base de données électronique consultée au cours de la recherche internationale (nom de la base de données, et si cela est réalisable, termes de recherche utilisés)
EPO-Internal

C. DOCUMENTS CONSIDERES COMME PERTINENTS

Catégorie*	Identification des documents cités, avec, le cas échéant, l'indication des passages pertinents	no. des revendications visées
X	PAN (HAMMERHEAD SYSTEMS) M BOCCI MUSTAPHA AISSAOUI (ALCATEL) FLORIN BALUS HAMID OULD-BRAHIM (NORTEL) P: "Pseudo Wire Protection; draft-pan-pwe3-protection-03.txt" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, no. 3, 1 juillet 2006 (2006-07-01), XP015047198 ISSN: 0000-0004 page 5, alinéa 4EME alinéa [3.1.SIGNALING.A.BACKUP.PSEUDO.WIRE]; figure 4 alinéa [4.1.THE.PROTECTION.TLV] -/--	1-7

[X] Voir la suite du cadre C pour la fin de la liste des documents

[ ] Les documents de familles de brevets sont indiqués en annexe

* Catégories spéciales de documents cités:

"A" document définissant l'état général de la technique, non considéré comme particulièrement pertinent

"E" document antérieur, mais publié à la date de dépôt international ou après cette date

"L" document pouvant jeter un doute sur une revendication de priorité ou cité pour déterminer la date de publication d'une autre citation ou pour une raison spéciale (telle qu'indiquée)

"O" document se référant à une divulgation orale, à un usage, à une exposition ou tous autres moyens

"P" document publié avant la date de dépôt international, mais postérieurement à la date de priorité revendiquée

"T" document ultérieur publié après la date de dépôt international ou la date de priorité et n'appartenenant pas à l'état de la technique pertinent, mais cité pour comprendre le principe ou la théorie constituant la base de l'invention

"X" document particulièrement pertinent; l'invention revendiquée ne peut être considérée comme nouvelle ou comme impliquant une activité inventive par rapport au document considéré isolément

"Y" document particulièrement pertinent; l'invention revendiquée ne peut être considérée comme impliquant une activité inventive lorsque le document est associé à un ou plusieurs autres documents de même nature, cette combinaison étant évidente pour une personne du métier

"&" document qui fait partie de la même famille de brevets

Date à laquelle la recherche internationale a été effectivement achevée	Date d'expédition du présent rapport de recherche internationale
23 mars 2009	01/04/2009

Nom et adresse postale de l'administration chargée de la recherche internationale	Fonctionnaire autorisé
Office Européen des Brevets, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Fax: (+31–70) 340–3016	Lefebvre, Laurent

Juniper Exhibit 1002, page 308

C(suite). DOCUMENTS CONSIDERES COMME PERTINENTS

Catégorie*	Identification des documents cités, avec, le cas échéant, l'indication des passages pertinents	no. des revendications visées
X	BOCCI ALCATEL S BRYANT CISCO SYSTEMS M: "An Architecture for Multi-Segment Pseudo Wire Emulation Edge-to-Edge; draft-ietf-pwe3-ms-pw-arch-02.txt" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, vol. pwe3, no. 2, 20 octobre 2006 (2006-10-20), XP015048046 ISSN: 0000-0004 cité dans la demande alinéa [1.INTRODUCTION]; figures 1,2,7,8	1,2,4,6
A	CCAMP GMPLS P&R DESIGN TEAM ERIC MANNIE DIMITRI PAPADIMITRIOU: "Recovery (Protection and Restoration) Terminology for Generalized Multi-Protocol Label Switching (GMPLS); draft-ietf-ccamp-gmpls-recovery-terminology-05.txt;" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, vol. ccamp, no. 5, octobre 2004 (2004-10), XP015016585 ISSN: 0000-0004 alinéa [6.PROTECTION.SCHEME] alinéa [7.1.PRE.PLANNED.LSP.RESTORATION]	1,2,4,6
A	LUCA MARTINI (ED) CISCO SYSTEMS INC MATTHEW BOCCI (ED) ALCATEL FLORIN BALUS (ED) ALCATEL: "Dynamic Placement of Multi Segment Pseudo Wires; draft-ietf-pwe3-dynamic-ms-pw-02.txt" IETF STANDARD-WORKING-DRAFT, INTERNET ENGINEERING TASK FORCE, IETF, CH, vol. pwe3, no. 2, octobre 2006 (2006-10), XP015048043 ISSN: 0000-0004 alinéa [7.1.PSEUDO.WIRE.ROUTING.PROCEDURE]	1,2,4,6

RAPPORT DE RECHERCHE INTERNATIONALE

Demande internationale n°
PCT/FR2008/050324

Cadre n°. II Observations – lorsqu'il a été estimé que certaines revendications ne pouvaient pas faire l'objet d'une recherche (suite du point 2 de la première feuille)

Le rapport de recherche internationale n'a pas été établi en ce qui concerne certaines revendications conformément à l'article 17.2)a) pour les raisons suivantes :

1. [X] Les revendications n°s 8,9
se rapportent à un objet à l'égard duquel l'administration chargée de la recherche internationale n'est pas tenue de procéder à la recherche, à savoir :
voir FEUILLE ANNEXÉE PCT/ISA/210

2. [ ] Les revendications n^{os}
parce qu'elles se rapportent à des parties de la demande internationale qui ne remplissent pas suffisamment les conditions prescrites pour qu'une recherche significative puisse être effectueé, en particulier :

3. [ ] Les revendications n^{os}
parce qu'elles sont des revendications dépendantes et ne sont pasrédigées conformément aux dispositions de la deuxième et de la troisième phrases de la règle 6.4.a).

Cadre n°. III Observations – lorsqu'il y a absence d'unité de l'invention (suite du point 3 de la première feuille)

L'administration chargée de la recherche internationale a trouvé plusieurs inventions dans la demande internationale, à savoir:

1. [ ] Comme toutes les taxes additionnelles exigées ont été payées dans les délais par le déposant, le présent rapport de recherche internationale porte sur toutes les revendications pouvant faire l'objet d'une recherche.

2. [ ] Comme toutes les revendications qui se prêtent à la recherche ont pu faire l'objet de cette recherche sans effort particulier justifiant des taxes additionnelles, l'administration chargée de la recherche internationale n'a sollicité le paiement d'aucunes taxes de cette nature.

3. [ ] Comme une partie seulement des taxes additionnelles demandées a été payée dans les délais par le déposant, le présent rapport de recherche internationale ne porte que sur les revendications pour lesquelles les taxes ont été payées, à savoir les revendications n^{os}:

4. [ ] Aucunes taxes additionnelles demandées n'ont été payées dans les délais par le déposant. En conséquence, le présent rapport de recherche internationale ne porte que sur l'invention mentionnée en premier lieu dans les revendications; elle est couverte par les revendications n^{os}:

Remarque quant à la réserve

[ ] Les taxes additionnelles étaient accompagnées d'une réserve de la part du déposant et, le cas échéant, du paiement de la taxe de réserve.

[ ] Les taxes additionnelles étaient accompagnées d'une réserve de la part du déposant mais la taxe de réserve n'a pas été payée dans le délai prescrit dans l'invitation.

[ ] Le paiement des taxes additionnelles n'était assorti d'aucune réserve.

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SUITE DES RENSEIGNEMENTS INDIQUES SUR PCT/ISA/ 210

Suite du cadre II.1

Revendications nos.: 8,9

Les revendications 8 et 9 n'a pas été recherchée car elle concerne un objet qui n'est pas brevetable. En effet, les signaux ,en particulier numériques, qui n'ont aucune caractéristique physique propre, ne représentent qu'une succession de 0 et de 1 qui n'ont en tant que tels aucune signification ni effet technique particulier et ne font que présenter de l'information.(Règle 67 v PCT)
L'effet technique d'une telle succession, dans le cadre de la demande, n'est réalisé qu'en combinaison avec une méthode ou un appareil interprétant/utilisant cette succession d'une manière particulière, produisant alors un effet technique.
Néanmoins, par raison de clarté, et d'auto confinement de l'objet à revendiquer, il nest pas permis d'incorporer les étapes d'une telle méthode ou les moyens d'un tel appareil, ce qui rend les revendications de signal non brevetables.

Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/FR2008/050324

International filing date: 26 February 2008 (26.02.2008)

Document type: Certified copy of priority document

Document details: Country/Office: FR
Number: 0753489
Filing date: 26 February 2007 (26.02.2007)

Date of receipt at the International Bureau: 26 June 2008 (26.06.2008)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)

World Intellectual Property Organization (WIPO) - Geneva, Switzerland
Organisation Mondiale de la Propriété Intellectuelle (OMPI) - Genève, Suisse

RÉPUBLIQUE FRANÇAISE

PCT/FR2008/050324

INSTITUT NATIONAL
DE LA PROPRIÉTÉ
INDUSTRIELLE

Brevet

d'invention

Certificat d'utilité

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Fait à Paris, le 06 MAI 2008

Pour le Directeur général de l'Institut
national de la propriété industrielle
Le Chef du Département des brevets

Martine PLANCHE

DB 26702/07

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Établissement public national créé par la loi n°51-444 du 19 avril 1951

INPI
INSTITUT NATIONAL DE LA PROPRIETE INDUSTRIELLE

BREVET D'INVENTION

CERTIFICAT D'UTILITE

cerfa N°12236*01

26bis, rue de Saint-Pétersbourg
75800 Paris Cédex 08
Téléphone: 01 53.04.53.04 Télécopie: 01.53.04.52.65

Code de la propriété intellectuelle-livreVI

REQUÊTE EN DÉLIVRANCE

DATE DE REMISE DES PIÈCES: **26/02/2007** N° D'ENREGISTREMENT NATIONAL: **0753489** DÉPARTEMENT DE DÉPÔT: DATE DE DÉPÔT:	FRANCE TELECOM CODA Sandrine DIVISION R&D/PIV/BREVETS 38-40 rue du Général Leclerc 92794 ISSY MOULINEAUX Cédex 9 France
Vos références pour ce dossier: 06403-FR	

1 NATURE DE LA DEMANDE			
Demande de brevet			
2 TITRE DE L'INVENTION			
	MECANISME DE PROTECTION D'UN PSEUDO-LIEN		
3 DECLARATION DE PRIORITE OU REQUETE DU BENEFICE DE LA DATE DE DEPOT D'UNE DEMANDE ANTERIEURE FRANCAISE	Pays ou organisation	Date	N°
4-1 DEMANDEUR			
Nom	FRANCE TELECOM		
Suivi par	CODA Sandrine		
Rue	6, place d'Alleray		
Code postal et ville	75015 PARIS		
Pays	France		
Nationalité	France		
Forme juridique	Société anonyme		
N° SIREN	380 129 866		
Code APE-NAF	642A		
N° de téléphone	01 45 29 56 84		
N° de télécopie	01 45 29 65 60		
Courrier électronique	sandrine.coda@orange-ftgroup.com		
5C ADRESSE DE CORRESPONDANCE			
Nom	FRANCE TELECOM		
Rue	DIVISION R&D/PIV/BREVETS 38-40 rue du Général Leclerc		
Code postal et ville	92794 ISSY MOULINEAUX Cédex 9		
Pays	France		

6 DOCUMENTS ET FICHIERS JOINTS	Fichier électronique	Pages	Détails
Texte du brevet	textebrevet.pdf	17	D 13, R 3, AB 1
Dessins	dessins.pdf	4	page 4, figures 10, Abrégé: page 2, Fig.3
Désignation d'inventeurs	Design.PDF		
Copie du pouvoir général	other1.pdf		
7 MODE DE PAIEMENT			
Mode de paiement	Prélèvement du compte courant		
Numéro du compte client	432		
8 RAPPORT DE RECHERCHE			
Etablissement immédiat			

9 REDEVANCES JOINTES	Devise	Taux	Quantité	Montant à payer
062 Dépôt d'une demande électronique	EURO	25.00	1.00	25.00
063 Rapport de recherche	EURO	500.00	1.00	500.00
Total à acquitter	EURO			525.00

La loi n°78-17 du 6 janvier 1978 relative à l'informatique aux fichiers et aux libertés s'applique aux réponses faites à ce formulaire.
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Signé par
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Emetteur du certificat: FR, INPI, INPI-EN-LIGNE 1.0
Fonction
(Demandeur)

R E P U B L I Q U E F R A N C A I S E

INSTITUT NATIONAL DE LA PROPRIÉTÉ INDUSTRIELLE

BREVET D'INVENTION
CERTIFICAT D'UTILITE

Réception électronique de la soumission

Il est certifié par la présente qu'une demande de brevet (ou d'un certificat d'utilité) a été reçue par le biais du dépôt électronique sécurisé de l'INPI. Après réception, un numéro d'enregistrement et une date de réception ont été automatiquement attribués.

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Documents envoyés	package-data.xml	FR-office-specific-info.xml
	request.xml	fee-sheet.xml
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	textebrevet.pdf (17 p.)	dessins.pdf (4 p.)
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Juniper Exhibit 1002, page 317

Mécanisme de protection d'un pseudo-lien

L'invention se situe dans le domaine des télécommunications, et plus particulièrement le domaine des réseaux de commutation de paquets.

Dans un réseau de commutation de paquets ou Paquet Switched Network en anglais, les données à transmettre se présentent sous forme de paquets traités par des routeurs du réseau jusqu'à atteindre leur destination. L'ensemble des paquets à transmettre constitue un flux de données.

Un exemple de technologie utilisé dans les réseaux de commutation de paquets pour acheminer des paquets de données, est la technologie MPLS (MultiProtocol Label Switching ou en français : commutation multi-protocole par étiquette). La technologie MPLS propose de rajouter en entête des paquets de données une ou plusieurs étiquettes contenant des informations permettant aux routeurs du réseau de déterminer le prochain saut qu'un paquet doit effectuer pour atteindre sa destination. La technologie MPLS est décrit plus en détail dans un document de l'IETF (groupe de standardisation de l'Internet, abréviation des termes anglais Internet Engineering Task Force), référencé RFC 3031 (RFC signifiant "requête pour commentaires, ou en anglais Request For Comments).

Cependant, le protocole MPLS ne permet de traiter que des paquets conformes au protocole IP (Internet Protocol, ou protocole internet).

Afin de palier cet inconvénient, le groupe de standardisation PWE3 (PseudoWire Emulation Edge to Edge) de l'IETF définit un concept de pseudo-lien permettant d'émuler un lien point à point entre deux équipements d'un réseau de commutation de paquets reposant sur la technologie IP/MPLS. De tels pseudo-liens, définis dans le document RFC 3985, permettent la transmission de paquets de données non-conformes au protocole IP, tels que par exemple des paquets de données conformes au protocole ATM.

En référence à la figure 1, un pseudo-lien pw1 est établi entre un premier routeur T-PE1 disposé en bordure d'un réseau de commutation de paquets PSN et un deuxième routeur T-PE2 également disposé en bordure du réseau PSN. Une première liaison L1 constitutive du pseudo-lien pw1 est établie entre le routeur d'entrée et un routeur intermédiaire S-PE du réseau PSN. Une deuxième liaison L2,

elle aussi constitutive du pseudo-lien pw1, est, quant à elle, établie entre le routeur intermédiaire S-PE et le deuxième routeur T-PE2. Le premier routeur T-PE1 est appelé routeur d'entrée et constitue une première extrémité du pseudo-lien pw1et le deuxième routeur T-PE2, est appelé routeur de sortie et constitue une deuxième extrémité du pseudo-lien pw1. Une fois le pseudo-lien pw1 établi, le routeur d'entrée T-PE1 émet un flux de données acheminé via le pseudo-lien pw1 jusqu'au routeur de sortie T-PE2. Un tel pseudo-lien pw1 est défini plus en détail dans le document « An Architecture for Multi-Segment Pseudo-Wire Emulation Edge-to-Edge. draft-ietf-pwe3-ms-pw-arch-02.txt ».

Afin d'assurer la continuité du service en cas de défaillance du routeur de sortie, le groupe de travail PWE3 propose une solution consistant à doubler le premier pseudo-lien, établi entre le routeur d'entrée et le routeur de sortie, par un deuxième pseudo-lien servant de pseudo-lien de secours de sorte que, lorsque le routeur de sortie constituant une extrémité du premier pseudo-lien tombe en panne les paquets de données sont acheminés au moyen du pseudo-lien de secours dont une extrémité est constituée par un routeur de sortie différent.

Ainsi, en référence à la figure 2, un premier pseudo-lien pw1 est établi entre un routeur d'entrée T-PE1 disposé en bordure d'un réseau de commutation de paquets PSN et un routeur de sortie T-PE2 également disposé en bordure du réseau PSN. Une première liaison L1 constitutive du pseudo-lien pw1 est établie entre le routeur d'entrée T-PE1 et un routeur intermédiaire S-PE du réseau PSN. Une deuxième liaison L2, elle aussi constitutive du pseudo-lien pw1, est établie entre le routeur intermédiaire S-PE et le routeur de sortie T-PE2. Un deuxième pseudo-lien pw2 est ensuite établi entre le routeur d'entrée T-PE1, constituant une première extrémité du pseudo-lien, et un deuxième routeur de sortie T-PE3 constituant une deuxième extrémité du pseudo-lien. Une première liaison L3 constitutive du deuxième pseudo-lien est établie entre le routeur d'entrée T-PE1 et le routeur intermédiaire S-PE et une seconde liaison L4, également constitutive du deuxième pseudo-lien est établie entre le routeur intermédiaire S-PE et le deuxième routeur de sortie T-PE3.

Afin d'assurer la continuité du service, le routeur d'entrée T-PE1 comporte des moyens mettant en œuvre une fonction de détection d'une panne du premier routeur de sortie T-PE2 et une fonction de basculement du flux des données du premier pseudo-lien pw1 vers le deuxième pseudo-lien pw2.

Lorsqu'une défaillance intervient au niveau du premier routeur de sortie T-PE2, celle-ci est détectée au niveau du routeur d'entrée T-PE1, par exemple à partir d'un message indiquant l'apparition d'une défaillance émis à travers le réseau PSN à destination du routeur d'entrée T-PE1. Une fois informé de la défaillance, le routeur d'entrée T-PE1 déclenche le basculement du flux de données du premier pseudo-lien pw1 vers le deuxième pseudo-lien pw2 assurant ainsi l'acheminement des données vers le routeur de sortie T-PE3.

Cependant, une telle solution présente l'inconvénient d'être consommatrice en ressources du réseau telles que par exemple des ressources de traitement au niveau des équipements (capacité de mémoire de stockage, capacité de calcul, etc ;), les flux de signalisation en vu de l'établissement des deux pseudo-liens, la bande passante, notamment entre le routeur d'entrée et le routeur intermédiaire. Ceci a pour conséquence un allongement du temps de restauration en cas de défaillance d'un routeur de sortie impactant de manière négative sur la qualité de service.

La solution proposée dans le cadre de l'invention ne présente pas ces inconvénients de l'art antérieur.

En effet, elle repose sur un procédé d'établissement d'au moins deux pseudo-liens aptes à diffuser un flux de données, le premier pseudo-lien étant établi entre un routeur d'entrée et un premier routeur de sortie, le deuxième pseudo-lien étant établi entre ledit routeur d'entrée et un deuxième routeur de sortie, lesdits routeurs d'entrée et de sortie appartenant à un réseau de commutation de paquets, une première liaison constitutive du premier pseudo-lien étant établie entre le premier routeur de sortie et un routeur intermédiaire appartenant audit réseau, et une deuxième liaison constitutive du deuxième pseudo-lien étant établie entre le deuxième routeur de sortie et ledit routeur intermédiaire,

Un tel procédé d'établissement est particulier en ce qu'une troisième liaison constitutive des deux pseudo-liens, est établie entre ledit routeur intermédiaire et ledit routeur d'entrée.

De cette manière, on optimise l'utilisation des ressources du réseau, telle que la bande passante, entre le routeur d'entrée et le routeur intermédiaire en établissant, entre ces deux équipements, une liaison unique commune aux deux pseudo-liens. Cette solution n'a jamais été envisagée dans l'art antérieur. En effet, dans l'art

antérieur, lorsqu'un pseudo-lien principal et un pseudo-lien de secours sont établis entre un routeur d'entrée et un premier, respectivement, un deuxième routeur de sortie, une liaison est établie entre le routeur d'entrée et le routeur intermédiaire pour chaque pseudo-lien, soit deux liaisons. L'homme du métier a en effet toujours considéré un pseudo-lien comme une liaison point à point établie entre un routeur d'entrée et un routeur de sortie, de sorte qu'à chaque couple routeur d'entrée/routeur de sortie, est associé un pseudo-lien. En outre, une telle approche est préconisée dans les normes.

Allant à l'encontre de ces préjugés de l'homme du métier, les inventeurs de la présente demande proposent, au contraire, de mettre en commun la liaison établie entre le routeur d'entrée et le routeur intermédiaire ce qui permet d'améliorer l'utilisation des ressources du réseau et ainsi de réduire le temps de restauration en cas de défaillance du premier routeur de sortie. En effet dans l'état de l'art, le pseudo-lien de secours, bien que n'étant utilisé pour diffuser les données que lorsque le pseudo-lien principal est défaillant, réserve, de part son établissement, des ressources sur l'ensemble du réseau entre le routeur d'entrée et le routeur de sortie. En rendant commune au pseudo-lien principal et au pseudo-lien de secours la liaison établie entre le routeur d'entrée et le routeur intermédiaire, les ressources du réseau précédemment réservées pour le pseudo-lien de secours sont libérées et peuvent être utilisées de manière plus optimale.

Les données diffusées dans les pseudo-liens peuvent être des données utiles, comme par exemple un flux ATM transportant un service ou encore des données de services, telle que par exemple un message de détection de défaillance d'un équipement du réseau. Ainsi dans le cas d'échanges de données de services, la solution proposée dans la présente demande permet d'améliorer la réactivité des équipements présents dans le réseau.

Selon une caractéristique du procédé d'établissement objet de l'invention, les pseudo-liens sont établis à l'initiative du routeur d'entrée par émission, à destination du routeur intermédiaire, d'un message d'établissement de ladite troisième liaison comportant un identifiant dudit routeur d'entrée, un identifiant du premier routeur de sortie, et un champ comprenant un identifiant du deuxième routeur de sortie ainsi qu'un paramètre précisant que le deuxième pseudo-lien est un pseudo-lien de secours.

Dans une telle réalisation, l'établissement des pseudo-liens est à l'initiative du routeur d'entrée. Afin de pouvoir initier l'établissement des pseudo-liens principaux et de secours, on suppose, dans le cadre de l'invention, que le routeur d'entrée possède, dans une table de routage, les informations sur les sauts à effectuer pour atteindre les premiers et deuxièmes routeurs de sortie. Grâce à ces informations, le routeur d'entrée sait à destination de quel routeur du réseau, qui est considéré alors comme le routeur intermédiaire, il doit envoyer le message d'établissement des pseudo-liens. Il n'est alors nécessaire de configurer que le routeur d'entrée, ce qui allège les opérations de maintenance du réseau. Le paramètre, compris dans le message d'établissement et indiquant que le deuxième pseudo-lien est un pseudo-lien de secours, permet de configurer le routeur intermédiaire, en vue de la diffusion ultérieure des données.

L'invention concerne également un procédé de diffusion de flux de données entre un routeur d'entrée et un premier routeur de sortie, lesdits routeurs appartenant à un réseau à commutation de paquets, un flux de données étant diffusé dans un premier pseudo-lien constitué d'une première liaison établie entre ledit routeur d'entrée et un routeur intermédiaire appartenant audit réseau et d'une deuxième liaison établie entre ledit routeur intermédiaire et ledit premier routeur de sortie, ledit procédé comportant une étape de détection d'une défaillance du premier routeur de sortie.

Un tel procédé de diffusion comporte, en outre, une étape de basculement, sur réception, par le routeur intermédiaire, d'une information de défaillance, du flux de données sur une troisième liaison établie entre ledit routeur intermédiaire et un deuxième routeur de sortie, ladite première liaison et ladite troisième liaison constituant un deuxième pseudo-lien.

Une telle réalisation permet d'améliorer le temps de restauration en cas de défaillance du premier routeur de sortie puisque le basculement du flux de données intervient au plus près de la défaillance.

L'invention a, en outre, pour objet un routeur destiné à être connecté par une première liaison à un routeur d'entrée et par une deuxième liaison à un premier routeur de sortie, lesdits routeurs ainsi connectés appartenant à un réseau de

commutation de paquets, lesdites premières et deuxièmes liaisons étant constitutives d'un premier pseudo-lien apte à diffuser un flux de données.

Ce routeur comprend : des moyens de réception d'un premier message d'établissement de la première liaison, comportant un identifiant dudit routeur d'entrée, un identifiant du premier routeur de sortie, et un champ contenant un identifiant d'un deuxième routeur de sortie appartenant au réseau, des moyens d'émission d'un deuxième message d'établissement de ladite deuxième liaison et d'un troisième message d'établissement d'une troisième liaison entre ledit routeur et ledit deuxième routeur de sortie, le deuxième message comportant l'identifiant du routeur d'entrée, et l'identifiant du premier routeur de sortie, le troisième message comportant l'identifiant du routeur d'entrée et l'identifiant du deuxième routeur de sortie, lesdites première et troisième liaisons constituant un deuxième pseudo-lien, et des moyens de configuration d'au moins une table de commutation, en vu de ladite diffusion avec un paramètre précisant que le deuxième pseudo-lien est un pseudo-lien de secours, ledit paramètre étant compris dans le premier message d'établissement.

Un tel routeur intermédiaire est apte à établir sur réception d'un message d'établissement émis par le routeur d'entrée deux pseudo-liens ayant une liaison commune entre le routeur d'entrée et le routeur de sortie puis une liaison propre entre le routeur intermédiaire et un premier, respectivement, un deuxième routeur de sortie. Ceci permet une optimisation des ressources du réseau entre le premier routeur et le routeur intermédiaire ce qui a pour conséquence l'amélioration du temps de restauration lors de la détection d'une défaillance intervenant au niveau du premier routeur de sortie.

Selon une autre caractéristique, le routeur selon l'invention comporte des moyens de détection d'une défaillance du premier routeur de sortie et des moyens de basculement du flux de données de la deuxième liaison vers la troisième liaison.

En embarquant une fonction de détection d'une défaillance du premier routeur de sortie et une fonction de basculement du flux de données dans le routeur intermédiaire, on améliore le temps de restauration lors de la détection d'une défaillance intervenant au niveau du premier routeur de sortie.

Ceci a pour conséquence une amélioration de la réactivité réseau car la détection intervient au plus près de la défaillance. Ainsi, la défaillance du premier

routeur de sortie est détectée plus rapidement, l'information n'ayant pas à traverser le réseau jusqu'au routeur d'entrée avant d'être traitée. La fonction de basculement du flux de données étant également embarquée dans le routeur intermédiaire, le basculement du flux de données vers la troisième liaison, établie entre le routeur intermédiaire et le deuxième routeur de sortie et constitutive avec la première liaison du pseudo-lien de secours, intervient plus rapidement puisque le basculement est déclenché à détection de la défaillance par le routeur intermédiaire.

Une telle solution permet de diminuer la quantité de données perdues consécutivement à la défaillance du premier routeur de sortie.

L'invention concerne un produit programme d'ordinateur téléchargeable depuis un réseau de communication et/ou enregistré sur un support lisible par ordinateur et/ou exécutable par un processeur, un tel produit programme d'ordinateur comprend des instructions de code de programme pour la mise en œuvre du procédé d'établissement objet de l'invention lorsque ledit programme est exécuté par un ordinateur.

L'invention concerne un second produit programme d'ordinateur téléchargeable depuis un réseau de communication et/ou enregistré sur un support lisible par ordinateur et/ou exécutable par un processeur, un tel produit programma d'ordinateur comprend des instructions de code de programme pour la mise en œuvre du procédé de diffusion objet de l'invention lorsque ledit programme est exécuté par un ordinateur.

L'invention concerne enfin un signal destiné à être transmis entre un routeur d'entrée et un routeur intermédiaire appartenant à un réseau de commutation de paquets, ledit signal étant porteur d'un message d'établissement d'au moins deux pseudo-liens apte à diffuser un flux de données, le premier pseudo-lien étant établi entre le routeur d'entrée et un premier routeur de sortie, le deuxième pseudo-lien étant établi entre ledit routeur d'entrée et un deuxième routeur de sortie, lesdits routeurs de sortie appartenant audit réseau, ledit message d'établissement comprenant : un identifiant dudit routeur d'entrée, un identifiant du premier routeur de sortie, et un champ contenant un identifiant du deuxième routeur de sortie ainsi qu'un paramètre précisant que le deuxième pseudo-lien est un pseudo-lien de secours.

D'autres caractéristiques et avantages apparaîtront à la lecture de modes de réalisation préférés décrits en référence aux dessins dans lesquels :

- la figure 1 représente un pseudo-lien établi conformément à l'état de l'art, entre un routeur d'entrée et un routeur de sortie appartenant à un réseau de commutation de paquets,

- la figure 2 représente la solution mise en œuvre dans l'état de l'art afin d'assurer la continuité du service dans un réseau de commutation de paquets,

- la figure 3 représente deux pseudo-liens établis conformément au procédé d'établissement objet de l'invention,

- la figure 4 propose un diagramme temporel d'échanges de requêtes entre un routeur d'entrée et un routeur intermédiaire appartenant à un réseau de commutation de paquets d'une part et le routeur intermédiaire et un premier et un deuxième routeur de sortie d'autre part, afin d'établir des pseudo-liens, conformément au procédé d'établissement objet de l'invention,

- la figure 5 représente de manière schématique les tables de routage et de commutation d'un routeur intermédiaire conforme à l'invention,

- les figures 6A, 6B et 6C représentent des messages d'établissement utilisés dans le procédé d'établissement objet de l'invention,

- la figure 7 propose un diagramme temporel d'échanges de messages entre un routeur d'entrée et un routeur intermédiaire appartenant à un réseau de commutation de paquets d'une part et le routeur d'entrée et un premier et un deuxième routeur de sortie d'autre part, lors de la diffusion de données dans les pseudo-liens établis dans le réseau de commutation de paquets, dans un premier mode de réalisation de l'invention,

- la figure 8 propose un diagramme temporel d'échanges de messages entre un routeur d'entrée et un routeur intermédiaire appartenant à un réseau de commutation de paquets d'une part et le routeur intermédiaire et un premier et un deuxième routeur de sortie d'autre part, lors de la diffusion de données dans les pseudo-liens établis dans le réseau de commutation de paquets, dans un deuxième mode de réalisation de l'invention.

La figure 3 représente une connexion établie entre un routeur d'entrée T-PE1 et deux routeurs de sortie T-PE2 et T-PE3, chacun de ces trois routeurs étant disposé en bordure d'un réseau de commutation de paquets PSN.

En référence à cette figure, une première liaison L1 est établie entre le routeur d'entrée T-PE1 et un routeur intermédiaire S-PE appartenant au réseau PSN. Une deuxième liaison L2 est établie entre le routeur intermédiaire S-PE et le premier routeur de sortie T-PE2. La première et la deuxième liaison constituent un premier pseudo-lien pw1 établissant une connexion entre le routeur d'entrée T-PE1 et le premier routeur de sortie T-PE2. Le pseudo-lien pw1 ainsi établi permet de diffuser des flux de données découpées en paquets entre le routeur d'entrée T-PE1 et le premier routeur de sortie T-PE2.

Un deuxième pseudo-lien pw2 est établi entre le routeur d'entrée T-PE1 le deuxième routeur de sortie T-PE3. Le pseudo-lien pw2 est constitué de la première liaison L1 et d'une deuxième liaison L3 établie entre le routeur intermédiaire S-PE et le deuxième routeur de sortie T-PE3.

Ainsi, la première liaison L1 est commune aux deux pseudo-liens pw1 et pw2. Une telle solution permet d'optimiser les ressources du réseau, telles que la bande passante, entre le routeur d'entrée T-PE1 et le routeur intermédiaire S-PE puisqu'une unique liaison est établie entre ces deux routeurs.

Un exemple d'application de l'invention est la collecte de trafic pour un réseau mobile. Dans un tel exemple, le routeur d'entrée T-PE1 est connecté à un premier équipement tel qu'une station de base (non représentée sur les figures) dont il assure la transmission des données vers d'autres équipements d'agrégation tels que un RNC (Radio Network Controller, ou contrôleur de réseau radio en français), connectés aux routeurs de sortie T-PE2 et T-PE3.

La figure 4 représente un diagramme temporel d'échange de messages entre les routeurs d'entrée T-PE1, intermédiaire S-PE et de sortie T-PE2 et T-PE3 lors de l'établissement des pseudo-liens pw1 et pw2.

Conformément à l'invention, l'établissement des pseudo-liens pw1 et pw2 est à l'initiative du routeur d'entrée T-PE1 et repose sur l'échange de messages d'établissement conformes au protocole LDP (Label Distribution Protocol, ou protocole de distribution d'étiquette en français) tel que défini dans les documents

RFC3036 et RFC4477. Ainsi, un premier message d'établissement SIG1 est émis par le routeur d'entrée T-PE1 à destination du routeur intermédiaire S-PE. Ce premier message d'établissement comporte un identifiant SAII du routeur d'entrée T-PE1, un identifiant d'une interface d'entrée IFE associée à un équipement connecté au routeur d'entrée, un identifiant TAII2 du premier routeur de sortie T-PE2, un identifiant d'une interface de sortie IFS2 associée à un équipement connecté au premier routeur de sortie T-PE2, ainsi qu'un champ comportant un identifiant TAII3 du deuxième routeur de sortie T-PE3, un identifiant d'une interface de sortie IFS3 associée à un équipement connecté au premier routeur de sortie T-PE3, et un paramètre « backup » précisant que le deuxième pseudo-lien est un pseudo-lien de secours. Un tel message d'établissement SIG1 est représenté à la figure 6A.

Le couple {identifiant SAII du routeur d'entrée T-PE1/interface d'entrée associée IFE ; identifiant TAII2 du premier routeur de sortie T-PE2/interface de sortie associée IFS2} constitue une FEC (*Forwarding Equivalent Class*, ou en français classe équivalente de transfert. Ces informations sont nécessaires à l'établissement d'un pseudo-lien. Le couple constitué par l'identifiant SAII du routeur d'entrée T-PE1/interface d'entrée associée IFE et l'identifiant TAII3/interface de sortie associée IFS du premier routeur de sortie T-PE3 constitue également une FEC.

Le premier message d'établissement SIG1 se distingue d'un message classique d'établissement d'un pseudo-lien car il comporte des données supplémentaires telles que l'identifiant TAII3 du deuxième routeur de sortie T-PE3 et le paramètre « backup » renseignant sur la nature du deuxième pseudo-lien pw2 à établir.

Le message d'établissement SIG1 comporte également une étiquette lbl1 associée à la première liaison L1. Cette étiquette est utilisée par le routeur d'entrée T-PE1 et le routeur intermédiaire S-PE lors de la diffusion des flux de données. Cette étiquette est ajoutée par le routeur d'entrée T-PE1 à chaque paquet de données destiné à être émis vers le premier routeur de sortie T-PE2.

En référence à la figure 5, à réception du premier message d'établissement SIG1, le routeur intermédiaire S-PE extrait l'identifiant du routeur d'entrée T-PE1, l'identifiant du premier routeur de sortie T-PE2 ainsi que les informations contenues dans le champ supplémentaire du message SIG1, à savoir l'identifiant du deuxième routeur de sortie T-PE3 et le paramètre « backup ».

Fort de ces informations, le routeur intermédiaire S-PE complète une table de commutation TC. Cette table de commutation TC comporte pour une FEC donnée une information indiquant l'étiquette qui doit être insérée dans l'entête du message afin de procéder au saut suivant, ainsi que l'interface de sortie if2, if3 vers laquelle diriger les flux de données. La table de commutation TC est également complétée avec le paramètre « backup » indiquant la nature du deuxième pseudo-lien pw2.

Une fois la table de commutation TC complétée, le routeur intermédiaire émet deux messages d'établissement SIG2 et SIG3. Le message d'établissement SIG2 est émis à destination du premier routeur de sortie T-PE2, et le message d'établissement SIG3 est à destination du deuxième routeur de sortie T-PE3.

Le message SIG2 comporte l'identifiant SAII du routeur d'entrée T-PE1, l'identifiant d'une interface d'entrée IFE associée à un équipement connecté au routeur d'entrée, l'identifiant TAII2 du premier routeur de sortie T-PE2, l'identifiant d'une interface de sortie IFS2 associée à un équipement connecté au premier routeur de sortie T-PE2 ainsi que l'étiquette lbl2 associée à la liaison L2 et utilisée lors de la diffusion des données. Un tel message est représenté à la figure 6B.

Le message SIG3, quant à lui, comporte l'identifiant SAII du routeur d'entrée T-PE1 l'identifiant d'une interface d'entrée IFE associée à un équipement connecté au routeur d'entrée, l'identifiant TAII3 du deuxième routeur de sortie T-PE3, l'identifiant d'une interface de sortie IFS3 associée à un équipement connecté au premier routeur de sortie T-PE3 ainsi que l'étiquette lbl3 associée à la liaison L3 et utilisée lors de la diffusion des données. Un tel message est représenté à la figure 6C.

Une fois les pseudo-liens pw1 et pw2 établis, des flux de données sont diffusés entre le routeur d'entrée T-PE1 et le premier routeur de sortie T-PE2.

A réception d'un paquet de données émis par le routeur d'entrée T-PE1, le routeur intermédiaire S-PE utilise l'étiquette ajoutée au paquet par le routeur d'entrée pour déterminer, en fonction des informations contenues dans la table de commutation TC, vers quelle interface de sortie if2, if3 diriger le paquet de données. Les paquets émis à destination du premier routeur de sorite T-PE2 sont dirigés vers l'interface if2 du routeur intermédiaire S-PE. Cette interface if2 constitue une première extrémité de la liaison L2. Avant l'émission du paquet de données à destination du

premier routeur de sortie T-PE2, la nouvelle étiquette lb2 est ajoutée au paquet de données.

La figure 7 représente un diagramme temporel d'échange de messages entre le routeur d'entrée T-PE1, le routeur intermédiaire S-PE, le premier routeur de sortie T-PE2 et le troisième routeur de sortie T-PE3 lors de la diffusion de flux de données, dans une première variante de réalisation.

Un flux de données D1 est émis par le routeur d'entrée T-PE1 à destination du premier routeur de sortie T-PE2. Ce flux de données est diffusé à travers le réseau PSN au moyen du premier pseudo-lien pw1.

Afin d'assurer la continuité du service, le routeur d'entrée T-PE1 embarque une fonction de détection d'une défaillance du premier routeur de sortie T-PE2. Afin de détecter une telle défaillance, le routeur d'entrée T-PE1 échange régulièrement des messages « écho » avec le premier routeur de sortie T-PE2 ainsi qu'avec le routeur intermédiaire S-PE.

Lorsque le routeur d'entrée ne reçoit pas de réponse à un message « écho », il en déduit que le premier routeur de sortie T-PE2 ou le routeur intermédiaire S-PE est défaillant.

Si le routeur défaillant est le premier routeur de sortie T-PE1, il émet alors un message MG1 de basculement à destination du routeur intermédiaire S-PE. A réception de ce message, le routeur intermédiaire S-PE bascule les flux de données sur la liaison L3.

Un flux de données D2 émit par le routeur d'entrée T-PE1 suite à la détection de la défaillance du premier routeur de sortie T-PE2 est alors diffusé par le deuxième pseudo-lien pw2 et reçu par le deuxième routeur de sortie T-PE3.

La figure 8 représente un diagramme temporel d'échange de messages entre le routeur d'entrée T-PE1, le routeur intermédiaire S-PE, le premier routeur de sortie T-PE2 et le troisième routeur de sortie T-PE3 lors de la diffusion de flux de données, dans une deuxième variante de réalisation.

Un flux de données D1' est émis par le routeur d'entrée T-PE1 à destination du premier routeur de sortie T-PE2. Ce flux de données est diffusé à travers le réseau PSN au moyen du premier pseudo-lien pw1.

Afin d'assurer la continuité du service, le routeur intermédiaire S-PE embarque une fonction de détection d'une défaillance du premier routeur de sortie T-PE2. Afin de détecter une telle défaillance, le routeur intermédiaire S-PE échange régulièrement des messages « écho » avec le premier routeur de sortie T-PE2.

Lorsque le routeur intermédiaire ne reçoit pas de réponse à son message « écho », il en déduit que le premier routeur de sortie T-PE2 est défaillant. Il bascule alors les flux de données provenant du routeur d'entrée T-PE1 sur la liaison L3 et en informe le routeur d'entrée T-PE1.

Ainsi, un flux de données D2' émit par le routeur d'entrée T-PE1 suite à la détection de la défaillance du premier routeur de sortie est alors diffusé par le deuxième pseudo-lien pw2 et reçu par le deuxième routeur de sortie T-PE3.

Enfin, l'invention a aussi pour objet un programme d'ordinateur, notamment un programme d'ordinateur sur ou dans un support d'informations ou mémoire, adapté à mettre en œuvre l'invention. Ce programme peut utiliser n'importe quel langage de programmation, et être sous la forme de code source, code objet, ou de code intermédiaire entre code source et code objet tel que dans une forme partiellement compilée, ou dans n'importe quelle autre forme souhaitable pour implémenter un procédé selon l'invention.

Le support d'informations peut être n'importe quelle entité ou dispositif capable de stocker le programme. Par exemple, le support peut comporter un moyen de stockage, tel qu'une ROM, par exemple un CD ROM ou une ROM de circuit microélectronique, ou encore un moyen d'enregistrement magnétique, par exemple une disquette (floppy disc) ou un disque dur.

D'autre part, le support d'informations peut être un support transmissible tel qu'un signal électrique ou optique, qui peut être acheminé via un câble électrique ou optique, par radio ou par d'autres moyens. Le programme selon l'invention peut être en particulier téléchargé sur un réseau de type Internet.

REVENDICATIONS

1. Procédé d'établissement d'au moins deux pseudo-liens aptes à diffuser un flux de données, le premier pseudo-lien étant établi entre un routeur d'entrée et un premier routeur de sortie, le deuxième pseudo-lien étant établi entre ledit routeur d'entrée et un deuxième routeur de sortie, lesdits routeurs d'entrée et de sortie appartenant à un réseau de commutation de paquets, une première liaison constitutive du premier pseudo-lien étant établie entre le premier routeur de sortie et un routeur intermédiaire appartenant audit réseau, et une deuxième liaison constitutive du deuxième pseudo-lien étant établie entre le deuxième routeur de sortie et ledit routeur intermédiaire,

caractérisé en ce qu'une troisième liaison constitutive des deux pseudo-liens, est établie entre ledit routeur intermédiaire et ledit routeur d'entrée.

2. Procédé d'établissement selon la revendication 1 dans lequel les pseudo-liens sont établis à l'initiative du routeur d'entrée par émission, à destination du routeur intermédiaire, d'un message d'établissement de ladite troisième liaison comportant un identifiant dudit routeur d'entrée, un identifiant du premier routeur de sortie, et un champ comprenant un identifiant du deuxième routeur de sortie ainsi qu'un paramètre précisant que le deuxième pseudo-lien est un pseudo-lien de secours.

3. Procédé de diffusion de flux de données entre un routeur d'entrée et un premier routeur de sortie, lesdits routeurs appartenant à un réseau à commutation de paquets, un flux de données étant diffusé dans un premier pseudo-lien constitué d'une première liaison établie entre ledit routeur d'entrée et un routeur intermédiaire appartenant audit réseau et d'une deuxième liaison établie entre ledit routeur intermédiaire et ledit premier routeur de sortie, ledit procédé comportant une étape de détection d'une défaillance du premier routeur de sortie,

caractérisé en ce qu'il comporte, en outre, une étape de basculement, sur réception, par le routeur intermédiaire, d'une information de défaillance du flux de données sur une troisième liaison établie entre ledit routeur intermédiaire et un deuxième routeur

de sortie, ladite première liaison et ladite troisième liaison constituant un deuxième pseudo-lien.

4. Routeur destiné à être connecté par une première liaison à un routeur d'entrée et par une deuxième liaison à un premier routeur de sortie, lesdits routeurs ainsi connectés appartenant à un réseau de commutation de paquets, lesdites premières et deuxièmes liaisons étant constitutives d'un premier pseudo-lien apte à diffuser un flux de données, caractérisé en ce que ledit routeur comprend :

- des moyens de réception d'un premier message d'établissement de la première liaison, comportant un identifiant dudit routeur d'entrée, un identifiant du premier routeur de sortie, et un champ contenant un identifiant d'un deuxième routeur de sortie appartenant au réseau,

- des moyens d'émission d'un deuxième message d'établissement de ladite deuxième liaison entre ledit routeur et ledit premier routeur de sortie et d'un troisième message d'établissement d'une troisième liaison entre ledit routeur et ledit deuxième routeur de sortie, le deuxième message comportant l'identifiant du routeur d'entrée, et l'identifiant du premier routeur de sortie, le troisième message comportant l'identifiant du routeur d'entrée et l'identifiant du deuxième routeur de sortie, lesdites première et troisième liaisons constituant un deuxième pseudo-lien,

- des moyens de configuration d'au moins une table de commutation, en vu de ladite diffusion avec un paramètre précisant que le deuxième pseudo-lien est un pseudo-lien de secours, ledit paramètre étant compris dans le premier message d'établissement.

5. Routeur selon la revendication 4, caractérisé en ce qu'il comporte des moyens de détection d'une défaillance du premier routeur de sortie et des moyens de basculement du flux de données de la deuxième liaison vers la troisième liaison.

6. Produit programme d'ordinateur téléchargeable depuis un réseau de communication et/ou enregistré sur un support lisible par ordinateur et/ou exécutable par un processeur, caractérisé en ce qu'il comprend des instructions de code de programme pour la mise en œuvre du procédé d'établissement selon la revendication 2 lorsque ledit programme est exécuté par un ordinateur.

7. Produit programme d'ordinateur téléchargeable depuis un réseau de communication et/ou enregistré sur un support lisible par ordinateur et/ou exécutable par un processeur, caractérisé en ce qu'il comprend des instructions de code de programme pour la mise en œuvre du procédé de diffusion selon la revendication 3 lorsque ledit programme est exécuté par un ordinateur.

8. Signal destiné à être transmis entre un routeur d'entrée et un routeur intermédiaire appartenant à un réseau de commutation de paquets, ledit signal étant porteur d'un message d'établissement d'au moins deux pseudo-liens apte à diffuser un flux de données, le premier pseudo-lien étant établi entre le routeur d'entrée et un premier routeur de sortie, le deuxième pseudo-lien étant établi entre ledit routeur d'entrée et un deuxième routeur de sortie, lesdits routeurs de sortie appartenant audit réseau, ledit message d'établissement comprenant :

- un identifiant dudit routeur d'entrée,
- un identifiant du premier routeur de sortie,
- un champ contenant un identifiant du deuxième routeur de sortie ainsi qu'un paramètre précisant que le deuxième pseudo-lien est un pseudo-lien de secours.

FIG 1 (AA)

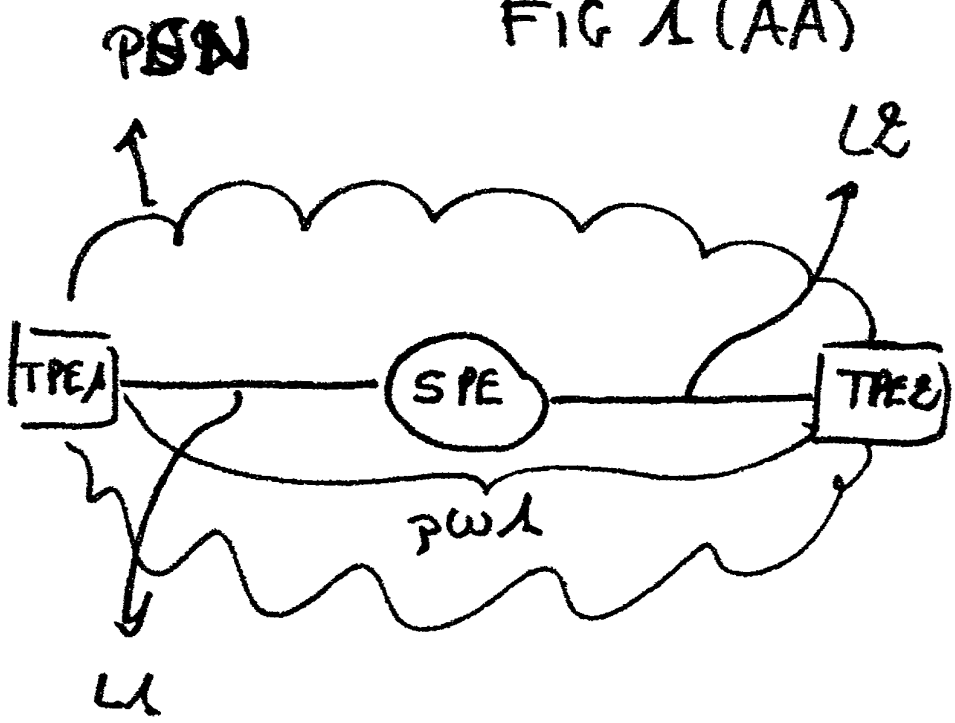
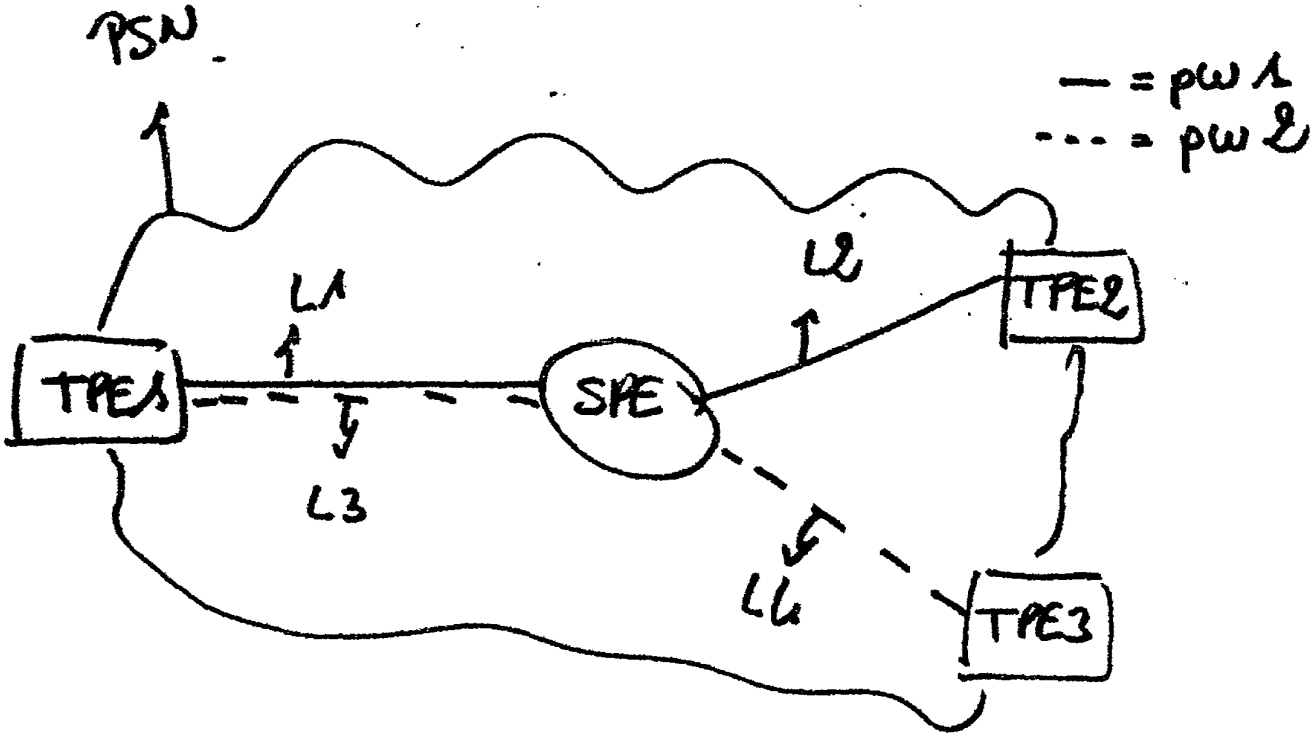


FIG 2 (AA)



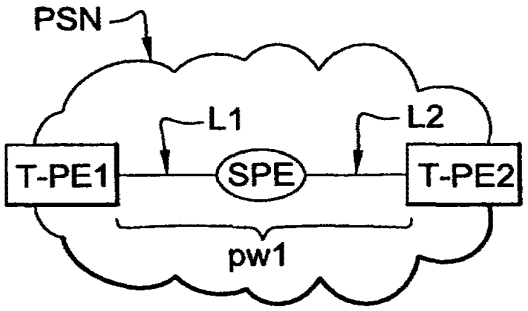


Fig. 1(AA)

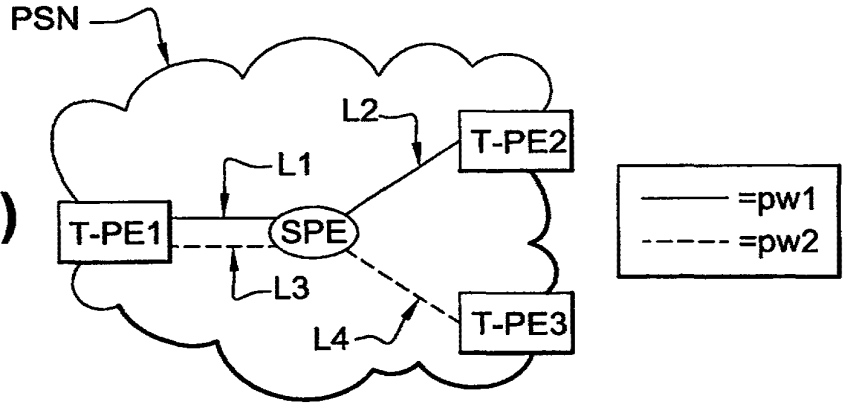


Fig. 2(AA)

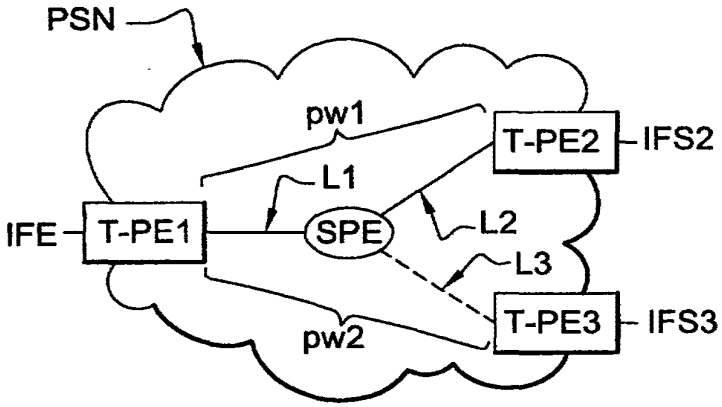


Fig. 3

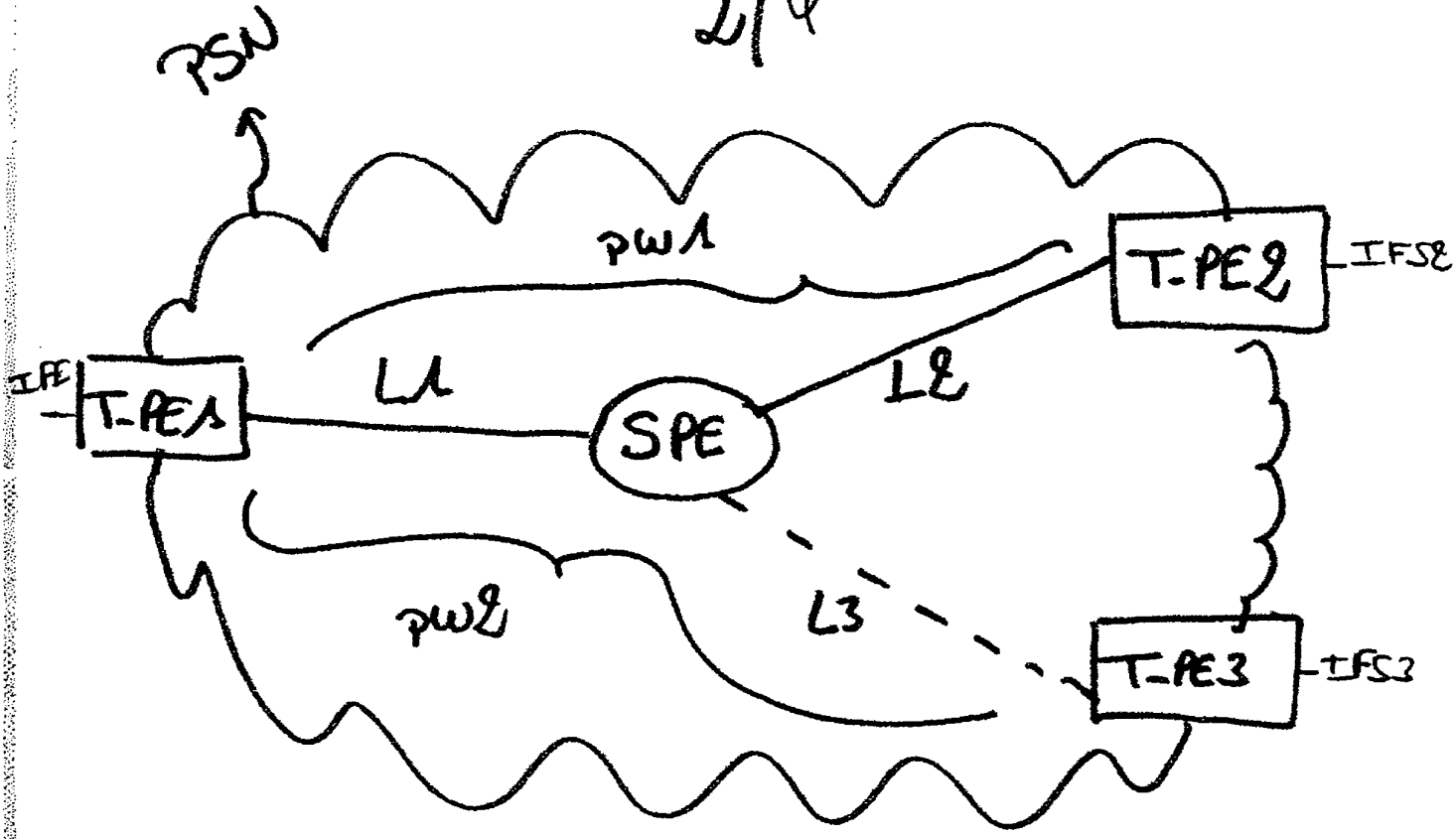

PSW
pw1
T-PE2
IFS2
IPE
T-PE1
L1
SPE
L2
pw2
L3
T-PE3
IFS3

FIG 3

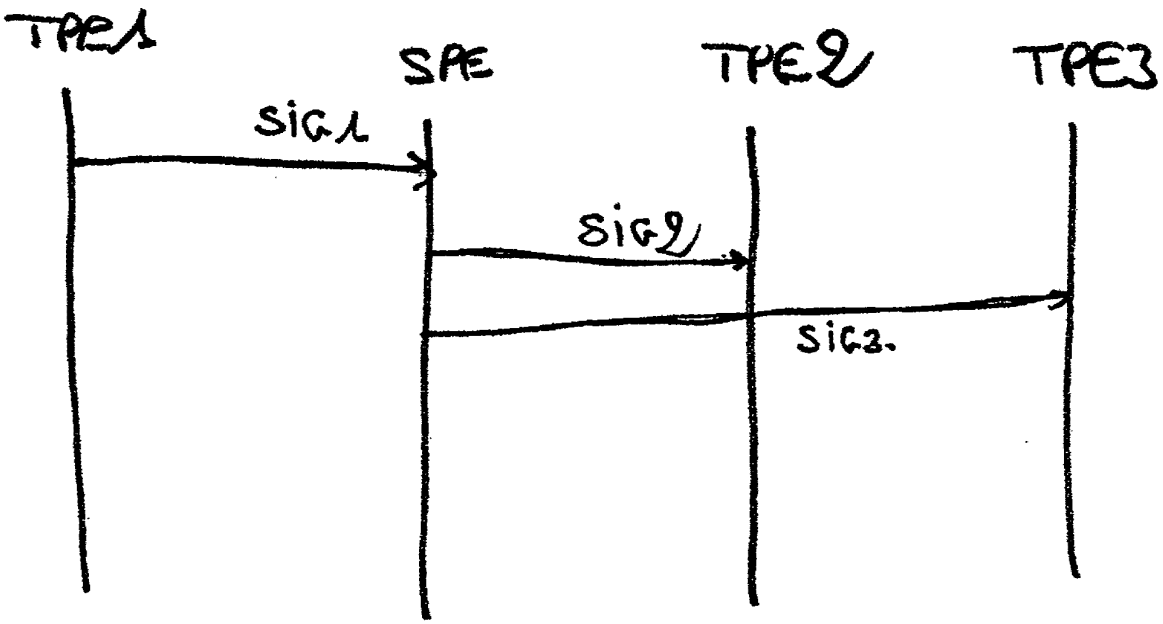

TPE1
SPE
TPE2
TPE3
sig1
sig2
sig3

FIG 4

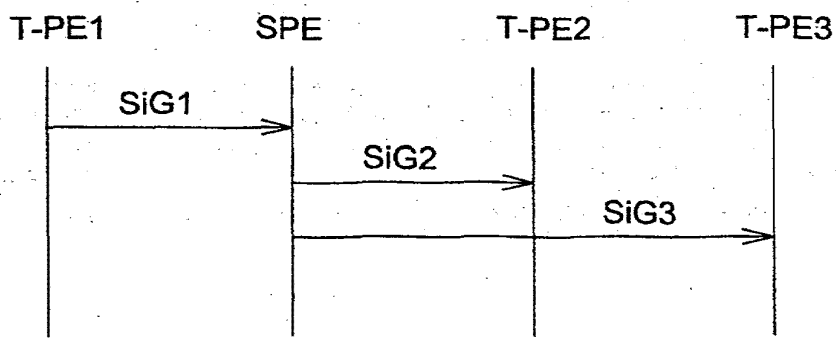


Fig. 4

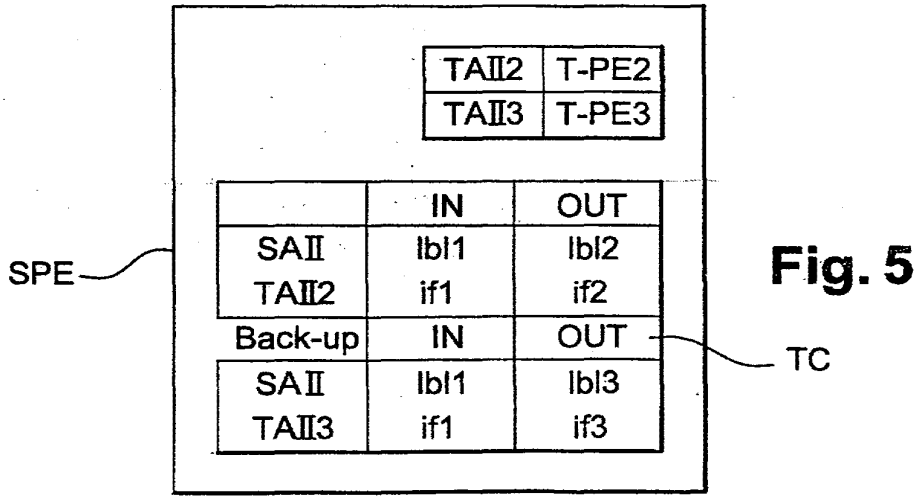


Fig. 5

SAII / IFE	TAII2 / IFS2	lbl1	TAII3 / IFS3	Back-up

Fig. 6A

SAII / IFE	TAII2 / IFS2	lbl2

Fig. 6B

SAII / IFE	TAII3 / IFS3	lbl3

Fig. 6C

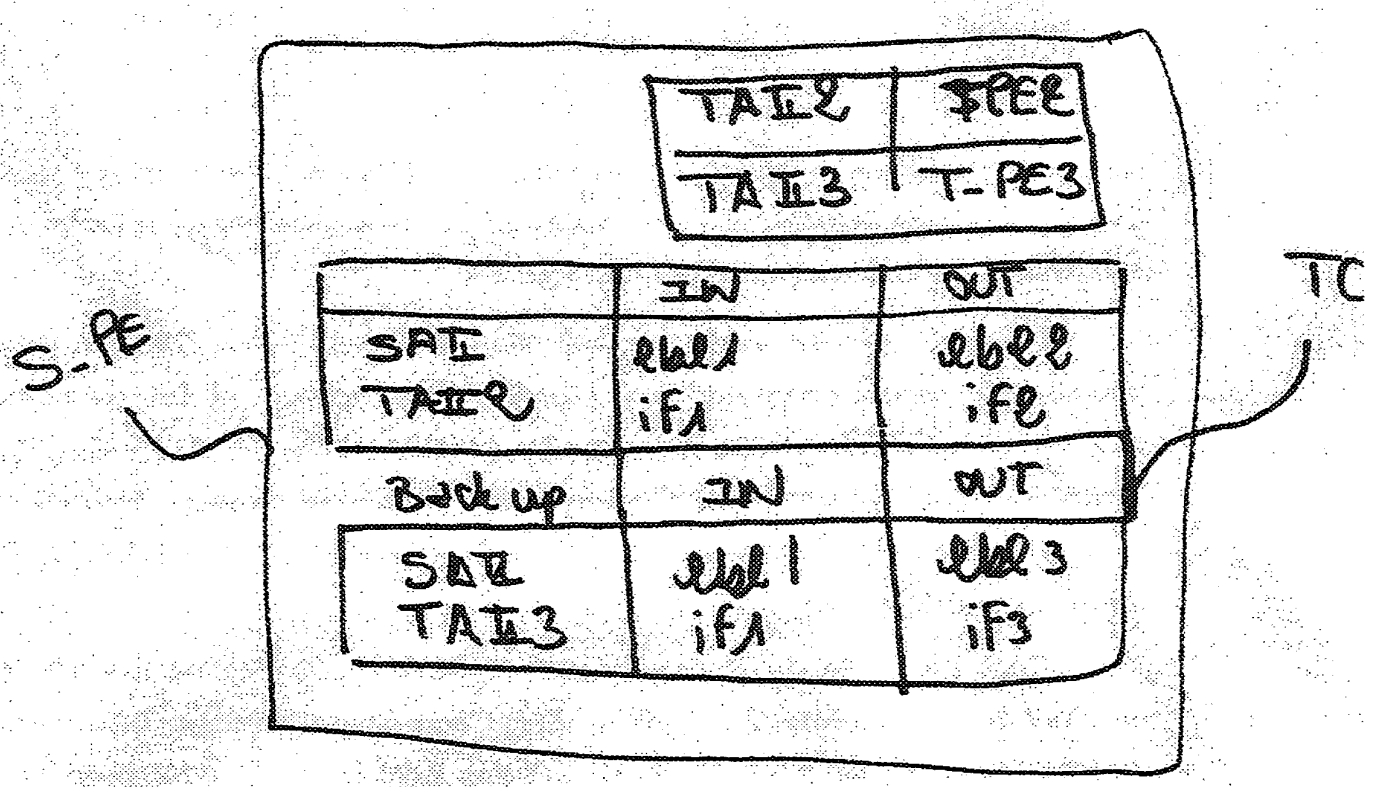


FIG5

SAIL/IFE	TAIL2/IFS2	lbl1	TAIL3/IFS3	Backup

FIG6A

SAIL/IFE	TAIL2/IFS2	lbl2

FIG6B

SAIL/IFE	TAIL3/IFS3	lbl3

FIG6C

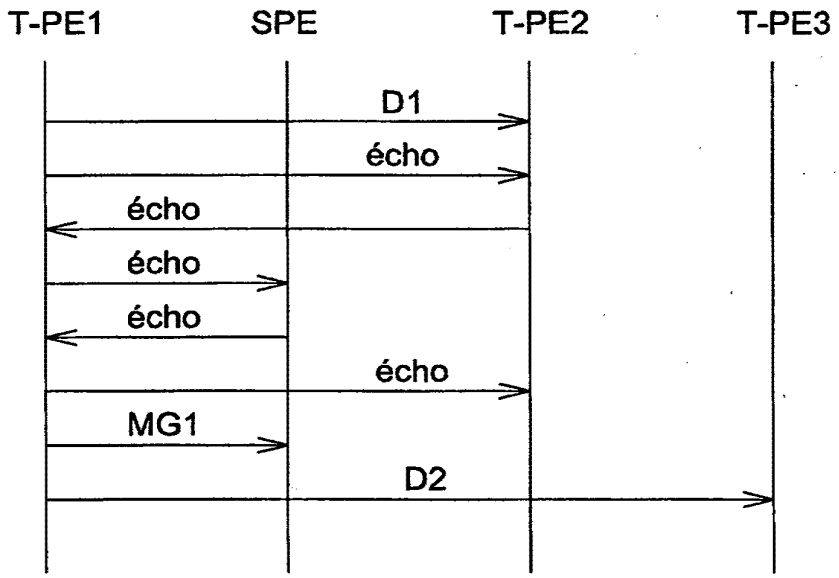

T-PE1
SPE
T-PE2
T-PE3
D1
écho
écho
écho
écho
écho
MG1
D2

Fig. 7

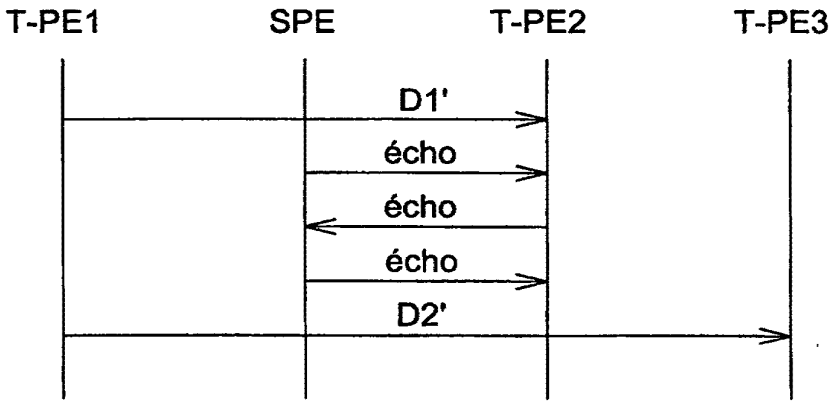

T-PE1
SPE
T-PE2
T-PE3
D1'
écho
écho
écho
D2'

Fig. 8

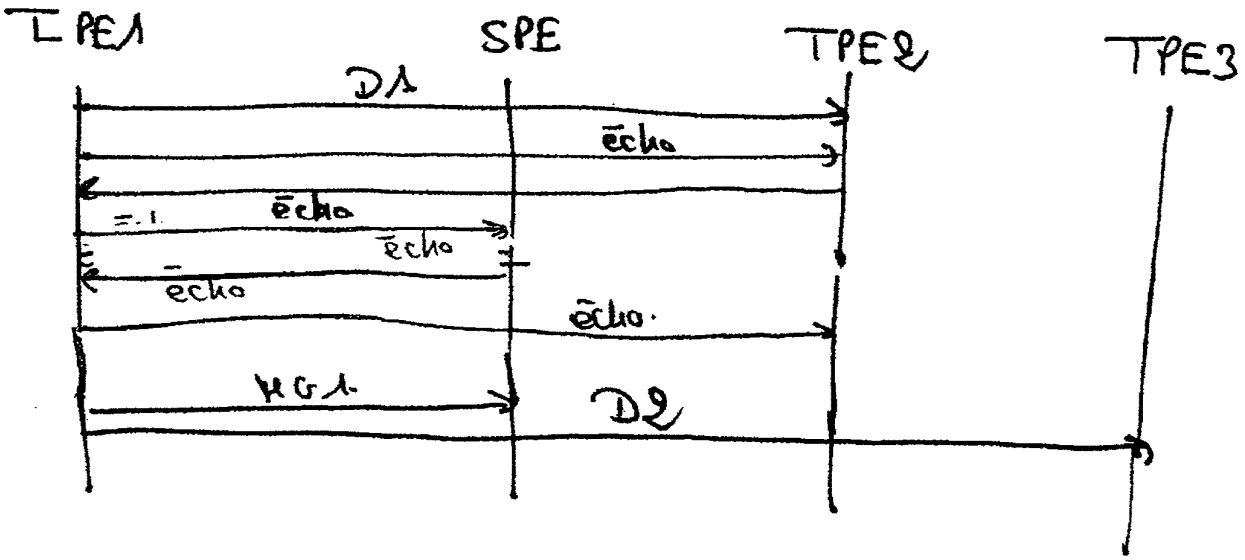

TPE1
SPE
TPE2
TPE3
D1
écho
écho
écho
écho
écho
MG1
D2

FIG 7.

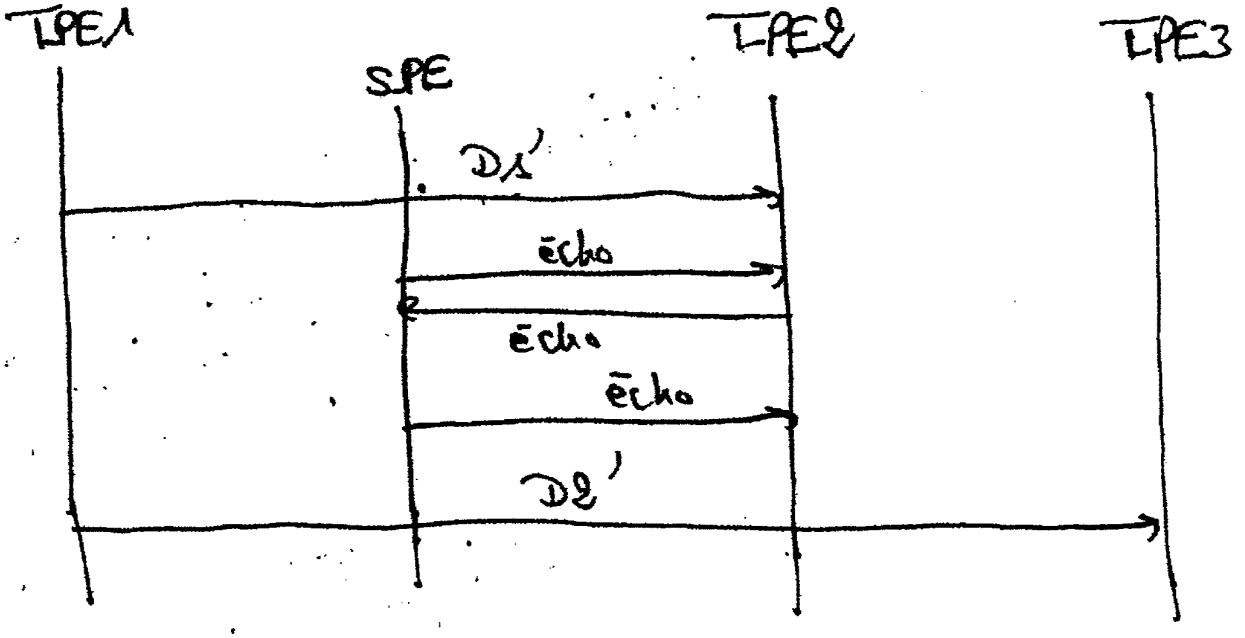

TPE1
SPE
TPE2
TPE3
D1'
écho
écho
écho
D2'

FIG 8

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BREVET D'INVENTION
CERTIFICAT D'UTILITE

cerfa N°12236*01

Désignation de l'inventeur

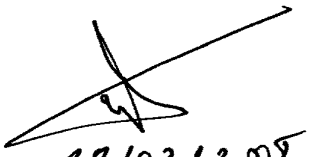
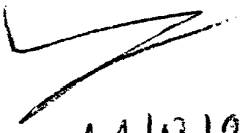
Vos références pour ce dossier	06403-FR
N°D'ENREGISTREMENT NATIONAL	
TITRE DE L'INVENTION	
	MECANISME DE PROTECTION D'UN PSEUDO-LIEN
LE(S) DEMANDEUR(S) OU LE(S) MANDATAIRE(S):	
DESIGNE(NT) EN TANT QU'INVENTEUR(S):	
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Société d'appartenance	FRANCE TELECOM
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Société d'appartenance	FRANCE TELECOM

La loi n°78-17 du 6 janvier 1978 relative à l'informatique aux fichiers et aux libertés s'applique aux réponses faites à ce formulaire.
Elle garantit un droit d'accès et de rectification pour les données vous concernant auprès de l'INPI.

Signé par
Signataire: FR, FRANCE TELECOM RD, Myriam PLAT
Emetteur du certificat: FR, INPI, INPI-EN-LIGNE 1.0
Fonction
(Demandeur)

VIII-4-1	**Déclaration : Qualité d'inventeur (seulement aux fins de la désignation des États-Unis d'Amérique)** Déclaration relative à la qualité d'inventeur (règles 4.17.iv) et 51bis.1.a)iv)) aux fins de la désignation des États-Unis d'Amérique :	Par la présente, je declare que je crois être le premier inventeur original et unique (si un seul inventeur est mentionné ci-dessous) ou l'un des premiers coïnventeurs (si plusieurs inventeurs sont mentionnés ci-dessous) de l'objet revendiqué pour lequel un brevet est demandé. La présente déclaration a trait à la demande internationale PCT/FR2008/050324 (si la déclaration est remise en vertu de la règle 26ter) Par la présente, je déclare que mon domicile, mon adresse postale et ma nationalité sont tels qu'indiqués près de mon nom. Par la présente, je déclare avoir passé en revue et comprendre le contenu de la demande internationale à laquelle il est fait référence ci-dessus, y compris les revendications de ladite demande. J'ai indiqué dans la requête de ladite demande, conformément à la règle 4.10 du PCT, toute revendication de priorité d'une demande étrangère et j'ai identifié ci-dessous, sous l'intitulé "Demandes antérieures", au moyen du numéro de demande, du pays ou du membre de l'Organisation mondiale du commerce, du jour, du mois et de l'année du dépôt, toute demande de brevet ou de certificat d'auteur d'invention déposée dans un pays autre que les États-Unis d'Amérique, y compris toute demande internationale selon le PCT désignant au moins un pays autre que les États-Unis d'Amérique, dont la date de dépôt est antérieure à celle de la demande étrangère dont la priorité est revendiquée.
VIII-4-1-1	Demandes antérieures :	

		Par la présente, je reconnais l'obligation qui m'est faite de divulguer les renseignements dont j'ai connaissance et qui sont pertinents quant à la brevetabilité de l'invention, tels qu'ils sont définis dans le Titre 37, § 1.56, du Code fédéral des réglementations, y compris, en ce qui concerne les demandes de continuation-in-part les renseignements pertinents qui sont devenus accessibles entre la date de dépôt de la demande antérieure et la date du dépôt international de la demande de continuation-in-part. Je déclare par la présente que toute déclaration ci-incluse est, à ma connaissance, véridique et que toute déclaration formulée à partir de renseignements ou de suppositions est tenue pour véridique; et de plus, que toutes ces déclarations ont été formulées en sachant que toute fausse déclaration volontaire ou son équivalent est passible d'une amende ou d'une incarcération, ou des deux, en vertu de la Section 1001 du Titre 18 du Code des États-Unis, et que de telles déclarations volontairement fausses risquent de compromettre la validité de la demande de brevet ou du brevet délivré à partir de celle-ci.
VIII-4-1-1-1	Nom (NOM DE FAMILLE, prénom) :	JOUNAY, Frédéric
VIII-4-1-1-2	Domicile : (ville et État (des États-Unis d'Amérique), le cas échéant, ou pays)	PLEUMEUR BODOU, France
VIII-4-1-1-3	Adresse postale :	19 Le Dossen 22560 PLEUMEUR BODOU France
VIII-4-1-1-4	Nationalité :	FR
VIII-4-1-1-5	Signature de l'inventeur : (La signature doit être celle de l'inventeur, il ne peut s'agir de celle du mandataire)	
VIII-4-1-1-6	Date :	28/02/2008

VIII-4-1-2-1	Nom (NOM DE FAMILLE, prénom) :	NIGER, Philippe
VIII-4-1-2-2	Domicile : (ville et État (des États-Unis d'Amérique), le cas échéant, ou pays)	LANNION, France
VIII-4-1-2-3	Adresse postale :	47 Hent Ar Vouden Servel 22300 LANNION France
VIII-4-1-2-4	Nationalité :	FR
VIII-4-1-2-5	Signature de l'inventeur : (La signature doit être celle de l'inventeur, il ne peut s'agir de celle du mandataire)	
VIII-4-1-2-6	Date	29/02/2008
VIII-4-1-3-1	Nom (NOM DE FAMILLE, prénom) :	CAUVIN, Arnaud
VIII-4-1-3-2	Domicile : (ville et État (des États-Unis d'Amérique), le cas échéant, ou pays)	PARIS, France
VIII-4-1-3-3	Adresse postale :	15 avenue Parmentier 75011 PARIS France
VIII-4-1-3-4	Nationalité :	FR
VIII-4-1-3-5	Signature de l'inventeur : (La signature doit être celle de l'inventeur, il ne peut s'agir de celle du mandataire)	
VIII-4-1-3-6	Date	11/03/2008